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A CENTRE OF EXCELLENCE IN SCIENCE & TECHNOLOGY BY THE CATHOLIC ARCHDIOCESE OF TRICHUR
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3.3.2 Number of research papers per teachers in the Journals notified on UGC website during the last five years

INDEX SHEET

2018-2019

Sl. No.	Title of paper	Name of the author/s	Name of journal	Indexing	Page/ Journal No.
1	Study of on street & off street parking choice behavior	Jisha Akkara	International Journal of Advanced Research in Computer and Communication Engineering	Others	50
2	Two Lane Highway Consistency Based On Alignment Indices	Jisha Akkara	International Journal of Advanced Research in Computer and Communication Engineering	Others	51
3	Influence of Geometric Design Characteristics on Safety Under Heterogeneous Traffic Flow	Jisha Akkara	International Journal of Advanced Research in Computer and Communication Engineering	Others	52
4	Fuzzy Logic Based Route Choice Behaviour Modelling	Jisha Akkara	International Research Journal of Engineering and Technology (IRJET)	Others	53
5	Performance Evaluation of Kerala State Road Transport Corporation	Jisha Akkara	International Journal of Engineering Research and Technology (IJERT)	Others	54
6	Road traffic induced noise pollution modelling and fuel emission analysis at rail-road crossings	Jisha Akkara	International Journal of Scientific and Engineering Research	Others	55
7	Vehicle choice behaviour on "on street" parking	Jisha Akkara	International Journal of Scientific and Engineering Research	Others	56

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8	Modeling of Intercity Mode Choice Behaviour of Passengers	Jisha Akkara	International Journal of Scientific and Engineering Research	Others	57
9	Development of Accident Prediction Model on Horizontal Curves	Jisha Akkara	International Research Journal of Engineering and Technology (IRJET)	Others	58
10	Crash Characteristic Analysis and Blackspot Identification using QGIS	Archana S	International Journal of Advanced Research in Computer and Communication Engineering	Others	59
11	Estimation Of Pedestrian Level Of Service Model At Signalised Intersections	Archana S	International Journal of Advanced Research in Computer and Communication Engineering	Others	60
12	Analysis and Development of Traffic Speed-Flow-Density Relationships for Urban Roadway	Archana S	International Journal of Engineering and Advanced Technology (IJEAT)	Others	61
13	STUDY ON PEDESTRIAN CROSSING BEHAVIOUR AT INTERSECTIONS	Archana S	International Research Journal of Engineering and Technology (IRJET)	Others	62
14	GIS based Road Safety Audit of State Highways in Thrissur	Archana S	International Research Journal of Engineering and Technology (IRJET)	Others	63
15	ANALYSIS OF PASSENGER FLOW PARAMETERS OF RAIL TRANSPORTATION IN KERALA	Archana S	International Research Journal of Engineering and Technology (IRJET)	Others	64
16	Pedestrian Safety Analysis at School Zones	Archana S	International Research Journal of Engineering and Technology (IRJET)	Others	65
17	A Study to Determine Pedestrian Walkability Index in Mixed Traffic Condition	Archana S	International Research Journal of Engineering and Technology (IRJET)	Others	66
18	Crash Prediction Modeling of Two Lane Undivided Highways Using Artificial Neural Network	Archana S	International Journal of Scientific & Engineering Research	Others	67

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19	Performance Analysis and Modeling of Entry Capacity of Roundabout Under Heterogeneous Traffic	Vincy Verghese	International Journal of Advanced Research in Computer and Communication Engineering	Others	68
20	Urban Resident's Awareness and Readiness for Sustainable Transportation a Case Study	Vincy Verghese	International Journal of Advanced Research in Computer and Communication Engineering	Others	69
21	Passing Opportunity Model of Vehicles on Two Lane Undivided Highways under Mixed Traffic Conditions	Vincy Verghese	International Research Journal of Engineering and Technology (IRJET)	Others	70
22	Mode choice Behaviour Analysis of Students in Thrissur city	Vincy Verghese	International Research Journal of Engineering and Technology (IRJET)	Others	71
23	Feasibility Study of Provision for Exclusive Bus Lanes on Urban Roads	Vincy Verghese	International Journal of Engineering and Advanced Technology (IJEAT)	Scopus	72
24	Environmental Impact Assessment of Thrissur-Vadanapally Road Project	Vincy Verghese	International Journal of Engineering and Advanced Technology (IJEAT)	Scopus	73
25	Traffic Flow Modeling and Capacity Estimation for Heterogeneous Traffic on Four Lane Divided Carriageway	Archana S	International Journal of Scientific & Engineering Research	Others	74
26	Bus Route Optimization and Scheduling In Hyderabad City Using Arc-Gis in Association with Lumiplan Pvt. Ltd.	Vincy Verghese	International Journal of New Technology and Research (IJNTR)	Others	75
27	Use of Data Mining Technique for Systematic Road Safety Audit of Non-urban Highways	Dr.Anitha Jacob	International Journal of Engineering and Advanced Technology (IJEAT)	Scopus	76
28	Activity Based Transportation Modeling for Chelakottukara ward of Thrissur District	Dr.Anitha Jacob	International Journal of Engineering and Advanced Technology (IJEAT)	Scopus	77
29	Subgrade Soil Stabilization Using Chicken Feather Fiber	Dr. Agnes Anto C	International Journal of New Technology and Research (IJNTR)	Others	78

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30	Review of Software to Analyse the Physi- cal Conditions of the Athletes using sEMG	Aneesh Chandran	International Journal of Trend in Scientific Research and Development (IJTSRD)	Others	79
31	Medical image enhancement by a bilateral filter using optimization techniques, Journal of Medical Systems-Springer	Anoop V	Journal of Medical Systems	Web of Science	80
32	Solution for Unintentional Events o f Vehicle Security	Ponmani Raja M	Transactions on Innovations in Science and Technology	Others	81
33	"Investigation of RF and DC Performance of E-Mode In0.80Ga0.20As /InAs /In0.80Ga0.20As Channel Based DG-HEMTs for Future Submillimetre wave and THz Applications	Prajoon P	IETE Journal of Research	Web of Science	82
34	Visible Light Communication Using Sensors	Jinesh KJ	International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering	Others	83
35	Converging Blockchain and Internet of Things	David Nettikadan	International Journal of Innovative Technology and Exploring Engineering (IJITEE)	Others	84
36	Smart Community Monitoring System using Thingspeak IoT Plaform	David Nettikadan	International Journal of Applied Engineering Research	Others	85
37	A Study on Millimeter-Wave Vehicular Communication	Ponmani Raja M	International Journal of Innovative Research in Science, Engineering and Technology	Others	86
38	Numerical analysis of circularly polarized modes in coreless photonic crystal fiber	Jarin T	Elsevier-Results in Physics	Web of Science	87
39	Exploring magnetic fluid sensor using dual circular core elliptical cladding photonic crystal fiber	Jarin T	Elsevier-Results in Physics	Web of Science	88

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40	Evaluation of various benchmark processes with appropriate controller design in LabVIEW platform	Jarin T	Journal of Instrumentation	Web of Science	89
41	Designing and modelling of a low cost wireless telemetry system for deep brain stimulation studies	Jarin T	Indian Journal of Science and Technology	Google Scholar	90
42	Evaluation strategies for wireless ultra wideband communication towards orthopedic surgical scheme	Jarin T	Journal of Medical Imaging and Health Informatics.	Web of Science	91
43	A Prototype design of RFID centered Hi-Tech Toll Assortment Plaza	Jarin T	Mediterranean Journal of Basic and Applied Sciences	Google scholar	92
44	Corrosion of reinforcement in concrete with fly ash and manufactured sand	Jarin T	Material Research Innovations	scopus	93
45	Experimental study of refrigeration cycle using diffuser pipe and application of nano particles	Anto Zacharias	Transactions on Innovations in Science & Technology	Others	94
46	Energy and exergy analysis, drying kinetics, modelling and quality parameters of microwave - dried turmeric slices.	B. Deepanraj	Journal of Thermal Analysis and Calorimetry	Web of Science	95
47	Experimental Investigation on Performance, Combustion and Emission Analysis of a Direct Injection Diesel Engine fuelled with Rapeseed Oil Biodiesel	B. Deepanraj	Fuel	Web of Science	96
48	Experiment on Carbon dioxide removal from flue gas	Sukesh O.P, ArunRaj A	Materials Today Proceedings	Scopus	97
49	A review on analysis of HHO gas in IC engines	Arun Raj A,	Materials Today Proceedings	Scopus	98
50	Design and Development of a Gear based Conveyor System	Anto Zacharias	International Journal for Scientific Research & Development	Others	99
51	Voltage controlled DC-DC converter for enhancing waste heat recovery.	Della David	International journal of research in advent technology	Others	100

3

Study of "On-Street" and "Off-Street" Parking Choice Behaviour

Herin K.J[1], Jisha Akkara[2]

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Abstract: Growth of population and motor vehicle coupled with economic ideas are resulting in high increase in transport demand. India has influenced a tremendous increase in the overall number of registered motor vehicles. However because of the enhancement in development worldwide it is estimated that nearly 30% of urban congestion is developed by drivers looking for parking. Unreliable situations that enhance such congestion include checking for on street parking facility, requirements and cost-comparison shopping between parking alternatives, which are all combinated by the need to reinimize walking distance or make timely appointments or connections. The technology is developed to receive it does not appear to have enhanced at the same level as still ticket system is being followed. All the popular cities of India the problem of parking is one of them. The vehicle to population ratio is higher than one. The data's collected under the study from various sub-areas of CBA has estimated to get the globed view of parking behaviour in CBA and advance parking technologies and parking supply and management techniques such as park and wide facilities. Observations included 500 interviews with individuals who chose between on-street and off-street parking. The characteristics of individuals choosing both facilities were presented. The resulting observations were used to estimate various log it models with different utility functions. Dynamic pricing or segment of customer and consumer / provider constrains has been taken in consideration to tackle the problem have been suggested. Then a correlation matrix was formed from the database using the software SPSS. These predicted models help a designer to make suitable model for parking choice behaviour.

Keywords: Parking choice behaviour, License plate method, Binary logit model, Questionnaire survey.

I.   INTRODUCTION

THE 30% of urban congestion is created by drivers looking for parking. Parking is one of the major problems that are created by the increased demand for parking space especially in central business area. This affects the mode choice also. This has great economical impact.

A.   Background

Fig.1 Study stretch

Dr. SUNNY JOSEPH KALAYATHAN
M.Tech, MCA, M.Sc, M.Phil, B.Ed
Ph.D (Computer Science), Ph.D (Mat!
PRINCIPAL

Two Lane Highway Consistency Based on Alignment Indices

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Abstract: Road fatalities are common and regular problem nowadays. These complex events associated with a variety of factors, like highway geometry, weather conditions, speed limits driver behavior, and human factors. Various highway geometric design consistency measures are alignment indices, driver workload, operating speed and vehicle stability. The safety assessment of highways has an important role in transportation engineering as the increased rate of accidents can be avoided by the consistent design of highway alignment .This paper is focusing on the influence of alignment indices in the accidents rate. This work put forward a methodology for evaluating two-lane rural highway consistency and safety through alignment index. The influence of this alignment index on accidents is quantified through mathematical models and certain criteria were developed to evaluate the level of safety. The results of this work may greatly influence the implementation of road safety measures and thereby safety on highways.

Keywords: Operating speed, Vehicle stability, Driver Workload, Alignment Indices

I.   INTRODUCTION

Road fatalities are complex events occur on the road without any prior intensions and are associated with variety of factors like highway geometry, weather conditions, speed limits and human factors. As the number of accidents increasing day by day the design consistency evaluation is becoming more significant. Geometric design consistency is an important component in highway design and an important tool in evaluating road safety. Mainly design consistency depends on four factors. They are vehicle stability, operating speed, and driver work load and alignment indices. Alignment indices based consistency measurement method is a convenient method for evaluating the consistency of highways. This paper mainly concentrates in highway geometry and its effect on safety. Horizontal alignment in road design consists of straight sections of road, known as tangents, connected by circular horizontal curves. Circular curves are defined by radius and deflection angle.

II.   BACKGROUND

The goal of transportation is generally stated as the safe and efficient movement of people and goods. To achieve this goal, designers use many tools and techniques. One technique used to improve safety on roadways is to examine the consistency of the design. Increased knowledge and experience have proved that a consistent highway design, which ensures soundly tuned successive elements, can produce harmonious, homogeneous driver performance and does not provoke unexpected events. In contrast, inconsistent roadway design can produce unexpected changes in dynamic and speed conditions, which may impose high workloads that can surprise the driver and lead to speed or path errors. These inconsistencies, which should be controlled by the engineer, can result in critical driving manoeuvres for motorists, which may increase the probability of an accident. It is now widely recognized that highway consistency analysis can evaluate the performance of the road in terms of safety by correlating it with accident risk. Various approaches based on geometric relation design, operating speed differential, driving performance, and human workload evaluation have been used to evaluate the design consistency of a road alignment. Among them, naturalistic driving data obtained by using instrumented vehicles is a promising technique that can provide information directly related to the driving task and performance.

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Influence of Geometric Design Characteristic on Safety Under Heterogeneous Traffic Flow

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Assistant Professor, Civil Department, Jyothi Engineering College, Thrissur, India[2]

Abstract: Road fatalities are complex events involving a variety of factors, including highway geometry, driver behavior, weather conditions, speed limits and human factors. As the number of accidents increasing day by day the design consistency evaluation is becoming more significant. Geometric design consistency is an important component in highway design and an important tool in evaluating road safety. Mainly design consistency depends on four factors. They are vehicle stability, operating speed, and driver work load and alignment indices. Operating speed method is the more common method for evaluating the consistency of highways. The operating speed of a highway is the speed at which motor vehicles generally operate on that highway. The geometric characteristics of plain terrain, two lane rural state highway road of Kerala, has been assessed to understand the effect on the operating speed of vehicles. Vehicles considered in the model is 2 wheeler, 3 wheeler, light motor vehicle, LCV & MCV. The effects of design elements such as horizontal and vertical curves, lane width, shoulder width, super elevation, median width, curve radius, sight distance, etc. on safety will be taken. Research related to geometric characteristics showed that few variables have significant effect on the safety of roadways. The relationship between operating speed and road geometric design is examined through results of studies made in different localities. Statistical modelling approaches by SPSS software is used for model development.

Keywords: Geometric elements, Operating speed, Design consistency, SPSS software

I. INTRODUCTION

As per the World Road Statistics (2008) report of International Road Federation, India is one of the major contributor to road crash fatalities. About two-third of the fatalities that takes place in India is on National Highways and State Highways, in rural areas. Vehicles in rural highways are less interrupted by other vehicles and drivers are able to move at their desired speed, permitted by the geometry of road. Studies showed that more than 50% of fatal crashes in rural highways take place at curves. This happens when a driver encounters with an unexpected change in alignment along a highway. Many studies underlined the relationship between crashes and curve geometry. Hence, a good design of highway geometry necessitates proper coordination of straight and curved sections, so that drivers will not be surprised by a change in the alignment. In other words, any improper design of geometry leads to unnecessary speed changes. If this variability in speed demanded by the geometry is beyond safe limits, the driver may take on an inappropriate manoeuvre. As speed on highways is comparatively high, any erroneous driving manoeuvre may result in crashes of high severity. Such a road design is generally considered to be inconsistent. Evaluating the consistency of geometric design is one of the promising strategies for improving the rural highway safety as sections that lack design consistency experience high collision occurrences. The available methods for evaluating consistency are speed based, vehicle stability based, alignment indices based and driver workload based. Among the available methods, operating speed based approach can be considered as the most efficient and widely used. This is because speed is a visible indicator of consistency. Also, operating speed and speed variations can be easily observed and measured.

This paper focuses specifically on highway geometry, its effect on the speed of vehicles and its effect on safety. The operating speed of a highway is the speed at which motor vehicles generally operate on that highway. AASTHO defines the operating speed as "the highest overall speed at which a driver can travel on a given highway under favourable weather conditions and under prevailing traffic conditions without at any time exceeding the same speed as determined by the design speed on a section-by-section basis."The 85th percentile of a sample of observed speeds is the general statistic used to describe operating speeds on a geometric feature. Thus, operating speed, usually termed V85, is defined as the 85-th percentile of the speed distribution under free flow conditions. It represents the speed scenario at a given section. Operating speeds on two-lane rural roads depend on many factors related to drivers, vehicles, roadway

Fuzzy Logic Based Route Choice Behaviour Modelling

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Abstract - *Travelling is one of the most important activities people engage in to serve various purposes of everyday life. Route choice modelling is essential in terms of transportation planning which requires predicting future traffic conditions on transportation networks and understanding travellers response and adaptation to sources of information. The main objectives of the study is to predict the route choices for the thrissur city and to determine the significant factors. These perceptions and preferences based on route characteristics are then tied to travellers personal attributes such as income, age, gender, and other socio-economic characteristics. Household survey is carried out in Thrissur city for collecting travellers information. Survey is carried out in the 52 corporation ward of Thrissur City. The collected data is analysed and the highest number of trip attraction (destination) and production (origin) zones are identified and the origins and destination is fixed. Fuzzy Logic concept is used to model the uncertain route choice behaviour. From the Fuzzy Inference System, the result obtained are for Punkunnam the mostly choosen routes are Thrissur Kuttipuram Road and Kodungallur Shornur Road, for Nedupuzha the mostly choosen routes are Kodungallur Shornur/SWaraj round and Kodungallur Shornur Road,for Mannuthy the mostly choosen routes are Thrissur Palakkad Road and Thrissur Mannamangalam Road, for Kuttumuck the mostly choosen route.In this study factors affecting route choice between alternate routes were identified using Surface Plots.They are Travel Cost, Distance, travel time between Origin and Destination and Type of Employment.*

Key Words: **Predicting; Socio-economic;Fuzzy Logic; Fuzzy Inference System**

1.INTRODUCTION

The process of allocating given set of trip interchanges to the specifed transportation system is usually referred to as traffic assignment. The fundamental aim of the traffic assignment process is to reproduce on the transportation system, the pattern of vehicular movements which would be observed when the travel demand represented by the trip matrix, or matrices, to be assigned is satisfied. The traffic assignment or route assignment problem is one of the critical steps in travel demand forecasting process. It is used to forecast traffic flow of links in a network, given the traffic volumes between the origin destination nodes and the characteristics of the links.

The study of travel behaviour is a broad topic that provides insights into the choices that individuals and households make about their travel needs. Within this broadarea lie various sub-categories like study of mode choice, destination choice, route choice, and so forth. The interplay of these different choice dimensions is what makes the analysis of travel behaviour so complex and yet interesting. Over the years, travel behaviour researchers have worked towards the development of increasingly sophisticated quantitative models, often used in conjunction with qualitative approaches, which could offer us powerful tools for helping us to understand those complexities. Although, understanding route choice behaviour is only a dimension to overall travel behaviour analysis, it does provide very useful insights into travellers decision making process which can eventually be tied back to broad travel behavior assessment. Route choice prediction is also essential in terms of transportation planning which requires predicting future traffic conditions on transportation networks and understanding travellers response and adaptation to sources of information.

It involves evaluating travellers perception of route characteristics that include travel time, cost, distance, safety, reliability and so. These perceptions and preferences based on route characteristics are then tied to travellers personal attributes such as income, age, gender, and other socio-economic characteristics. Route choice prediction or development depends on human behaviour, travellers imperfect knowledge about the transportation network composition, and the uncertainty and heterogeneity associated with travellers perceptions about route characteristics.

Travellers decision to take particular routes depends on the utilities associated with these routes. In Thrissur City , the nature of transportation system as well as availability of mode, comfort of the mode, road surface conditions etc. are different. No study has been done by using Fuzzy Logic to address this issue of how people choose their route in Thrissur, more precisely in Thrissur city. In this thesis efforts will be given to predict the route choices using Fuzzy Logic for one origin and one destination point in the context of Thrissur City.

2. LITERATURE REVIEW

Carlo Giocomo[1] Trip generation is the first step in the conventional four-step transportation forecasting process (followed by trip distribution, mode choice, and route assignment),widely used for forecasting travel demands. It

Performance Evaluation of Kerala State Road Transport Corporation

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Abstract—**Kerala State Road Transport Corporation (KSRTC) is the oldest state run public bus transport services in India. It plays a crucial role in strengthening the public transport system in Kerala. But today the corporation is facing a big crisis. The main objectives of this study are to evaluate the operational and financial performance of KSRTC and to compare the performance of various depots in KSRTC. This study uses both primary and secondary data. It includes interviews with the employees and visiting major depots and KSRTC offices to collect the required data. Different parameters for data analysis are operational parameters and financial parameters which includes, fleet, collection and passengers etc. The analysis of 28 main bus depots of Kerala State Road Transport Corporations are done by using Data Envelopment Analysis (DEA) in the software DEAP 2.1. The analysis shows that Trivandrum City and Trivandrum Central depots have maximum degree of efficiency in every year with an average efficiency score of 1. Ernakulam is the most inefficient depot with average efficiency score of 0.741. It is found out from the Technical Efficiency analysis that on an average 11.5 percent of the technical potential of the depot is not in use. This study has discussed how DEA can be applied to evaluate the degree of efficiency of the depots. Thus, these results give an indication on the degree of efficiency of depots in the process of transforming inputs into output. Target values are also discussed in this project. Target values are the values of input and output which would result in an inefficient organization to become efficient.**

Keywords—KSRTC; Technical efficiency; Data Envelopment Analysis; Decision Making Units;

I. INTRODUCTION

Transportation is the most important part of human life. It allows people to travel from one place to another. To make people feel convenient and comfortable with their position, different modes of the transportation system are found and it is evolved from the earliest stage to the present stage of the transportation system. At present, with the upgraded technology different modes of transportation systems are developed. The primary mode of transport for most of the Indian citizens are public transport. The availability of a safe and comfortable passenger transport facility is an important index of the economic development of any Country. Public transport provides vital connectivity to different areas of society.

Kerala State Road Transport Corporation (KSRTC) was developed in 1961. KSRTC is a state-owned public transport corporation in the Indian State of Kerala. This organization divided into three different zones for its proper working namely North Zone, Central Zone, and South Zone, with headquarters at Thiruvananthapuram. The corporation has 6241 buses which include Scania, Volvo, Ashok Leyland, Tata Motors, Eicher Motors, and minibuses.

Kerala State Road Transport Corporation(KSRTC) It is one of the oldest state-run public bus transport services in India. It has an important role in the public transport system strengthening in Kerala. But today the corporation is facing a huge crisis in its operation. Management problems, increase in fuel price, etc. can be called as reasons for this crisis. This project aims to study the performance of Kerala Road Transport Corporation by collecting operational and financial parameters from all the depots in Kerala. So the main objectives of this project are

1. To evaluate the operational and financial performance of KSRTC
2. To compare the performance of various depots in KSRTC

In India, it is not a good experience to travel through public transport, and for good reason. Most of the vehicles run by its state road transport undertakings (SRTUs) is old, and there is a shortage of funds to replace them. The government report shows that most of the SRTUs are not profitable. So it is important to understand various problems associated with working of KSRTC which makes the corporation inefficient, to improve the efficiency of depots.

II. LITERATURE REVIEW

This section provides an overview of previous research on Road Transport Corporation with a specific focus on efficiency improvement, management strategies and related issues of the corporation. It shows the details and methods used for the case study that contains the main focus of the research explained in this thesis.

Bangalore is the largest city in the state of Karnataka and is considered to be the Information Technology capital of India. In order to fulfill the different needs of the growing city population BMTC had introduced different services to serve the different segments of public transportation users. The performance evaluation of Bangalore Metropolitan Transport Corporation specifically aiming at premium bus services of BMTC operating in Bangalore city is conducted by Devaraj Hanumappa et al. (2016). The performance measurement of premium bus services is done using two different approaches. Ratios were computed considering different operational and financial indicators and these ratios are benchmarked by considering the best performing units as the target to compare the bus depots performance. Further, they studied the performance of bus depots using data envelopment analysis (DEA). The main conclusion in our study is that even though the cost of operation in terms of fuel, type maintenance, etc., has increased in these days the efficiency of KSRTC as a whole

Road Traffic Induced Noise Pollution Modelling and Fuel Emission Analysis at Rail-Road Crossings

Chandni Divakaran P, Jisha Akkara

Abstract— The railway crossings force both road traffic and trains to reduce their speed, increasing travel time, congestion and decreasing overall efficiency of the rail network. The main problems affected by such intersections are delay, poisonous gas emissions and the noise pollution from road traffic. The aim of this study is to find the delay and environmental impact of the major level crossings of Thrissur city. During the passage of train along the level crossings, the gates will be closed. This may lead to long time delay to the road traffic. Almost all the vehicles do not turn off their engines for the entire block time which will cause increased emissions of pollutants. Also, the poisonous gas emission will be very high due to slower speed and stop & go situation of vehicles. Emissions not only affect the passengers and riders, but also have severe effect on people living close to level crossing junctions. Along with air pollution there is a large amount of noise produced both from train and the road traffic. Also there will be a large amount of fuel consumption which will further cause extra fuel cost. The sound pollution were measured using Sound level meter. These air and noise pollution will be a great concern in terms of environmental pollution. So it is important to model for road traffic induced noise pollution at rail-road crossings. Also the delay analysis at these level crossings need to be done. According to results obtained, suitable solutions have been proposed to reduce delay and pollution at the level crossings.

Index Terms— Block Time, Delay, Emission, Gate closing, Noise Pollution, Railway Crossing, Road Traffic.

——————————— ◆ ———————————

1 INTRODUCTION

The road traffic population is increasing over the years making travel very difficult in terms of driving comfort, travel time, tiredness and pollution. When a road and railway line meets a rail-road intersection or commonly called Level Crossing appears. At these intersections long delay may occur to the road traffic. The main reason for the traffic delay is due to the closing of gates at the level crossing for the passage of train. The delay occur not only due to train occurrences but also it varies based on the road condition, track condition, width of road, presence of shoulders and land use pattern. The road vehicles will experience a great loss of time and fuel due to congestion, delay and accidents. It will also cause loss of money due to fuel loss. Level crossings are responsible for economic losses, emission of harmful gases, and increase in accident risks for roadway traffic. Delay time is such that the cost incurred on travel time loss is greater as it includes travel time cost. The delay presents direct cost of fuel consumption and indirect cost of time lost to motorists.

Noise pollution is also a great problem of these intersections. The noise may be due to both the road traffic and train traffic. But the main noise generate from the road traffic after the gate opening. The vehicles will raise their engines to its maximum to indicate their urgency to pass the intersection. The major factors influencing the generation of noise due to railways are Frequency of Trains, Speed of Trains, Nature of Railway Track, Intensity of Horn and many more Noise pollution has become major concern for communities living near the rail-road crossings. Considering the sudden increase in the number of trains and road traffic there is rapid growth and illness effect due to noise pollution. So it is important to model for noise pollution at rail-road crossing for the road traffic.

The economic loss is mainly concerned about the extra fuel cost. When vehicles are waiting for a 'GO' signal, the drivers normally keep the engines of their vehicles "ON" and these result in extra fuel consumption. Though the amount of consumption by one vehicle is not mentionable as less fuel is required at lower speed but, aggregation of fuel consumption by all the waited vehicle cause the quantity become very high. The fuel consumption of vehicle is increasing day by day as a result of enhanced trip lengths, personal mode of transport and congested traffic condition. The extra fuel cost is derived from delay. When delay time increases, fuel consumption and fuel cost also increases.

The traffic waiting at the rail-road crossings during the gate closure cause emission of high amount of harmful gases which results in air pollution. These air pollution have many negative effects on environment as well as human beings. In this paper the emission rate of different gases from different vehicles were found out by collecting the traffic volume at rail-road crossing during the time of gate closure and it is multiplied with the emission factors.

2 OBJECTIVES

- To model for noise pollution created by road traffic at rail-road crossings
- Find the poisonous gas emission from the road traffic due to the idling at rail-road crossings
- To find the fuel consumption and extra fuel cost from the road traffic due to idling condition
- Suggest mitigation measures

VEHICLE CHOICE BEHAVIOUR ON "ON STREET" PARKING

Herin K.J and Jisha Akkara

Abstract -Population growth plays a vital role in the urban traffic systems. Due to the budding population on the streets, traffic congestion is an inevitable scenario. One of the main factor which leads to this traffic congestion is the improper parking system followed by vehicle obstruction, road capacity reduction, careless accidents due to parking, etc on the streets. Parking has become the critical problem for urban areas, because there are limited areas for parking vehicles. An understanding of parking behaviour is important for city planners to design parking facilities and draw parking policy. This paper describes the parking choice behaviour of vehicles on "on street" parking system. The data were collected from Thrissur town area in 2018. The observations included 250 interviews with individuals who choose bike or car on street parking. The characteristics of individuals choosing the vehicles were presented. The resulting observations were used to estimate binary logit model with various utility functions. The utility functions included some factors that influences the choice behaviour are distance, time, condition of parking space, road width, purpose, etc. The analysis was done by using SPSS software. The predicted model helps to designer to make suitable parking choice model.

Keywords - Binary logit model, parking choice model, licence plate method, parking volume.

1 INTRODUCTION

In urban areas, especially in town areas, there is strong competition for the use of space among the various urban activities like housing, economic activities, green space, traffic and parking. The main urban congestion is created by drivers looking for parking. Parking is one of the major problems that are created by the increased demand for parking space especially in central business area. This affects the mode choice also. This has great economical impact.

2 STUDY AREAS

As the vehicle ownership rapidly increasing, parking is becoming a serious problem in Thrissur. In this paper we conduct a survey of the parking lots around the Thrissur temple round of about 2 km. The study area consisted of Thrissur temple, Puthanpali, Zoo, Park, etc,This area is mainly for tourism, commercial purposes also there is resident and business..

Fig.1 study area

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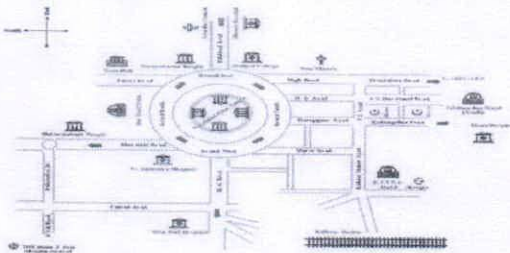
The study sections chosen mainly the five different locations in Thrissur, The main criteria were set in selecting these parking locations. It is the availability of both types of vehicles used in the areas. The second criterion is the variability in land uses and activities among the selected parking locations in order to study the effect of trip purposes on individual's choices. The selected parking locations are in the following areas:

1. Near SIB bank,control room junction
2. Near East police station
3. Chettiyangadi parking area
4. Pooram hotel (Near kuruppam road)
5. Marar road (opp.swedessi auto mobiles)

These locations where used for work, recreational and commercial trips, respectively.

3 OBJECTIVES

- Evaluation of present condition of parking system.
- Determine the parking choice behaviour model.

4 LIMITATIONS

The survey has been carried out only on the working days in the middle of the week. A detailed parking study spread over longer duration of time would have yielded more reliable results. Adequate with of road is less is the main problem of parking.

5 NEED FOR THE STUDY

Thrissur is considered to be an industrial and commercial center. Every car owner would wish to park their car as closely as possible to his destination so as to minimize his walking. High volume of traffic consisting of both fast and slow moving vehicles is plying through the road. Major traffic comes from commercial centers, shopping centers, bank, residential, government office.

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Modeling of Intercity Mode Choice Behaviour of Passengers

Jeena Johny A, Jisha Akkara

Abstract—Mode choice behavior study is crucial to explain travelers' mode preferences under different scenarios and for the infrastructure development for new modes. And which has as a crucial part in transport planning process. Different mode choice generation, modeling the mode choice behaviour of different mode alternatives and heterogeneity across travelers are non-trivial challenges in intercity mode choice studies. This paper tackles these challenges by focusing on the revealed preferences of public transport users in the Thrissur, Cochi and Calicut cities. For a transport modeling process, adequate data is required. The data were bagged using the questionnaire survey. This work compares the predictive performance of train and bus public transport systems for travel mode choice analysis for intercity travel and makes recommendations for model selection. In addition, the model addresses the importance of different variables and how they relate to different travel modes. The trip distance and purpose are found in affecting the mode choice passengers. Travel time and cost are the most important variables in the binary logistic model development; the importance of the other variables varies with classifiers and travel modes.

Index Terms—Binary logistic model,Intercity Travel, Mode choice behavior,Mode Preferences, Model, Public Transport, Transport Planning, Travel Demand.

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1 INTRODUCTION

CONGESTION in intercity corridors has been increasing steadily, which has raised serious impacts on regional economic development, environmental issues, national productivity and competitiveness (Bhat, 1995). To alleviate congestion, many major investment projects, such as high-speed and Maglev rail projects were proposed by different agencies. The quality of decisions of project selection is impacted by the accuracy of the travel demand prediction and the sensitivity of this demand to travel cost and enhancement of levels of service. Meanwhile, intercity passenger carriers welcome reliable forecasts of intercity demand so that they can be more responsive to their patronage and to remain competitive. Therefore, intercity travel behavior research is needed to estimate and evaluate expected policy impacts prior to implementation. Intercity travel behavior analysis can be used for demand forecasting, service pricing and improvement impact studies. Research is needed to understand the travelers' preferences and willingness to choose among many existing or potential alternatives, such as intercity bus, automobile, conventional rail, highspeed rail, Maglev, and any other convenient travel modes. The outcomes of the research can assist the policy makers in solving the issues of transit planning, with an efficient transit access mode network. Large numbers of people are travelling from Thrissur to Ernakulam and Kozhikode for the work, educational, recreational and also for some other purposes. Since the transportation needs are increasing day by day it is necessary to find the feasibility of public transit vehicles. Increased use of private vehicles creates problems like environmental impacts, traffic congestion, accident rates etc. This situation becomes harsher when the distance of travel is more. Various needs and objectives of the study are:

- To test the feasibility of developing disaggregate passenger mode choice models in a multi-modal environment of the study area, for different cities and trip purpose.
- To determine the influence of various modal parameters, in order to identify their relative influence on the travel behaviour
- To forecast the mode choice behaviour of passengers of the three cities for different trip lengths and trip purposes.

The outcomes of the research can assist the policy makers in solving the strategic issues of transit planning, including the future development of a busway corridor, implementation of high speed rail system or any other efficient systems with an efficient transit access mode network. The research findings can also be utilised in evaluating the feasibility of developing metros and bus rapid transit systems between the Thrissur, Ernakulam and Calicut cities.

2 LITERATURE REVIEW

2.1 History of Intercity Travel Demand Model

As early as 1961, Lansing et al. applied simple gravity models for New York and Chicago. The initial gravity model described the relationship between the total traffic between each of these two cities and the demographic and socioeconomic characteristics of the city pairs. In this model, only population, per capita income, and distance were included as independent variables. In 1969, Quandt and Young improved the initial model. Later, it was employed in the Northeast Corridor Project to forecast the ridership on potential and existing modes of intercity travel along the Washington DC - New York - Boston corridor (U.S. DOT, 1970).

2.2 Heteroscedastic Extreme Value Model

Chandra R. Bhat (1995) developed a Heteroscedastic

Development of Accident Prediction Model on Horizontal Curves

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Abstract-Nowadays accidents on horizontal curves are increasing day by day. The speed reduction affect to the safety of the road. To reduce accidents, an accident prediction model has to be developed. Accident Prediction Model is made to take remedial measures in advance by studying future trends, to take mitigation measures to minimize the accident rates to certain extent and to take other safety measures. The main objectives are identify the factors influencing road crashes and to develop a accident prediction model using SPSS software

Key Words: Accident prediction model, Road stretch. Horizontal curves

1. INTRODUCTION

Every year five lakhs of people are injured and died by road accidents. In 2017 census 4.85 lakh peoples are affected by road accidents. From that 1.5 lakh people were died. Millions of people were seriously injured. Annual GDP loss to India due to road accident is 55,000 crore rupees. Childrens are killed every day. This due to lack of proper education. From a study 50% of deaths are between the age of 15 and 35. In Kerala scenario in 2017, 38.500 road accidents are occurred. Most of the victims of road accidents are two wheelers, pedestrian and vulnerable road users more than twenty million individuals are wounded and over one thousand are killed per annum globally owing to traffic crashes. Highly developing countries account up to eighty fifth of all the facilities.. Driver, vehicle and road conditions are the, major three components relative to the highways. The inconvenience in any part of these components will cause accidents. The vehicle components of road accidents depend to some extent on the design, but it is mainly related to the maintenance aspects. In India the motor vehicle population is growing at a faster the economic and population growth. According to the WHO road traffic injuries are the sixth leading cause of death in India worth a greater share of hospitalization, deaths, disabilities and socio economic losses in the young and the middle aged population. In Kerala road crashes have touched on all time high during the last six years with 39,029 crashes being registered in 2015. It is estimated that more than 50% of the total fatalities on rural highways can be attributed to the crashes that takes place on curved sections. Thus curved sections and the corresponding transition section represents the most critical locations while considering measures for improvement of highway safety. Therefore models have to be develop for predicting accidents or crashes.

2. LITERATURE REVIEW

Harshit Gupta and Dr. Siddhartha Rokade (2017) says the purpose of the study is to develop a model for prediction of crashes in urban medium size cities. In this paper Crash prediction model (CPM) is developed using multiple regression analysis. A model is a simplified representation of a real world process. It should be representative in the sense that it should contain the salient features of the phenomena under study. In general, one of the objectives in modeling is to have a simple model to explain a complex phenomenon. Praveen Vayalamkuzhi and Veeraragavan Amirthalingam (2016) says traffic safety is of prime concern worldwide. Highway geometry should be designed for vehicle safety and efficiency. Several researches have been carried out to identify the factors contributing to road crashes and for finding measures to reduce the crash rate. One of the critical gaps in the management of highway safety is the lack of a reliable method for estimating the safety of an existing roadway with, widely varying road geometrics and vehicle mix. The focus of this work is mainly to quantify the relationship between geometric design characteristics and level of safety of intercity highways under heterogeneous traffic conditions. Study was carried out in a four-lane divided rural highway in Tamil Nadu, India and a relationship was established using statistical modeling technique

3. STUDY OBJECTIVE
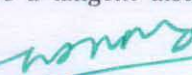
The main objective of the study is to evaluate the road geometrics that effect the road accidents and develop models to predict safety.

4. METHODOLOGY AND DATA COLLECTION

The data collection basically have 2 components, the geometric data and crash data. Firstly the study stretch was identified and the variables that are to be collected were identified. The stretch having only horizontal curves were taken and another criteria was that the curves in this selected stretch should have a tangent distance of 100m or more

4.1 Study Stretch

The three stretches were selected for the study in the state highway as shown below.

Crash Characteristic Analysis and Blackspot Identification using QGIS

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Abstract: Road accidents are becoming a major threat to the infrastructure development of a nation. Along with the development of a nation, road safety is an important parameter that needs a special concern. Road accidents were reported more in State highway and National highway, leads to tremendous economic loss approximately up to cores. The identification of accidents prone zones are necessary to provide appropriate safety improvement measures. GIS have a significant application in the transportation field. Blackspot identification helps to find out the reasons for accidents based on the spatial features of that area and preventive measures can be taken in order to reduce the accidents. As per National Transportation planning and research centre (NATPAC) State Highway 69 have reported lot of accidents. This project aims to find out the blackspot regions within Westfort junction -Kunnamkulam road (SH-69) using weighted severity index method (WSI) and locating the blackspots using QGIS.

Keywords: Blackspot, QGIS, Weighted Severity Index

I. INTRODUCTION

In Indian cities, the traffic is highly heterogeneous in nature, promotes a large accident rates. Analysis of traffic data indicated that drivers fault is responsible for majority of the accidents. The economic and social costs of traffic accidents are tremendous. Property damage, lost productivity, medical expenses, and inflated motor insurance rates imposed an estimated loss to the Indian economy. Therefore there is need to study and analysis the accident pattern and reasons along with the identification of black-spots. Accidents causing reasons can be classified as road related factors, vehicle related factors, road user factors and environmental related factors. As per National Transportation planning and research centre (NATPAC) state highway 69 have reported lot of accidents. It is necessary to find out the blackspots within the specified area and to suggest appropriate remedial measures. The selected stretch of road for the project is from Westfort - Kunnamkulam road (part of SH-69) should be evaluated on the basis of accident data and identification of blackspots using QGIS.

II. OVERVIEW OF THE LITERATURE

Mohammed [1] focuses the study of various types of accidents including causative factors in blackspot identification in Cyberabad area. The study involves collection of accident data from various police stations for the period of four years. On the other hand a GIS (Geographic Information System) technique used for development of accident blackspot map with same data. Based on the data collected, the data analysis, blackspot identification is done in attribute table is created to give information about various fields involved in blackspots. Maps are marked with GPS (Global Positioning System. G.Apparao [2] reviews the traffic accident information on NH-58 from Meerut to Muzaffarnagar in Uttarakhand State and also discussed the identification of high rate accident locations by using GIS Software and safety deficient areas on the highway. Hence implementation of remedial measures to those accidental locations (Blackspots) and provisions for traffic safety were suggested. To determine the accident prone locations in Muzzaffanagar district, accident data from police stations were collected, analysed and blackspot location done using GIS. The ground control points (GCP) are collected with the help of the GPS. K.S Sojib [3] studied on Bhanga-Mawa-Dhaka road named N8 connected the south western part of Bangladesh. Arc GIS is found to be suitable for the accident analysis The data were collected from corresponding police station and GCP is normally collected with the help of the Google Map, Hand held GPS at the road segment where the accident occur. Characteristics analysis is done on selected hazardous road locations in national highway. This will help to understand the crash scenario of those roads which will assist in implementation of safety measures of those locations. R Mizanur [4] focused on hazardous road locations on Dhaka-Aricha-Banglabandh national highway. They concluded that the implementation of GIS in crashes analysis to make an effective

Estimation of Pedestrian Level of Service at Signalised Intersections

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Abstract: Pedestrian Level of Service (PLOS) is a qualitative measure used to relate the quality of pedestrian service and it represents quality of given intersection in terms of perceived safety, convenience and comfort in terms of pedestrian perspective. Pedestrian delay was one of the key performance indicators for pedestrian level of service. The main objective of this study is to identify the various factors affecting PLOS at signalized intersections and to develop a PLOS model for signalized intersection crosswalk. Video graphic method was used for collection of field data. Questionnaire survey was conducted to know the perceived level of service of pedestrians. The correlation between PLOS and various factors affecting it were determined by using Pearson correlation in SPSS software. And by using the linear regression a model was created for determining the LOS at intersections. This study concludes that turning vehicles, number of pedestrians and pedestrian delay are the main factors affecting LOS of crosswalks at signalized intersection. The model helps intersection designers to decrease the delay while separating the conflicting vehicles to best accommodate pedestrians comfortably and safely.

Keywords: Pedestrian Level of Service, Pedestrian Delay, Signalized intersection, Crosswalk

I.   INTRODUCTION

In Indian urban and suburban areas pedestrians form the largest and most vulnerable road users. Pedestrians consist of any person walking, running or standing in the road. Pedestrian concerns are always neglected in transportation planning, construction and management even though pedestrian's safety is the most important category in the traffic system. The pedestrian related problems mainly arises at intersections since they are losing their space. The chances of accidents and conflicts are more at intersections since the vehicles and pedestrians are using the space at same time and due to the traffic violation behaviour of pedestrians. Level of service is one of the best known criteria to express the condition and performance of a road in terms of traveller's point of view. It gives an idea about the environmental qualities of a pedestrian space and serves as a guide for development of standards for pedestrian facilities. Pedestrian Level of Service (PLOS) is an overall measure of walking conditions on a route, path, or facility and it is influenced by a lot of factors. This paper helps to identify the pedestrian related problems at signalised intersections and to identify the various factors affecting PLOS. Also the correlation between the various factors and PLOS were found using Pearson Correlation analysis. With perceived LOS as dependent variable and significant factors obtained from correlation as independent variables, regression analysis was done to develop the model that fit for urban mixed traffic condition. Thus, the factors which is adversely affecting the safe pedestrian movement can be identified which helps in assessing the safety level of pedestrians crossing.

II.   OVERVIEW OF LITERATURE

E. M. Cepolin et al. (2017) conducted a study on PLOS: the impact of social groups on pedestrian flow characteristics. They studied on the behaviour of pedestrian groups. Pedestrian's behavior seems very different in the voluntary group. The study concluded that level of comfort of people is related to the area of space that people can use while they are walking and individuals walking independently exhibit similar speed variations as groups since they are not forced to move in a certain way, as slower or closer to each other to keep the consistency of the group, then this behavior does not depend on the presence of people clusters solely.

Vaibhav Vijayawargiya et al. (2017) researched to identify the factors affecting PLOS of crosswalks at roundabouts. They designated six level of services from A to F which indicates best operating condition to worst operating condition. Factors affecting PLOS of crosswalks at roundabouts were found out. They concluded that Roundabouts have

14

Analysis and Development of Traffic Speed-Flow-Density Relationships for Urban Roadway

Thasneem Nadirsha, Archana S

Abstract: India is a developing country containing heterogeneous traffic, which is characterized by wide variations in traffic characteristics. The new technologies offer the greatest challenge and hope for improving the quality of traffic system. The ability to apply traffic flow fundamentals is an essential ingredient in working toward improving the transportation system. The present study is concerned with macroscopic traffic flow characteristics observed on 4-lane divided carriageway [Thrissur-Kunnamkulam (SH-69)]. The intention of this paper was to analyse traffic flow, density, and speed for developing a model that provide the exact character of traffic flow. Traffic flow fundamental diagrams are used to characterize the relationship between these parameters. Study of traffic flow involves selection of location, videographic survey, analysis of video recordings, statistical analysis and calculation of basic parameters of traffic flow. Data extracted are compiled for each direction. Scatter diagrams were plotted by using the collected data. The relationship between parameters was developed based on regression analysis using statistical software SPSS 21. The speed-density function obtained was compared to macroscopic models such as Greenshield's model and Greenberg's model. By using speed-density model, flow-density and speed-flow relationships are predicted for the given highway. Further validation of the predicted model is done using graphical residual analysis. This succeeded to develop new models enabling theoretical determination traffic parameters for a given urban roadway.

Index Terms: Fundamental diagrams, Heterogeneous traffic, Macroscopic parameters, Scatter diagrams.

I. INTRODUCTION

Traffic flow represents the traffic load on the transportation system and the interaction between these loadings and the facility capacity determines the operational performance of the system. Hence it is extremely important to know the flow rates, their temporal, spatial and modal variations, and the composition of the traffic stream. Speed and travel time are the fundamental measurements of traffic performance of the existing highway system, and speed is a key variable in the redesign or design of new facilities.

Density is an important characteristic that can be used in assessing traffic performance from the point of view of users and system operators. The traffic stream models determine the fundamental relationships among macroscopic parameters for uninterrupted flow conditions.

The traffic stream characteristics include flow, speed, and density. The relationships are for free-flow and congested-flow conditions away from flow interruptions such as at intersections.

II. LITERATURE REVIEW

J Roux [1] tested the relevance of overseas models to South African conditions, a number of models have been investigated with data obtained from South African freeways. Models obtained from three separate freeway sections were compared to overseas models as well as models obtained from local studies. P. Balaji [2] in his paper vehicle class-wise speed volume model for three-lane undivided urban road found that multi-class speed flow equations are more relevant to these types of facilities rather than single class flow speed models. D. Ashish [3] developed speed density relations for different vehicle type on urban arterial roads under mix traffic conditions in Chandigarh, Jaipur and Delhi using a set of simultaneous equations and established speed prediction models. R.S. Dhapudkar [4] reviews the status of heterogeneous mixes worldwide, and what factors need to be considered in such mixes. He developed a macroscopic stochastic model of traffic movements at signalized intersection, to study macroscopic traffic parameters (flow, speed and density) and to establish new models for the Indian highway. XU Cheng [5] developed fundamental diagrams of traffic flow. 10 typical speed-density relation models are summarized and analyzed by parameter calibrations and fitting errors using Beijing Expressway data. Saurav B. [6] study among vehicular density measured from moving observer method in field and density predicted from theoretical speed-density models. Moving observer data were collected from nine test vehicle runs in a weekday. Vehicle counts with and against test vehicle, vehicle passing and over taking the test vehicles, journey time and travel distance were recorded. Parameters of traffic stream such as volume, speed and density were calculated from the collected data. Then Greenshield's model, Greenberg's model and Underwood's model were fitted in the graphical representation of speed-density relationship and corresponding parameters were determined using SPSS. Hashim and Wahidah [7] based on the functional relationships between flow, density and speed for the three major highways in Malaysia. The trans-logarithm function of density-speed model was compared to the classical models of Greenshield's, Greenberg's, Underwood and Drake et al.

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STUDY ON PEDESTRIAN CROSSING BEHAVIOUR AT INTERSECTIONS

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Abstract - *Among different modes in transportation walking is one of the sustainable mode in urban transportation especially in India, because of the flexibility and mobility involved in the walking mode. Pedestrians face many problems during the crossing of crosswalk at intersections. Study of pedestrian crossing behavior under mixed traffic conditions is required in order to provide necessary infrastructure. It also helps in achieving the pedestrian safety especially at intersections. This study focuses on analyzing the crossing behavior of pedestrians like crossing speed variation and pedestrian crossing compliance with signal under mixed traffic conditions at controlled and uncontrolled intersections. Influencing factors of pedestrian crossing behavior are identified based on statistical tests. Three controlled and uncontrolled intersections were identified in Thrissur district. Video graphic method was adopted for data collection. Observed pedestrian samples from these intersections were used for analyzing the crossing behavior of pedestrians. To identify the significant factors that affects the traffic signal compliance, Pearson's correlation coefficient test and ANOVA test is used. Influencing factors that affects pedestrian crossing speed were studied. This study helps in understanding the pedestrian crossing behavior at both controlled and uncontrolled intersections. The major findings of this study are age, gender and group characteristics are the significant factors affecting pedestrian crossing speed and also gender, crossing speed and age has a significant affect in pedestrian compliance behavior.*

Key Words: Pedestrian Compliance, Pedestrian Crossing Behaviour, Pedestrian Crossing Speed.

1. INTRODUCTION

A person who travels on foot is termed as pedestrian. Pedestrian can be any person walking, running, standing or sitting on a road, a pram or in a mobility device or persons in a toy vehicle and not capable of exceeding 10 km/h is known as pedestrian Walking is always recommended for a healthy life and it is also considered to be a clear example of sustainable mode of transport especially suitable for urban use and for shorter distances. Nowadays, pedestrian spaces are becoming increasingly rare due to the importance bestowed to vehicular modes of travel, in the planning and design of transportation systems,

pedestrians are not taken into account. At some point every person is a pedestrian. So, it is necessary to consider the various issues relevant to pedestrians such as pedestrian safety, convenience and amenities.

A crosswalk is a fundamental pedestrian facility in the urban roadway system which helps the pedestrians to safely cross the streets. This study identifies pedestrian characteristics such as pedestrian crossing speed and their compliance behavior towards traffic regulations at the respective study areas and evaluating the significant factors that affect pedestrian crossing speed in the crosswalks at intersections. A video survey is preferred for this study and detailed analyses is needed in order to study the changes of pedestrian characteristics. Length of the crosswalk and pedestrian speed are very important indicators to determine minimum pedestrian crossing timing.

1.1 Objectives

- To examine the effects of pedestrian characteristics on pedestrian crossing behavior
- To identify the significant factors that affect pedestrian crossing speed in crosswalks at both controlled and uncontrolled intersections
- To determine the most significant factors affecting pedestrian compliance behaviour

2. BACKGROUND

In order to carry out the study, more information regarding the pedestrians and their crossing behaviour were required. For this, different journals were referred and the information gathered was used for the successful execution of the study.

Marisamynathan. et al. [5] analyzed the crossing behavior of pedestrians like crossing speed, compliance with signal and pedestrian vehicular interaction under mixed traffic conditions and identified the influencing factors based on statistical tests. Factors influencing pedestrian crossing speed was studied and a design crossing speed was determined for old 0.95m/s and adult pedestrians 1.12m/s.

Jain,A,. et al. [4] This paper is focused on studying the crossing behavior of pedestrians at uncontrolled intersections in Roorkee. Various factors related to

GIS based Road Safety Audit of State Highways in Thrissur

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Abstract - *In India the number of road crashes is raising at frightening rate. There is one death in every four minutes due to road crashes in India. Hence it is necessary to improve the road safety by conducting a detailed Road Safety Audit (RSA) in order to identify road safety issues and to make necessary improvements. This will eventually delay any rehabilitation or repair process making the road conditions the worst and risky. This project work focus on conducting a detailed Road Safety Audit and qualitatively estimates potential road safety issues on two road stretches and also proposes a systematic approach to do the road safety audit on a highway and to do effective and efficient data mining, for deriving knowledge driven decisions in the ranking of highway sections based on their risk. The approach will help to perform safety evaluation of sections and to identify the crash potential locations. Further output of the work is the development of a mathematical model for classification of highway sections based on road safety audit.*

Key Words: Road Safety Audit, Factor analysis, Data mining, Road safety model, Geographic Information system

1. INTRODUCTION

A Road Safety Audit (RSA) is that the formal safety performance examination of existing or future road by a multidisciplinary team. It qualitatively estimates and reports on potential road issues of safety and identifies opportunities for enhancements in safety for all road users. Every year, more than one million people across the world become the victims of road traffic injuries. To combat the number of injuries and fatalities, road safety audits have become an increasingly popular approach to improve safety on roadways. Road safety audits are versatile because they can be used to evaluate existing roadways and also roadways in the planning and construction processes. Road safety audits measure a proactive means for transportation agencies to diagnose safety deficiencies before crashes and injuries occur. Public agencies with a desire to enhance the safety performance of roadways underneath their jurisdiction will be be excited concerning the concept of RSAs. Road safety audits will be employed in any section of project development from planning to construction. The RSA method is qualitative in nature thus there

are restricted quantitative studies of the advantages gained through road safety audit recommendations on existing roadways. In this study Road safety audit is conducted in the State Highways in Thrissur as a tool to assist and quantify the road characteristics with road crashes.

2. METHODOLOGY

Two study stretches were selected for conducting road safety auditing. It is the State Highway SH 74(17 KM) and SH 50 (15 KM). For conducting the road safety audit road sections are divided on the basis of geometry (500m each section).Crash spot is identified based on the accident details collected from the police stations. The study stretch is selected based on the past five year crash data. Based on the road safety manual, check list is prepared. While conducting the road safety audit the parameter considered are shown in Table 1

Table -1: Check List

Description	Observations
Roadway width (m)	
Type of terrain	
Shoulder width	
Shoulder condition	
Fit of horizontal and vertical curve	
Volume (Veh/3min)	
Pavement condition	
Road markings	
Sight distance problems	
Type of sign and condition	
Protection for pedestrians and bicycle	
Presence of road side hazard	
Post mounted delineators	

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ANALYSIS OF PASSENGER FLOW PARAMETERS OF RAIL TRANSPORTATION IN KERALA

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Abstract - *Travel by rail transit has become more favorable and has increased in popularity and reputation. One of the identified factors with respect to quality attributes of public transport and to attract as many commuters as possible is by the improvement of rail transit. The overall efficiency of transit operation depends on effective operation of various facilities like transit units, transfer stations and access infrastructure. Access infrastructure includes many facilities that's helps in getting access to railway station, among this the Entrance and Exit width provided by the railway stations is an important factor for the easy and convenient movement of passengers towards and outside the railway station, this is selected as the study area for this study. Fluctuations in passenger flow according to the arrival and departure schedule of train, especially during the peak hours affect the smooth flow of passengers. Present study is carried out in three A1 category railway stations namely, Trivandrum Central, Ernakulam Junction and Kozhikode which has the highest annual passenger income in Kerarla. In order to understand the effect of available width of entrance and exit on the passengers, passenger flow characteristics such as speed, density and flow is analyzed. Video graphic technique is used to collect the data and using this data fundamental relationship of passenger flow is studied. Flow model of speed-density is developed and correspondingly relationship between passenger flow parameters is studied.*

Key Words: **Railway Station, Passenger Flow Characteristics, Speed, Density, Pedestrian Flow**

1. INTRODUCTION

In recent years, the use of rail transit system as a dependable and convenient way of travel has gained increasing popularity in urban cities around the world. Rail transit services receive positive support due to its high capacity, comfort, safety, and reliability. One of the identified factors with respect to quality attributes of public transport and to attract as many commuters as possible is by the improvement of facilities provided by rail transit. In India, railway stations are classified based on the annual passenger income. Among all the categories A1 category railway stations has the highest annual passenger income and hence the passenger flow is greater compared to the other categories. Passengers face a lot of issues due to insufficient facilities provided by railways especially by railways having high passenger flow.

This study focuses on three A1 category railway stations in Kerala namely Trivandrum Central, Ernakulam Junction and Kozhikode. Passenger flow parameters such as speed, density, flow and space is studied for the entrance and exit area. Finally the relationship between speed – flow – density is developed and the space provided for the entry and exit movement is evaluated.

1.1 Objectives

- To analyze the passenger flow on entrance and exit of the A1 category railway stations in Kerala
- To develop fundamental relationships between density, speed and flow
- To develop speed – density model

2. BACKGROUND

In order to carry out the study, more information regarding the passenger flow parameters was required. For this, different journals were referred and the information gathered was used for the successful execution of the study.

Shaha.J et.al [ ] This study is targeted on pedestrian flow This study is targeted on pedestrian flow behavior at Vadodara terminal within the state of Gujarat, India. Four completely different stairways with different physical dimension connecting to the platform and FOB were thought of for the study. For various sizes of steps, flow speed- space and density plots show totally different trends however with general similar pattern. Result shows that pedestrian walk quicker throughout the afternoon or day time compared to evening and conjointly presence of the pedestrian with baggage has potential result on reduction within the average walking speed of pedestrian. For lower flow, large variation in speed; within the vary of 18-48 m/min is determined.

Olander et. al [ ] This study investigated the impact of elevator handiness. Stair and elevator choices were monitored by automatic counters every weekday during two phases. During a natural experiment days with four accessible elevators were compared with days once 3 elevators were accessible. Increasing building occupancy was related to exaggerated step use, while reduced passenger

Pedestrian Safety Analysis at School Zones

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Abstract - *Walking is one of the active transport modes with many public health benefits and precedes all other transportation modes. It helps with reducing greenhouse gas emissions, which is responsible for global warming, climate change, and poor air quality. Walking can also help relieve traffic related congestion problems. With a rise of motor vehicles, separation of pedestrian path from vehicle seemed to be inevitable in order to provide pedestrians safety. The goal of organising transportation is to ensure the safety of road users. Safety can be measured by comparing the accident rates. Road traffic accidents are sometimes associated with the pedestrians. Therefore, the research in the safety of educational spaces for children aims to analyse the potential dangers during pedestrian activities and to promote safety standards so as to create a safe and healthy outdoor environment for our children. The safety of vulnerable road users such as pedestrians is a critical issue. School zones are typically high pedestrian areas, particularly with children and young people walking in groups or individually without adult supervision. These groups of pedestrians might exhibit unpredictable behaviour and take more risks when walking or crossing the road. The relationship between the school infrastructure, the sidewalks and the pedestrian crossings determine the comfort and safety level of pedestrian in school zones. The safety evaluation of school zones will be done by assessing the condition of the pedestrian infrastructure and analyzing pedestrian behaviour. Also the percentage of pedestrian crashes that occurs at school zone will be calculated. A model related to pedestrian safety will be developed.*

Key Words: Pedestiran, Vulnerable road user, School zone, Safety, Pedestrian behaviour

1. INTRODUCTION

Walking is an important mode of transportation. The safety of vulnerable road users such as pedestrians is a critical issue. Understanding pedestrians road-crossing decisions is an important traffic safety issue, especially for those countries, where populations are rapidly aging. Safety of pedestrians becomes more questionable in uncontrolled midblock sections. The risk to pedestrians becomes high because of the least priority given by the vehicle drivers to yield for the pedestrians. As per the data of Ministry of Road Transport and Highways in India, there were pedestrians killed in 8.7% of total traffic accidents. Globally, pedestrians constitute 22% of all road deaths, and in some countries this proportion could be as

high as two third. Past studies analysed pedestrian movements in walkways, sidewalks, movements under unidirectional or bidirectional pedestrian flows or under mixed traffic conditions. In India, little attention has been devoted to study pedestrian behaviour and the risks involved, or model them for their use in integrated design of urban areas with consideration to walking as a mode of movement. In research studies on pedestrian safety, pedestrian behaviour is very often considered in terms of the degree to which pedestrians obey rules, that is, whether the pedestrian cross the road in accordance with road safety regulations or not. Among pedestrians students causes more unsafe behaviour and this will leads to crashes. Due to this a project based on pedestrian safety analysis at school zones is necessary to ensure safety of school students. School zones are typically high pedestrian areas, particularly with children and young people walking in groups or individually without adult supervision.

1.1 Objectives

i.   Before To evaluate the safety of pedestrian in school zone by comparing the pedestrian crossing behaviour and safety of LP, UP, HS and HSS
ii. To develop a model based on pedestrian safety index

1.2 Scope of the Work

Analyzing pedestrian crossing behaviour and safety at school zones and to provide valuable insights for improving pedestrian safety at school zones.

2. METHODOLOGY

Several researches were carried out on the basis of pedestrian safety analysis. Many researchers have verified that one of the parameters that most influence the pedestrian safety is pedestrian crossing behaviour. By referring different journals information required for the successful execution of the project was gathered. About eighteen journals were referred in order to get a general concept of our study. It mainly helps to know what all data that needs to collect to reach at the ultimate aim. It also helps to know about various analysis procedures that can be used. The general behaviour of students   were

A Study to Determine Pedestrian Walkability Index in Mixed Traffic Condition

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Abstract - *Walking is a significant mode of transport. A pedestrian can be defined as "Any person who is a foot or who is on a wheel chair, or by a means of conveyance propelled by human power other than a bicycle". Therefore the needs of the pedestrians, like the needs of motor vehicles, should be considered in the design of the urban environment and transportation facilities. The ability to walk (walkability) in Asian cities has gradually deteriorated due to the increase of motorized vehicles. The study mainly describes about the walkability index values of a particular midblock sections where the pedestrian problem is more and also determines the adequacy of footpath and its Level of Service (LOS) based on HCM 2000. The study stretch is selected in Thrissur city, because it shows a clear picture of intense traffic crisis. Improper and inadequate planning for pedestrians will lead to many negative consequences like unnecessary fatalities and injuries. By doing this it will generate awareness of Walkability as an important issues in developing cities, providing city officials with an incentive to address Walkability issues, helping city planners understand scope and extent of local pedestrian conditions relative to other places.*

Key Words: **Pedestrian, Walkability index, Midblock Section, Level of Service**

1.INTRODUCTION

Walkability is a measure of how safe an area is for walking. The ability to walk ("walkability") in Asian cities has gradually deteriorated due to the increase of motorized vehicles. A worldwide study of the World Health Organization analyzed the causes of accidents and relevant policies and suggests that: "Our roads are particularly unsafe for pedestrians, cyclists and motorcyclists who, without the protective shell of a car around them, are more vulnerable.

Most of the developing countries do not make pedestrian planning as a pre-requisite and there are a few incentives for them to do so. Helping city planners to understand the scope and extent of local pedestrian conditions, relative to other cities, would be a positive step in the right direction, as it would help them to identify specific counter measures and costs associated with improving pedestrian conditions.

2. LITERATURE REVIEW

Pragia Minhas [1] the Study Area is Lovely Professional University (LPU) and the paper includes an extensive study of important criteria such as the pedestrian facilities, safety, accessibility and aesthetic appearance. According to Ministry of Urban Development (MOUD) method, walk ability index is a function of availability of footpath and pedestrian facility rating. The walkability index is calculated based on the equation given by MOUD. Field Walkability survey will be carried out in each zones. The pedestrians will be asked to rate the factors of design on a scale of 10 point of each attribute 1 being the lowest and 10 being the highest in each of the selected areas. The average field walkability of LPU campus was found to be 51.34.

Parisar [2] on behalf of Clean Air Initiative (CAI) and was done using a toolkit provided by CAI which was adapted from the Global Walkability Index toolkit developed for the World Bank. The survey consists of two components, namely a Field Walkability Survey and Pedestrian Interview Survey. The walkability survey or study was conducted in 4 zones, i.e. residential, commercial, educational and transport terminals. The parameters and the procedure adopted were similar to the CIA. Totally survey was carried out in 28.65km in pune.Of particular concern are issues of non-existent or unreasonably narrow footpaths, obstructions on footpaths,unsafe crossings for pedestrians and lack of sufficient respect for pedestrians. Therefore, the city only scores an average of 54 out of 100 as its walkability score.

Dr. L.B. Zala [3] explained about the measurement of Pedestrian Flow Parameters.The data is being analyzed for the pedestrian speed, pedestrian space, pedestrian flow and pedestrian density and from that the LOS can be defined at the study stretch. The data thus evaluated is then compared with the H C M 2000 Pedestrian Level Of Service (PLOS) criteria for walkway.

Muzamil Rashid [4] determines that for calculating Walkability index we need of footpath and pedestrian facility ratings. Pedestrian facility survey for taking pedestrian ratings is prepared which includes the design and usability factors of pedestrian facilities that are provided in the area. The length of the major roads and pathways in the city is calculated using the city plan or a tape or Google maps. For finding the pedestrian facility rating, a pedestrian survey is to be done considering various factors such as footpath width, footpath length, obstructions, cleanliness of footpath etc.

Crash Prediction Modeling of Two Lane Undivided Highways Using Artificial Neural Network

Nivea John, Archana S

Abstract— Road accidents are increasing day by day, causing losses to human life and economy. This scenario focuses the necessity of understanding why these accidents occur and how to prevent future ones. Crash prediction models have been developed which are able to correlate accident frequency with infrastructure characteristics and to support the planning and design of countermeasures to enhance road safety. In this paper crash prediction model is developed using Artificial Neural network (ANN). Neural Networks have the ability to describe high complex systems and helps engineers to learn about, all the factors which promotes road crashes. ANN were developed in Python with Keras library. The factors considered in the model are crash data, speed, volume, landuse type, pavement width and condition, shoulder width, number of horizontal curves, vertical curves, intersections and bus stops. Results shows that estimated traffic accidents, based on the input data are close enough to actual road accidents hence it is reliable to predict future accidents in two lane undivided state highways. The performance of ANN is found to be better than other statistical methods.

Index Terms— Accident prediction model, Artificial neural network (ANN), Python, Keras

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1 INTRODUCTION

IN Indian cities, the traffic is highly heterogeneous in nature, promotes a large accident rates. Analysis of traffic data Indicated that drivers fault is responsible for majority of the accidents. The economic and social costs of traffic accidents are tremendous. Property damage, lost productivity, medical expenses, and inflated motor insurance rates imposed an estimated loss to the Indian economy.

Crash injury severity has always been a major concern in highway safety research. During road safety analysis of a road, a major target is to locate hazardous segments which are dangerous, and then to identify the factors influencing its safety level. Evaluation of road safety measures appears to be the weakest component of road safety management systems. To improve road infrastructure in the concern of safety management, road authorities, road designers and road safety practitioners need prediction tools, commonly known as Accident Prediction Models (APMs). Accident prediction model will helps to analyse the potential safety issues and helps to improve safety measures.

Two lane undivided state highways have a great contribution to the number of accidents due to several factors. This paper focuses on the identification of factors which promotes accidents and its relationship with the number of accidents. Development of accident prediction model will helps to know how these accidents occur and how to prevent future ones.

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2. LITERATURE REVIEW

Francisca Nonyelum Ogwueleka et.al. [1], focused on the design of an Artificial Neural Network (ANN) model for the analysis and prediction of accident rates in a developing country. The development of an Artificial Neural Network (ANN) model is done for the prediction of accidents rate using Nigeria as a case study. Number of vehicles, accidents, and population are used as model parameters. By using self- organizing map, road accident was categorized. The Multi-Layer Perceptron Neural Network (MLPNN) for the development of ANN. Results shows the ability of ANN over conventional programming in the study and this makes neural networks to relate input with output, by allowing large number of variables and error are tolerant.

Muhammed Yasin Codur et.al. [2], studies an accident prediction model of Erzurum's Highways in Turkey using artificial neural network (ANN) approaches. The geometric characteristics of the highway such as AADT, the degree of horizontal and vertical curvatures in each section, lane, median, and shoulder widths were considered. There are 8 input variables containing 31 neurons which are the input variables representing the potential risk factors for accidents. ANN were developed in MATLAB and using coefficients of determination (R2) mean square error (MSE), and the root mean square error (RMSE) performance of ANN model is evaluated.

Neural Network for road accident prediction in Khulna metropolitan city. In the design, vehicle type, accidents type, junction type and collision type were selected as model parameters. In the ANN model development, the sigmoid activation function was used with Levenberg-Marquardt algorithm. The results shows the estimated traffic accidents, based on sufficient data are close enough to actual

Ebrahim. S et.al [4], studies the application of Artificial

Performance Analysis and Modeling of Entry Capacity of Roundabout Under Heterogeneous Traffic

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Abstract: Emerging traffic in medium and large cities is of major concern to develop a network which would be able to satisfy the needs of traffic. Intersections are a very important part of this network and are to be designed properly to handle the traffic efficiently. Un signalized intersections have a drawback of a large number of conflict points. Introduction of roundabouts at intersection had many advantages. Roundabouts eliminate the conflict points which lead to perpendicular crashes. It reduces driver confusion associated with perpendicular junctions and also reduces the queuing caused due to signalization. It is crucial to measure the performance of existing roundabouts in terms of its ability to handle the present traffic scenario. The entry capacity is found to vary immensely with the changing geometrics of the roundabout and circulating flow. A model can be developed using empirical analysis based on five such geometric parameters circulating flow and exit flow which proved to be significant for estimating the capacity. The model can be validated with the site data for checking its practicality. Performance analysis of rounabouts were also done by estimating entry capacity and capacity of weaving sections. And also level of service of both weaving sections and entry sections were found out as per HCM (2010) and IRC (65) respectively.

Keywords: Entry flow, Model, Level of service, HCM, IRC

I. INTRODUCTION

Road network is a very important aspect of transportation system as it connects even the smallest villages and cities. Emerging road traffic is of major concern to develop a network which would be able to satisfy the needs of traffic. Intersections are very important part of this network and are to be designed properly to handle the traffic effectively. Unsignalized intersections also play an important role in road network. They help in free movement of traffic without any constraint as in case of signalized intersection. Unsignalized intersection has a drawback of large number of conflict points. As the number of lanes increase, the unrest at the intersection also increases drastically. Over the years, many reforms have been made to reduce this. Initially, the traffic at intersection was controlled by policemen. Then in later years, rotaries were introduced. The concept of rotaries was then modified to what we call as roundabouts. A roundabout is a type of circular intersection or junction in which road traffic flows almost continuously in one direction around a central island. Introduction of roundabouts at intersection had many advantages other than eliminating the conflict points which lead to perpendicular crashes.

II. LITERATURE REVIEW

H.M.N.Al-Madani [1]developed a multivariate model for the prediction of roundabout maximum entry flow during forced flow condition is developed considering the circulating flow, exiting flow and roundabout geometric characteristics. None of the current available methods are specifically developed for forced flow conditions. The data were collected from 13 large roundabouts.Beside circulating and exitingflows, number of lanes and lateral position of the vehicles, as they approach and cross the roundabout,showed significant influence on roundabout entry capacity. RamuArroju [2] determined the capacity of the roundabout using various capacity formulas such as gap acceptance models given by Highway Capacity Manual 2010 (US), German model (2001); empirical regression models given by TRRL (UK) and weaving models given by IRC: 65–1976 (India). In addition, microscopic simulation model like VISSIM (PTV Germany) is also used to derive capacity values.

Urban Resident's Awareness and Readiness for Sustainable Transportation a Case Study

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Abstract: Abstract-The present way of transport development in Kerala noted by over dependence on motor vehicles leads our state into a greater disaster in transportation system. Increased use of personal vehicles in areas where it is unable to afford proper transport facilities comes at heavy economic and environmental problems. With the number of vehicles on its roads increasing to unmanageable levels, Kerala is already in the pressure of transportation crisis. Unless adaptive and innovative measures are adopted, the State might find it is impossible to assign an efficient transportation system. A sustainable or green transportation system should control air emissions, traffic congestion, excessive fuel use, and it must consider the present and long term needs for the environment, economic growth and equity. Walking and bicycling have negligible environmental effects. However, they are affected by the environmental impact of motorized transport. Walkers and cyclist are turning to be a rare sight in the cities. The union government has claimed that it has taken many important steps to make public transportation system sustainable and environment friendly. Many projects aimed for more sustainable mobility are either not or only partially successful. Sustainable mobility needs substantial changes in individual travel behavior. This paper studies the willingness of an urban population to use sustainable vehicles and their readiness to reduce car usage and also the barriers and motivations to using sustainable transportation for daily trips by conducting a survey of vehicle users. Modes of sustainable transportation considered in this project are pedestrians, bicycle and public transportation. Distribution of the questionnaire will make from house to house and also approaching respondent at the recreation center, shopping centers etc., for the selected area.

Keywords: Sustainable Transportation, Questionnaire, Car Sharing, Cycle Tracks, Household Survey

I.   INTRODUCTION

Development of road infrastructure has not kept pace with the rapid increase in the number of vehicles in Kerala. The number of all class vehicles in the State went up from 1,19,720 in 1975 to 36 lakhs in 2006. This was accompanied by increase in road length from 14,870 km to 21,347 km. Energy intensity of various transport modes is a key factor in determining transport related environmental impacts. Energy consumption per passenger km by bus is the least and is highest for cars among road based personalized vehicles. Public transportation provides more sustainable travel compared to other transport modes. But the sustainable mobility requires considerable changes in individual travel behavior. Road traffic has increased significantly over the years because most households today have access to two or more cars. In Kerala the average number of vehicles owned per family is two, and the average number of family members with driving license is also two. These figures indicate that virtually every family has a car and every family has more than one member with a driving license. The union government has claimed that it has taken many important steps to make public transportation system sustainable and environment friendly. Many projects aimed for more sustainable mobility are either not or only partly successful. Sustainable mobility requires considerable changes in individual travel behavior. Nevertheless, travel by private car remains the predominant mode of choice in major city centers. A number of studies have shown that some people might not always drive out of need, but because of choice. Car features provide a psycho-social value, which influences everyone to use a car rather than other modes of transportation. Therefore, the government should enhance transport policies that reduce the dependency and need to drive a car by providing alternatives other than driving.

Sustainable Transport is also known as Green Transport and it is any form of transport that does not use or depend on diminishable natural resources. Instead it depends on renewable energy rather than fossil fuels that have a finite life period. Because of this reason, there may be a little or a negative effect on the environment since it uses energy sources that are sustainable. Walking, cycling and sailing are best examples of sustainable transport. The sustainable

Passing Opportunity Model of Vehicles on Two Lane Undivided Highways under Mixed Traffic Conditions

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Abstract - *Traffic on Indian roads is heterogeneous in nature with wide variations in the static and dynamic characteristics of vehicles. Overtaking or passing is the act of one vehicle going past another slower moving vehicle, travelling in the same direction, on a road. Road geometry also plays an important role in providing gaps for overtaking. The main objective of the present study is to develop a logit model for passing opportunity. The results showed that passing opportunity depends on parameters like type of overtaking vehicle, speed of both overtaking and overtaken vehicle, density of vehicles in both directions, opposing gap, type of vehicles coming from the opposite direction. Road geometry has less significance.*

Keywords: Overtaking, Passing Opportunity, Moving observer method, Opposing gap, Logit model.

1. INTRODUCTION

Traffic is highly mixed in nature with lack of lane discipline on Indian roads. Traffic compositions mostly comprises of motorized vehicles such as two-wheelers, three- wheelers, cars, trucks, buses and non-motorized vehicles like bicycles, etc. Overtaking in two lane highways is a frequent phenomenon and a major consideration in traffic operations and safety. Characteristics like the dimensions, speed, acceleration, deceleration, clearances and manoeuvrability of these vehicles vary widely and hence, traffic speed is the most important factor affecting the safe movement of vehicles. In mixed traffic, vehicles use the road space more effectively and their movement depends on lateral and longitudinal gaps. The willingness to overtake mainly stems from the speed difference between the subject vehicle and the rest of traffic on the same or opposing travel lane and the tendency of each driver to maintain a desired speed during driving. They are unavoidable especially in the case of mixed traffic conditions where a speed differential always exists between the fast and slow moving vehicles. Also, overtaking is one of the most complex and important manoeuvre on undivided roads where the vehicles use the opposing lane to overtake the slower vehicles with the presence of oncoming vehicles from opposite direction. The ability to pass is influenced by a variety of parameters including the volumes of through and opposing traffic, speed differential between the overtaking and overtaken vehicles, highway geometry

particularly available sight distance, and human factors. Hence, the knowledge of overtaking and lane changing behaviour of vehicles is essential in understanding of traffic behaviour on undivided roads. The aim of the study is to evaluate the overtaking behaviour of vehicles on two lane undivided roads with the following specific objectives:

- To identify the factors that influences the overtaking behaviour of different modes of vehicles.
- To develop a passing opportunity model after analyzing the identified factors.

2. LITERATURE REVIEW

Asaithambi, G. et al. [1] carried out similar study on a two-lane two-way national highway (NH 66) of 1.2 km road section in Mangalore, India. The overtaking characteristics of all categories of vehicles under heterogeneous traffic conditions were observed and mathematically modelled. It was concluded that flying overtaking is performed by 62% of drivers and accelerative by 38% of drivers which shows that majority of vehicles are travelling with their current speed without reducing the speed during overtaking. Budhkar, A.K et al. [2] developed a methodology to model overtaking decision- making, based upon longitudinal gap, centerline separation and speeds of leading and following vehicle pairs in weak lane disciplined traffic was Inter-vehicular gaps and speeds were obtained from vehicular trajectories of pairs of leader and follower vehicles by logistic regression. They have concluded that average speed has little or no impact on decision to overtake. Chandra, S. et al [3] have studied the acceleration and overtaking characteristics of different types of vehicles using floating car method. The influence of shoulder condition (paved and unpaved) on the acceleration behaviour during overtaking was presented and found that the overtaking time depends upon the speed differential between the overtaking and overtaken vehicles. Farah, H. et al [4] developed a passing gap acceptance model using the data collected on two-lane highways that were collected with an interactive driving simulator. This model took into account the impact of the road geometry, traffic conditions and driver's characteristics. However, this model did not consider driver's motivation and desire to pass. Farah, H. et al. [5] developed a model that attempted to capture both driver's desire to pass and their gap acceptance decisions to

Mode choice Behaviour Analysis of Students in Thrissur city

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Abstract – *Travel behaviour plays an important role in transportation planning. Mode choice analysis is the process of arriving at a decision about which mode to use under a set of circumstances. Choice of a particular mode by a student affects the general efficiency of travel within the city. Main objective of the study is to find out the travel pattern, identify the factors to choose the mode and predict the model. Various techniques are available for mode choice modelling. Multinomial logit models are found to be efficient in estimating the different mode shares in a scenario where more than two choices of modes of travel are available for a student. Multinomial logistic regression is to analyse the mode choice behaviour of students in Thrissur city. SPSS is used to develop the model for different modes.*

Keywords: Travel behaviour, SPSS, Multinomial logit model

1.INTRODUCTION

Transportation modellings plays an vital role in planning. Major roles of transportation modelling are forecasting travel demand based on variations in the transportation planning system. Different types of models are there that have been developed to create actual travel patterns of people and existing conditions. Models are used to predict changes in travel pattern and utility of the transportation system. Thrissur city is the third largest urban agglomeration in Kerala about 1,854,783 population and the 20th largest in India. There are several number of schools within the city and outside the city. Mode choice behaviour of students in urban and rural area is different. The sex ratio of male and female is 1092:1000 . Development of models in rural and urban region helps the transportation planners to add in transport policies. And after work trips the second most occurrence of congestion are school trips at the peak time. Forecasting will help to design the transport planning systems and considering the travel behaviour of the study area. It also helps to develop a system that can accommodate the travel demand for the future. The problem faced is incomplete information that makes the uncertain conditions. If we need to reach on predictability; it can be achieved through the probability of individual decision and its leading characteristics. However, private automobiles remain the predominant school travel mode (45.3%mode share) followed by school buses (39.4 %), while walking or bicycling together account for only 12.7% of the total school transportation mode share in the USA as in 2000. In addition to personal and social factors such as parents' education,

income and attitudes, children's age, race, gender and attitudes, and peer influence studies have found many built environmental factors associated with school travel behaviours. Environmental approaches to promote walking to or from school have become increasingly popular with the recognition that a safe environment is a prerequisite to any promotional efforts. Further, environmental improvements are relatively permanent and can lead to population-level changes over time if successful. Among the environmental correlates, home-to-school distance has shown to be the most consistent and often the strongest predictor of school travel mode choice, followed by safety and weather .However, shortening the distance to school is not simple. It requires long-term, multilevel policy and environmental changes, such as school sitting, zoning, and land development policies.

1.1 Objectives

The main objectives of the study are:

- Study the mode choice behaviour of students

- Identifying the various factors that contribute to the selection of a particular mode in the city for educational trips.

- To develop a model to predict the mode choice behaviour of students Thrissur city for both rural and urban region

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2. LITERATURE SURVEY

The access travel characteristics are discussed with respect to mode use pattern, availability of access modes, satisfaction with the access environment and characteristics of the access leg of a trip in comparison to primary and egress legs. Acceptable trip lengths by walk and bicycle

25

Feasibility Study of Provision for Exclusive Bus Lanes on Urban Roads

Arathi A R, VincyVerghese

Abstract: Optimal use of road transport system is necessary to address the problems like traffic congestion, air pollution and safety. One such way to optimize is by encouraging use of public transport modes (buses) by assigning priority to them. One of the bus preferential treatments is the provision of exclusive lanes for buses on urban roads. The specific aim of this study is mainly to study the feasibility of provision of exclusive bus lanes based on two criteria, based on proportion of travellers using different types of road vehicles and based on the total travellers' time savings in terms of money value due to provision of exclusive bus lane on urban roads. The major work element of this study includes vehicle occupancy survey, vehicle volume and composition survey, income survey and estimation of journey time and journey time savings in terms of money value savings. The provision of exclusive bus lanes on urban roads increases the speed of buses, reduces journey time, saves travel cost and reduces road crashes.

Index Terms: Exclusive Bus Lane, Money Value Savings, Vehicle Composition, Windshield Method.

I. INTRODUCTION

Transportation aims at safe and efficient movement of goods and passengers. Faster mobility of goods and passengers is the catalyst for economic growth of a country and this is facilitated by efficient transportation system. In case of road transportation systems, as facility increases, the volume of traffic also increases due to increasing demand for transport, particularly in developing countries like India. Because of the space, financial and material constraints urban road infrastructure cannot be developed beyond a limit and this leads to increase in congestion, pollution and reduction in road safety. Hence, there is a need for an appropriate strategy for optimal use of road transport system to reduce congestion and to increase efficiency of road networks. One way to reduce congestion is by encouraging the travellers to use public transport system (Buses) instead of private transport modes, because public transport system enables mass transit of passengers in fewer vehicles. To bring about a shift in the passenger preferences, the public transport system should be highly efficient and relatively less expansive to attract the travellers from private modes of transport. This goal can be attained by encouraging public transport modes like buses by assigning priority. One of the methods of assigning priority to public transit are by providing exclusive bus lanes.).

Exclusive bus lanes are the lanes restricted only for buses

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provided in order to speed up the buses, to reduce the interactions between buses and other modes of vehicles and thereby reducing the road crashes.

II. OBJECTIVES

By considering the aim of the study, the main objective formulated is to study the general impact of provision of exclusive bus lanes on traffic flow characteristics un-der heterogeneous traffic conditions. To achieve this main objective the subtasks formulated was the following.

1. To develop social criteria based on the proportion of travellers using different modes
2. To develop economic criteria based on the money value of time of travellers using the different modes.

III. LITERATURE REVIEW

Arasan and Vedagiri [1] estimated the probable shift of car users to bus due to the increase in level of service (LOS) after providing exclusive bus lanes on Indian city roads carrying heterogeneous traffic. The increase in LOS was determined using a recently developed simulation model. A mode-choice probability curve to depict the possible modal shift of car users to bus was developed. From the curve, the probability of shift of car users to bus was estimated 0.7 at traffic flow corresponding to level of service C, for an 11 m wide road and 0.28 for 14.5 m wide road. Arasan and Vedagiri [2] developed and used a heterogeneous traffic flow micro-simulation model to study the impact of provision of reserved bus lanes on urban roads in terms of reduction in speed of other categories of motor vehicles due to the consequent reduction in road space, over a wide range of traffic volume. It has been found that the maximum permissible volume to capacity ratio that will ensure a LOS C was 0.62 for the traffic stream other than buses if the bus lane is provided. Justification of providing exclusive bus lane has also been defined on the basis of number of travellers per unit width of the road. Cevero [3] developed working paper on Bus Rapid Transit (BRT): An efficient and competitive mode of public transport. This report reviews experiences with designing and implementing BRT systems worldwide. BRT is first defined across a spectrum of service qualities and costs. The report closes with discussions on BRT's likely future given global growth projections and other pressing policy agendas in the foreseeable future. Chen et al. [4] carried out a study to examine the effect of exclusive bus lanes (XBLs) and transit signal priority (TSP) on bus rapid

26

Environmental Impact Assessment of Thrissur-Vadanapally Road Project

Rosmy Sebastian, Vincy Verghese, Cyriac M. G.

Abstract—Environmental impact assessment (EIA) for transportation projects has an integral role in environmental management schemes. All the road works and other transportation infrastructure development programs creates significant impact on various aspects of life. Impacts can be positive or negative. Here an EIA is conducted to study the socio-economic impacts and bio-physical impacts of widening of Thrissur - Vadanapally road project and evaluation of the same. The impact prediction is done by means of good fit models for the existing conditions. Gaussian air dispersion model, CRTN Model for traffic noise, Mass Balance and Streeter- Phelps Equation for water quality analysis were used. With the help of these models, the prediction is done accurately. The predicted impact includes the meteorological and climatic impacts, noise quality, water quality, air quality and social impacts. Water quality changes rises only when there is change in drainage pattern occurs. These change is modelled using the Streeter Phelps equation and the mass balance equations. Air quality modelling was done using the Gaussian dispersion model and the impact of traffic noise was done using the CRTN Models. The air and noise values at the present condition was greater than the prescribed norms of pollution control board. The air quality issues are predominant at distances nearer to the source, as the distance increases the effect of air pollution also decreases. Various mitigation measures are suggested for reducing the impacts predicted or to avoid the impact in each stage of construction.

Index Terms—Environmental impact assessment, impact modelling, impact prediction, mitigation measures.

I. INTRODUCTION

Recent environmental issues that has developed due to Urbanization with special effects on the environment has led to the process called Environmental Impact Assessment (EIA) which can be defined as "the need to identify and predict impacts on the environment and on man's wellbeing of legislative proposals, policies, programs, projects and procedures and to interpreter and communicate information about the impacts". Since the introduction of EIA over 30 years ago, the possible profits has been widely recognized and it has been adopted and implemented in more than 100 countries by numerous aid and funding agencies .In essence, EIA is a process that assesses the impact of developments on the environment in an efficient, universal and multidisciplinary way taking into consideration all environmental components. EIA as a process involves a

number of steps which are as follows: [3]
- Description of project
- Screening
- Scoping/consideration of alternatives
- Baseline studies public consultation and participation
- Impact prediction
- Preparation of Environmental Impact Statement(EIS)
- Decision making
- Post decision making and monitoring

A. Objectives

The main objective of the study is identified as to predict and evaluate impacts of a road project.

To achieve the main objective of predicting and evaluating the impacts of a road project involves following subtasks:
- Impact prediction using good fit models
- Suggesting mitigation measures for impacts predicted

II. LITERATURE REVIEW

Environmental impact assessment (EIA) is a planning tool for predicting the impacts on the environment from altering or building a new establishment. For the purposes of EIA, the meaning of environment incorporates physical, biological, cultural, economic and social factors. Over the last three decades, environmental impact assessment (EIA) or environmental assessment (EA) has become a major tool for effective environmental management. Over the years, the focus of EA has changed towards making it a useful tool for environmental sustainability, which can be very effectively put to use to ensure that all important factors are included and unnecessary factors are revealed and dropped. Generallyhighway projects are undertaken in order to improve the social and economic life of the people. But they may also have an adverse impact on the surrounding environment. Most affected people and property are those in the direct path of the road works. Damage to sensitive eco-systems, changes to drainage pattern and thereby groundwater, soil erosion, interference with animal and plant life, resettlement of people, demographic changes, loss of productive agricultural lands, , accelerated urbanization, disruption of local economic activities, and increase in air pollution are some of the impacts of highway projects. Highway development and construction should be planned with careful attention towards the environmental impacts.

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27   480

Traffic Flow Modeling and Capacity Estimation for Heterogeneous Traffic on Four Lane Divided Carriageway

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Abstract— In India, heterogeneous traffic condition due to various kinds of vehicles manoeuvres increase rapidly. Heterogeneous nature occurs due to different lane characteristics and driver behavior resulting in static and dynamic features. Therefore, traffic on the road varies and traffic volume exceeds normal range. Study on various traffic parameters is essentially required for manoeuvre of roadway facilities. Traffic flow fundamental diagrams can be used to characterize relation between traffic parameters such as speed, flow and density. Present study is concerned with macroscopic traffic flow characteristics observed on four lane divided carriageway. Traffic flow fundamental diagrams are used to characterize the relation between macroscopic parameters and compared with other multi-regime models such as Edie model, Modified Greenberg's model, Two regime linear model and Three regime linear model. Macroscopic models provide a general knowledge of vehicles and traffic as a continuum. Calibrated speed-density model under free-flow regime and congested flow regime can be used for predicting future scenario of traffic on four lane divided road. The speed-density models are modified based on percentage heavy motor vehicle composition. Capacity analysis of the roads is done using speed-flow diagram and compared with the capacity obtained from Indo-HCM method. Greater capacity shows better roadway structure that will improve the vehicular road traffic. At last the influence of operating speed on the roadway capacity is found and developed a new capacity model that can be used for predicting capacity for varying road sections.

Index Terms— Capacity, Edie model, Fundamental diagrams, Heterogeneous traffic, Indo-HCM method, Macroscopic models, Modified Greenberg's model, Three regime linear model, Traffic parameters, Two regime linear model.

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1 INTRODUCTION

TODAY's situation of congested road networks is a severe problem, which has to be addressed due to the increase in trend of transportation demand every year. Determination of road capacity is a major issue for transport planners. Capacity studies for heterogeneous traffic situations are very complex and only limited studies undertaken. There are several methods of estimation of capacity. However the major types of estimation can be classified under two broad categories as Direct Empirical Methods and Indirect Empirical (Simulation) Methods.

In this paper an attempt is made to study the fundamental diagrams of traffic flow and evaluate the capacity of urban mid block section, particularly for a four lane divided cross section. Macroscopic traffic flow models represent the traffic as a compressible fluid with the main properties flow, density and speed. Multi-regime models include two or three regimes to describe different traffic conditions.

Using the fundamental parameters, capacities of sections were evaluated and compared with the capacity estimated using Indo-HCM method. Free flow speed was also measured at each section and these speed data were used to determine operating speed 85th percentile of free flow speed on the road. Operating speed on a road can vary due to road surface condition, side friction or similar other factors.

2 OBJECTIVES

1. To develop speed-density model and to derive relationship between flow-density and speed-flow, in order to assess the behavior of traffic flow.
2. To compare the developed model with other multi-regime models such as Edie model, Modified Greenberg's model, Two regime linear model and Three regime linear model.
3. To modify the developed speed-density model based on percentage heavy motor vehicle composition.
4. To estimate the roadway capacity using parameters obtained from fundamental diagrams of traffic flow.
5. To determine influence of operating speed on the roadway capacity, for develop a capacity model.
6. To compare the estimated capacity with the capacity found out using Indo-HCM method.

4 LITERATURE REVIEW

Hwang Zunhwan et. al. [7] developed DHCE (Dynamic Highway Capacity Estimation) methods and applied to real traffic data. Result shows DHCE methods showed excellent performance in explaining real traffic situations, which can vary dynamically. Dr. Mehdi I. Alkubaisi et. al. [2] focuses on studying the speed flow density relationships. The developed regression models may be used to predict the speed- flow-density relationships for urban highways and other similar areas. K. M. Lum et. al. [5] present a new flow modeling of arterial roads in Singapore. She developed models for radial

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Bus Route Optimization and Scheduling In Hyderabad City Using Arc-Gis in Association with Lumiplan Pvt. Ltd.

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Abstract— Transportation is the movement of people or goods from one place to other place. It is the backbone of each economy. Different modes includes air, water, rail and road. The two important things considered before journey are, the route and the mode to reach the destination. The fleet management, logistics, and networking has got huge importance in this century. So without the above mentioned, the transportation system won't be efficient. Public transportation is one of the most important mode of transportation which is being used by the common people. So proper optimized schedule results in increased dependence on public transportation system, that ultimately reduce the traffic congestion, pollution etc. This project will be focussing on the city bus route system in Hyderabad, includes two pilot routes named route 40 (Secunderabad to Koti) and route 86J (Secunderabad Rathfile to Kesari hanuman Temple). The project is given to the French company in ITS field named LUMIPLAN ITS by the TSRTC (Telangana State Road Transport Corporartion)

Index Terms— Arc-GIS,Heures, Public Transportation, Route Optimization, Scheduling, .

I. INTRODUCTION

Transport is important because it enables trade between people, which is essential for the development of civilizations. It's very important to note the importance of the transportation. Modes of transport include air, land (rail and road), water, cable, pipeline and space the field can be divided into infrastructure, vehicles and operations. It is equivalent in the weightage about the mode as well as the route that selected for the travel. Use of public transport has a wide range of effects in environmental pollution. In order to get the people attracted towards the public transport the efficient schedules and passenger comfort should be offered from the authorities.

II. STUDY AREA & OBJECTIVES

TSRTC (Telangana State Road Transport Corporation) for the first time implementing the optimized schedule in their service pattern. So considered the two major routes from where the most of the revenue comes, that is Secunderabad to Koti (Route 40) and Secunderabad Rathfile to Kesari

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Hanuman temple (Route 86J). From the runtime analysis of the old pattern it's not actually syncing with the ground reality. They are following the old run time pattern as they made roughly before 10 years. So now also the total run time still remains the same even if the traffic and demand got increased. So the trips will be more with respect to the run time, which cannot be implemented successfully now a days just because of the hike in demand and the speed. So the drivers will be pressurized to complete their task in order to avoid the blackmark in their career. So skipping of the stops and inefficient run time, and the overtime duty (OT) will happen that will ultimately affect the passengers and the revenue to TSRTC. Digitized So the major objectives are given below.

- To find out the candid routes(CR) in the city (route which is beneficial to both passengers and service providers)
- Identify the redundant stops, removing them and allocating new stops efficiently if necessory
- Creating optimized schedule using Lumiplan software (Heures)
- Comparison of the existing and revised schedules in terms of revenue

Digitized study area is given below in Figure 1

Fig.1 Study area

III. CONCEPTS AND METHODS FOR OPTIMIZED SCHEDULING

Optimization doesn't always means to find out the shortest routes with low cost. Every time it will not be the same with a profitable service pattern which is useful for the bus owners and passengers. For optimized scheduling the concepts used are run time analysis and ticketing analysis .By using the run time it's very easy to adjust the frequency of the bus service, and the demand analysis shows the major stops/fare stages

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29

Use of Data Mining Technique for Systematic Road Safety Audit of Non-urban Highways

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Abstract— In India the number of road crashes is raising at frightening rate. There is one death in every four minutes due to road crashes in India. Hence it is necessary to improve the road safety by conducting a detailed Road Safety Audit (RSA) in order to identify road safety issues and to make necessary improvements. Budgetary constraints limit many developing countries from performing the audit on regular basis. This will eventually delay any rehabilitation or repair process making the road conditions the worst and risky. This paper proposes a systematic approach to do the road safety audit on a highway and to do effective and efficient data mining, for deriving knowledge driven decisions in the classification of highway sections. The approach will help to perform safety evaluation of sections and to identify the crash potential locations. Further output of the work is the development of a mathematical model for classification of highway sections based on road safety audit.

Index Terms— Data mining, Weka, Road Safety Audit, Road safety model

I. INTRODUCTION

Road Safety Audit (RSA) is method of evaluating the safety performance of a road by an independent team or trained specialties. Qualitative estimation on potential road safety issues, identification of opportunities for improvements and ensure safety for all road users are the basic objectives of RSA. Government incorporate RSAs into the initial stage of the project such as construction of new roads and intersections, and also encourages RSAs on existing roads and intersections. Thereby all the new and reconstructed roads can be made safe as possible. Since RSA is done based on a clearly defined procedure it can be used at any progressing stages of project. The principles of RSA can be applied throughout the highway project development in order to ensure a growing awareness about road safety principles. Traffic control devices provide safe and secure journey for the road users. These are devices used to inform, guide and control the traffic. Maintenance of traffic control devices is one of the most important aspects of highway management systems. Scientific and well-timed installation of the traffic control devices increases safety as well as significantly decreasing accident rates. For a safer driving environment, timely maintenance of the traffic signs is very important and incorporating these activities makes a viable economic sense. The specialized units of highway authorities that is the Road Safety Authority (RSA) frequently check the safety requirements of the traffic control devices.

Road Safety Audit can minimize the risk and severity of road accidents by the road project and also can minimize the need of remedial work after construction. Road safety inspection based on (IRC SP – 88, 2010) [9] is conducted on an existing road, from Kunnamkulam to Peramangalam, since it is identified as one of the accident black spot.

II. 11. LITERATURE REVIEW

This section, describe a short survey about Road Safety Audit, and classification of road by means of Weka software and analysis

A. Road Safety Audit (RSA)

Road safety audit is done to ensure the operational safety performance of a road. Hence, it has the potential for improving safety when it is applied to a road or traffic design before the project is implemented. Through RSA the identification of potential safety hazards on new road projects at the appropriate stage can be done and so that it can minimize the adverse effects at minimum cost. It can be conducted on any design proposal, which involves changes to the ways road users will interact, either with each other or with their physical environment. Purpose of the audit is to identify hazardous features on existing road so that it can be eliminated or otherwise treated before they become an accident prone location. Mehar and Agarwal [2] presented a systematic approach to improve the road safety by analyzing the crash records thus by identifying the most hazardous locations of the study area. They also describes the difficulties faced in the safety audits and analysis of accidents. They developed a hierarchical frame work for the improvement of road safety. Based on the crash rate safety hazardous locations were identified and ranking is done. They also suggest suitable remedial measures to improve the hazardous locations. Saffarzadeh and Farshad [3] studied the maintenance of highway traffic control device and the problems faced, they found that in many developing countries, due to budget limits and lack of regular maintenance activities and many deficiencies related to signs, guardrails road markings increased. They also tried to propose an appropriate management system for the maintenance of traffic control devices, along with the development of computer software for control devices, which can identifying the necessary time for maintenance.

30

Activity Based Transportation Modeling for Chelakottukara ward of Thrissur District

Midhun T, Anitha Jacob

Abstract: An Activity-based model is the one that generally replaces the conventional trip-based model, which is usually represented to as the four-step model. With the variations in the transportation system attributes and changes in socio-demographics of the individuals, the transportation planners and engineers' need to have the ability to estimate the variations in transportation demand so as to make a well-versed transportation infrastructure planning decision possible. Activity-based models are used for this purpose; these models are used to forecast travel characteristics and usage of transport services under different socio-economic scenarios. An activity-based travel pattern model has been developed for the individuals of the study area. This activity-travel pattern model will take different input parameters such as various land-use, socio-demographic, activity system, and transportation level-of-service attributes. Thus it will provide the activity-travel pattern of each individual in the study area as the output, within the continuous time domain.

Index Terms: Activity-Based Travel Pattern, Four-Step Model, Socio-Economic, Travel Demand.

I. INTRODUCTION

Transportation plays an important role in the growth and economy of a nation. For a country like India, transportation planning is becoming unavoidable due to the fast-growing population and travel demand. Transportation planners and engineers have to be able to forecast the response of transportation demand for the changes in the attributes of the transportation system and changes in the socio-demographics of the people using the transportation system in order to make informed transportation infrastructure planning decisions. Travel-demand models are used for this purpose. It is used to predict the travel characteristics and the use of transport services under various socioeconomic scenarios and for various transport service and land-use configurations.

The mathematical relationship between travel demand and traveler and system characteristics can be achieved with the help of travel demand modeling. Earlier travel demand modeling is done with the help of trip based four-step modeling – as the trip generation, trip distribution, mode choice and route choice. This four-step modeling is said to be conventional modeling. Later on, new generation models such as tour based and activity based models emerged overcoming most of the drawbacks of the conventional method. The tour based approach considers a chain of trips

starting and ending at the same location as the individual unit of analysis whereas activity-based travel demand model considers travel as a derived demand to satisfy the need of the individual [1]. The objective of this paper is to develop an activity-based travel demand model for Chelakottukara, the 22nd ward of the Thrissur City of Kerala, taking into consideration of the socio-economic factors and travel pattern, validating the generated model and suggesting how it can be made beneficial in the planning process. It includes a tour generation model for both single and complex activities.

II. LITERATURE REVIEW

A. Trip-Based Models

Trip-based travel models have evolved over many decades. As their name suggests, trip-based models use the individual person trip as the fundamental unit of analysis. Trip-based models are widely used in practice to support regional, sub-regional, and project-level transportation analysis and decision making. Trip-based models are often referred to as "4-step" models because they commonly include four primary components. The first trip generation components estimate the numbers of trips produced by and attracted to each zone (these zones collectively represent the geography of the modelled area). The second trip distribution step connects where trips are produced and where they are attracted to. The third mode choice step determines the travel mode, such as automobile or transit, used for each trip, while the fourth assignment step predicts the specific network facilities or routes used for each trip[8].

B. Activity-Based Models

Activity-based models are having some similarities to traditional 4-step models: activities are generated, destinations for the activities are identified, travel modes are determined, and the specific network facilities or routes used for each trip are predicted. However, activity-based models incorporate some remarkable advances over 4-step trip-based models, such as the clear representation of realistic constraints of time and space and the linkages among activities and travel, for an individual person as well as across multiple persons in a household. These linkages enable them to more sensibly represent the effect of travel conditions on activity and travel choices.

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Subgrade Soil Stabilization Using Chicken Feather Fiber

Anupama Krishnan, Dr. Agnes Anto C

Abstract— Sub grade soil is an integral part of the road pavement structure as it provides the support to the pavement from beneath. Poor sub grade soil conditions can result in inadequate pavement support and reduce pavement life. Thus soils properties may be improved through the addition of chemical or additives which is know as stabilization. These additives range from waste products to manufactured materials and include lime, Class C fly ash, Portland cement, cement kiln dust, fibers etc. These additives can be used with a variety of soils to help improve their native engineering properties. The effectiveness of these additives depends on the soil treated and the amount of additive used. Design of the various pavement layers is very much dependent on the strength of the sub grade soil over which they are going to be laid. The sub grade strength is mostly expressed in terms of California Bearing Ratio (CBR). For an engineer, it's important to understand the change of sub grade strength. This project is an attempt to understand the strength of sub grade in terms of CBR values. Treatment with chicken feather fiber (CFF) was found to be an option for improvement of soil properties, based on the testing conducted by varing percent(0.1%, 0.25% and 0.5%)of feathers . It was found that with the addition of stabilizers i.e. CFF, the C.B.R. increased upto a certain limit because CFF served as a reinforcement in soil but after that the C.B.R. decreased, due to replacement of soil by CFF.

Index Terms— CFF, stabilization, strength assessment , Subgrade soil.

I. INTRODUCTION

Subgrade layer is the lowest layer in the pavement structure underlying the base course or surface course, depending upon the type of pavement. Generally, subgrade consists of various locally available soil materials that sometimes might be soft and/or wet that cannot have enough strength/stiffness to support pavement loading. A sound knowledge of performance of the subgrade soil under prevailing in-situ condition is necessary prior to the construction of the pavement . The better the strength/stiffness quality of the materials the better would be the long-term performance of the pavement and thinner pavement layers. Hence, the design of pavement should be focused on the efficient, most economical and effective use of existing subgrade materials to optimize their performance. Most economical and efficient method in current practice to improve the properties of soil is stabilization which involves the use of stabilizing agents (binder materials) in weak soils to improve its engineering properties such as compressibility, strength, permeability and durability. Recent investigation on stabilization is using waste materials like fibers, a part of waste valorization

The storage or leaving of various products, which are obtained as waste products, creates a lot of problems in the means of environmental pollution. Putting waste products in good use prevents the pollution of nature by decreasing the usage of limited natural sources and decreases the problems that might occur when the waste products are stored for throwing. In parallel with the increase in the world's population, the pollution in food sector has also increased. Chicken feather is an example of waste products in food sector and this kind of waste products, which contain fiber,can be described as natural products. In the last decades, there has been an increasing interest in using natural materials (e.g., chicken quill (CQ) and carpet waste) as reinforcements in fine-grained soils. This occurs not only for environmental reasons but also for their properties and sustainability (Amieva et al. 2014).

Presently, huge amount of chicken feather disposed by different poultry industry as a solid waste arise solid-agricultural dispose issues. Chicken feather has more than 90 % protein called keratin. Keratin fibers is amino acid which able to crosslink with polymer matrix by forming disulfide or hydrogen bonds which enhance the fiber/matrix interaction to become stiff, strong, and lightweight properties. Furthermore, the advantages of chicken feather fiber are strictly bio-compatible, non-abrasive, low density, and warmth retention which promotes in reinforcement of polymer composites (Meyers et al.,2008). Present study focuses on strength properties of CFF stabilized soil.

A. Objectives and scopes

- The objectives of the project formed are the following:
- To determine the effectiveness of CFF as a sub grade soil stabilizer
- To determine the optimum content of CFF in soil to achieve the desirable sub grade characteristics
- Utilisation of sustainable materials like chicken feather fiber for soil stabilization

B. Need

Stabilization can increase

- the shear strength of a soil
- improving the load bearing capacity of sub grade soil to support pavements
- control of shrink swell properties
- to reduce compressibility
- increase in durability
- soil waterproofing
- reduction of pavement thickness

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Review of Software to Analyse the Physical Conditions of the Athletes using sEMG

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ABSTRACT

Electromyography measures muscle responses of a nerve's simulation of the muscle. EMG is generally measured or recorded through surface, needle or wired electrodes. The surface electromyography is a commonly used technique for measuring the muscle exhilaration. The purpose of this project is to evaluate the use of sEMG in the practical context and to translate the given context to the appropriate analysis. The sEMG are used on the athletes while they are running and respective results are being noted. By using this technique our project wishes to implement an android/iOS application to calculate the corresponding values which are being noted by the particular device which we have been made. The signals which are being given by the device is converted into the appropriate percentage values or graphs which can be determined into giving a complete overview about the person whom he is checking and can suggest the diets and exercises to make that person fit to the expectations. This software is mainly look forward for the development of the future athletes which can win the prizes. This platform provides immense forms of diets which are based on the values or results which have been depicted. Performance analysis in sports is considered to be an integral component of understanding the requirements of the optimal performance. Several measurement techniques have been used to inspect the performance of the best athletes today. it is mostly commonly done in laboratory where physiology and bio-mechanics can be analyzed. in this system first, the coaches conduct a study about the agility, strength and nutrition of the excellent players of the country. Then the coaches of the respective clubs or the schools check each and every student's physical condition and compare with the stored data in order to train them. The project has got direct advantage to the aspiring future athletes of the country and also to the health-conscious society by providing them a device to calculate on their body metrics and work around to improve on it.

KEYWORDS: Electromyography, Surface Electromyography, Sports, Muscle analysis

1. INTRODUCTION

Healthy lifestyle is an important aspect in our life. The present-day food habits and lifestyle make it difficult to lead a healthy life. So, it is important to take care of our health by following diet plans which are suitable to our body. Our project aims to provide diet plans suitable for each individual by measuring muscle strength using the technic surface electromyography This technic will be more helpful for athletes. This present equipment Electromyography helps only to measure muscle strength. While the existing system of electromyography helps only to observe the variations in muscle strength Our software provides diet plans which are adequate for maintaining the muscle strength. Surface Electromyography is an improved version of electromyography. Electromyography is painful as it makes use of needles for measuring muscles. The improved version, Surface Electromyography is a non-obvious method to quantify the electrical muscle activity with multiple closely spaced electrodes overlying a restricted area of the skin. Our software converts the analog readings of surface electromyography into digital values. The database of our

software consists of predefined diet plans prepared by doctors. When we upload the digitalized readings of muscle strength the software displays suitable diet plans apt for each individual.

2. OVERVIEW OF THE BASICS
2.1. Electromyography

Electromyography (EMG) is an electro-diagnostic procedure for the assessment of the health of muscles and the nerve cells that control them by recording the electrical activity produced by muscles of the EMG results can be used to show if the muscle is damaged by nerve dysfunction, muscle dysfunction or problems with nerve-to-muscle signal transmission.

Electromyography is recorded using an instrumental device with three specified sensors called an electromyograph to produce a documented report called an electromyogram. the electromyograph detects the electrical potential generated by muscle cells that control the muscles. when these cells are

Medical Image Enhancement by a Bilateral Filter Using Optimization Technique

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Abstract

For researchers, denoising of Magnetic Resonance (MR) image is a greatest challenge in digital image processing. In this paper, the impulse noise and Rician noise in the medical MR images are removed by using Bilateral Filter (BF). The novel approaches are presented in this paper; Enhanced grasshopper optimization algorithm (EGOA) is used to optimize the BF parameters. To simulate the medical MR images (with different variances), the impulse and Rician noises are added. The EGOA is applied to the noisy image in searching regions of window size, spatial and intensity domain to obtain the filter parameters optimally. The PSNR is taken as fitness value for optimization. We examined the proposed technique results with other MR images After the optimal parameters assurance. In order to comprehend the BF parameters selection importance, the results of proposed denoising method is contrasted with other previously used BFs, genetic algorithm (GA), gravitational search algorithm (GSA) using the quality metrics such as signal-to-noise ratio (SNR), structural similarity index metric (SSIM), mean squared error (MSE), and PSNR. The outcome shows that the EOGA method with BF shows good results than the earlier methods in both edge preservation and noise elimination from medical MR images. The experimental results demonstrate the performance of the proposed method with the accuracy, computational time, and maximum deviation, Peak Signal to Noise Ratio (PSNR), MSE, SSIM, and entropy values of MR images over the existing methods.

Keywords Bilateral filter · Rician and impulse noise · SNR · EGOA · Genetic algorithm · Noise elimination

Introduction

The medical image created by MRI, CT, X-ray and ultrasound assumes an essential part in the identification of diseases [1]. The distinguishing proof, examination and treatment of infections are influenced by the noises introduce in the image [2]. The noises are delivered in the images at the time of transmission and procurement because of the ecological conditions and obstruction in the channel. The temperature variations of the sensor additionally create noises [3]. The denoising of medical image is

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essential for the diagnosis and treatment planning process. As of late the images are caught utilizing the digital system. The evacuation of noises in the digital image is a troublesome errand [1]. The noises decrease the nature of the image. The sort of the noise ought to be distinguished and its statistical properties ought to be examined for the denoising procedure [4]. Different kinds of noises, for example, Gaussian noise, Rayleigh noise impulse noise are delivered amid the image acquisition process. The Gaussian noise and Rayleigh noise are produced amid sampling and transmission. The impulse noise is additionally called as salt and pepper noise. It happens in the image as black and white specks [5, 6]. Add up to variation filter, changing domain filter and gradient technique is a portion of the strategies utilized for image denoising. Add up to variation filters and change domain filters are influenced by finished smoothing impact [7, 8].

The noise named as Rician noise which is delivered in the MR images are evacuated utilizing the fuzzy hybrid filter. The Rician noises in the images influence the post handling procedures like segmentation and parametric synthesis [9]. The speckle noise in the ultrasound medical image is diminished

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Solution for Unintentional Events of Vehicle Security

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ABSTRACT

One of the major research topics in vehicle security part is the vehicle monitoring and alarm system. Many project either focus on how to keep safe a vehicle from stealers using detection system or alarm systems. This system presents the design and development of a boost vehicle security system that help to overcome the unintentional events that undergo in vehicles. The common unintentional events that occurs in vehicle are deliberately cease to think of to turn off headlight, forget to close window and door, and accidentally Locking someone in your car, and you just forgot of them. The main aim of the project is that to solve this unintentional event. This system proposes the design and construction of an advanced vehicle security system using PIR sensor, button switch and mobile communication network. The proposed project consists of both hardware and software parts. Hardware components include sensors like PIR sensors, button switch software components include a mobile app.

Keywords - IDE (Integrated Development Environment), PIR sensor (passive infrared sensor)

1. INTRODUCTION

Smart vehicle are used to solve bad habits that drivers often have which can cause a lot of struggle .Now a days the bad habits of the drivers are increasing and resulting in Drainage of car battery, Accidental locking up of passengers inside the car. The main motive of this project is that the user could easily protect their vehicle at any time. There should not be any worries to drivers about their unintentional activities. The first driver bad habits for getting turnoff a headlight after they leave their vehicle and it leads to drainage of vehicle battery. The bulb will indicate the status ON/OFF of the vehicle lights. If the light is on when the engine is off, an alert will be sent to the smart phone application. To identify when the driver winds down the windows, a button switch is placed at base of each window and return the status of OPEN/CLOSE. When the window closes, the base of the window will collide with the button switch, and activate it. When engine is off and window is in open state an alert message will be sent to car safety app .similar approach is done to detect whether door is closed or not. Next implemented Automatic motion event detection systems. When vehicle is locked due to any situation like accident (the door of the vehicle become automatically closed)or vehicle is locked by the owner intentionally and   if a person inside the vehicle undergo through any critical circumstances , an alert message will be sent to the mobile application "

car safety". In this app three numbers will be already set. So with the help of this car security app, Alert message can be sent to the saved contact. when there occurs any motion inside the car the PIR sensor detect the motion and an alert message will be sent to app.All devices are accessed through Bluetooth module in order to show results and alarm the driver on an application. These unintentional events are called vehicle owners daily bad habits. To help owners get rid of these bad habits, this project is implemented. It can be applied to make the daily routines of the people less complex.

2. METHODOLOGY

Solution for Unintentional Events of Vehicle Security is a project that helps the drivers to reduce the unintentional events that occur in their day to day life. It include,

- Automatic head light ON and OFF Detection system
- Automatic detection of door and window opened
- Life detection in vehicle.

The whole system of security is activated when the engine is off. And if any security steps are here it will be informed to the user with the help of mobile alert

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Investigation of RF and DC Performance of E-Mode In$_{0.80}$Ga$_{0.20}$As/InAs/In$_{0.80}$Ga$_{0.20}$as Channel based DG-HEMTs for Future Submillimetre Wave and THz Applications

J. Ajayan, T. Ravichandran, P. Mohankumar, P. Prajoon, J. Charles Pravin & D. Nirmal

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Visible Light Communication Using Sensors

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ABSTRACT: we propose different sensor system using visible light communication (VLC).It is considered as effective tool in future wireless communications technology.VLC is a secure communication compared with other wireless communications. Li Fi (Light Fidelity) is a fast and robust optical version of Wi-Fi the technology of which is based on VLC. In this paper VLC using three type sensors CMOS SENSOR, CCD IMAGE SENSOR And SOLAR CELL. Here, we propose a light encryption scheme using devices having light-emitting diode (LED) and receiver potion consider different sensors. In this technique using shutter effect that can increase data rate then speed is also increased this communication.

KEYWORDS: VLC, LiFi, CMOS, CCD, LED

I. INTRODUCTION

VLC is considered as an effective tool in future wireless communications technology. It is a secure communication when compared with other wireless communications .Visible light is only a small portion of the electromagnetic spectrum. VLC is used for Vehicle to vehicle communication, networking in indoor environments. LED are preferred sources for dual purpose of lighting and data communication. The main components of this system are a high brightness white LED. It can be switched on and off very quickly. It gives nice opportunities for transmitting data Li Fi is the future technology in wireless communication. It is a Visible Light Communications technology. That has running wireless communications to receive and transmitting data at very high speeds. CMOS CAMERA SENSOR has a data reception in a mobile phone using VLC. The camera of the smart phone is used as a receiver in order to capture the continuous changes in state on-off. Light are invisible to the human eye. The information is captured in camera in the form of light and dark bands. Which are then decoded by the smart phone and the received message is displayed. By exploiting the rolling shutter effect of CMOS sensors, a data rate much higher than the camera frame rate is achieved then speed is increased.

The CCD IMAGE SENSOR Main part of CCD camera is CCD image sensor CCD consists of very closely packed MOS capacitors formed by p substrate, SiO2 and metal gate which can store or transfer Analog Charge Signals .The CCD is composed of precisely positioned light sensitive semiconductor elements arranged as rows and columns. Each row in the array represents a single line in the resulting image. In SOLAR CELL downlink signal is transmitted by a white light LED lamp that can provide lighting, VLC and energy harvesting for mobile devices. The downlink is received by a solar cell. The uplink can be captured by a surveillance camera image sensor. Using the camera image sensor as a VLC receiver is challenging since the data rate is limited by the frame rate and due to uneven light exposure. The rolling shutter effect of the image sensor can be used to increase the data rate.

VISIBLE LIGHT COMMUNICATION (VLC)

It is considered as an effective tool in future wireless communications technology. VLC is a secure communication when compared with other wireless communications .Visible light is only a small portion of the electromagnetic spectrum. Li Fi is a Visible Light Communications technology. That has running wireless communications to receive and transmitting data at very high speeds. The main components of this system are a high brightness white LED. There are preferred sources for dual purpose of lighting and data communication.

Converging Blockchain and Internet of Things

David Nettikadan, Riya T Raphael, Blessy Daise Paul

Abstract: *Internet of Things (IoT) ecosystem is expanding at an unimaginable pace and is applied to every aspect of life. Though no one questions the impact and usefulness of this technology, many criticisms have been coming up these days as many security and privacy issues are made public. At the same time having a central system capable of controlling and maintaining a large number of devices is also an issue faced by the IoT ecosystem. The solution proposed by most of the researchers and industries is to converge the IoT ecosystem with the technology underlying the most secure cryptocurrency Bitcoin, which is called as Blockchain. A blockchain in short is an immutable distributed ledger system. It enables the IoT devices to have data security and privacy without needing a central authority. This paper studies what are the issues IoT ecosystem is currently facing and how a blockchain can help to solve it, the relevance of blockchain-IoT convergence, and the areas where this can be applied. The companies who are developing products based on this new technology and various challenges this technology is facing right now is also explored in this paper.*

Keywords: Blockchain, De-centralization, Distributed Systems, Internet of Things, Security.

I. INTRODUCTION TO INTERNET OF THINGS

Internet of Things (IoT) is a network of everyday objects often called as 'things', which are interconnected to each other. It is used to make everyday objects smarter. IoT is used in smart homes, to monitor the environmental and security conditions of the home and to control home appliances automatically. IoT has been used in enterprise based applications such as a factory setup for automation, climate control, and automation. It is also used for providing utilities like energy via smart grid and smart metering, water, and other utilities. Smart transportations and logistics are another domain of application of IoT. The live traffic situation is sensed using various sensors and the traffic lights and routing are controlled accordingly. Another main area of application is healthcare where the diagnosis can be automated to large extent. [1]

A. Challenges Faced by IoT Ecosystem

But as the application scenarios of IoT are exponentially increasing, the issues concerning IoT are also increasing. The challenges IoT ecosystem faces can be primarily categorized into three areas: security, scalability, and privacy. [2] The data IoT devices generate and process contains sensitive information. For example, a security camera or camera as part of a smart TV can be used to monitor the presence of people in a home. So these devices are always an appealing target for cyber-attacks. The security systems are not equipped to accommodate the large ecosystem which has resulted in various catastrophes.

Security Issues. A DNS provider named Dyn faced cyber-attack in October 2016, where the attack originated from 'tens of millions of IP addresses' and a considerable amount of the traffic was from IoT devices like webcams, baby monitors, home routers. Those devices were infected with malware named Mirai, which used those devices to launch a DDoS (distributed denial of service) attack on the server. This attack demonstrated how vulnerable the security of the IoT devices is. [3]

The IoT devices are usually of low energy and lightweight in nature. In IoT devices, most of the CPU resources are allocated to execute the core application functionalities. To attain security and privacy additional cryptographic support for devices is needed. This will need additional resources which will result in price hikes which will6 not be in the general interests of the manufacturers and consumers. Securing IoT network is also a major issue since there is a wide range of communication standards, protocols, and device capabilities. The network is getting more complex making it more difficult to secure it. Though many security mechanisms for IoT exist right now it's not equipped to address present challenges. [4]

Need of Central Server. It is predicted that the IoT devices will cross 20 billion in numbers by 2020. Present IoT solutions are depended on centralized server-client architecture which won't be able to accommodate the present growth of IoT devices. To accommodate the increasing number of IoT devices, the capacity of the central server has to be increased, which in case increase the price dramatically. So we need some decentralized architecture depending on Peer-to-Peer structure. For this, some new technology has to be adopted.

Privacy Issues. After the Edward Snowden leaks the customers cannot trust the technological partners who give access and control to authorities to collect and analyze their data which risks the privacy and anonymity of the user. To increase the trust factor and transparency they should adopt open-source approaches. [5] A new technology called blockchain can be a solution to the problems faced by the IoT ecosystem right now.

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Smart Community Monitoring System using Thingspeak IoT Plaform

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Abstract

The world especially homes are getting smarter on a daily basis, by the arrival of the Internet of Things (IoT). As man is a social being the smart homes must not be standing alone, they must collaborate each other to build a smart community. Smart community is a network of smart homes in a local geography. The smart community acts as an intermediate between smart homes and smart cities. Various papers propose smart community architecture where all homes in it are having the same functionality. But that is not the case in the real-world scenario. In a society, various homes will be needing various functionalities. Each home will have to monitor different parameters using different sensors and have to provide different responses and services accordingly. This paper presents a monitoring platform for a smart community, of which there are three custom-designed smart homes having different functionalities. The data is sent to ThingSpeak IoT platform via MQTT protocol which will be displayed in charts. The IoT platform also alerts the community manager and other homes in case of emergency using the ThingHTTP, React and TalkBack app in the ThingSpeak. Device control is based on time is implemented using TimeControl and based ib Tweet messages is implemented using TweetControl app. The monitoring platform was successfully implemented and was found functioning well.

Keywords: Smart Community, Smart Home Management System, Internet of Things (IoT), ThingSpeak, MQTT.

INTRODUCTION

Internet of Things (IoT) is a network of everyday objects often called as 'things', which are interconnected to each other. Internet of things is popularly used in making everyday appliances smarted, especially homes. These devices and record the surrounding conditions, or user activity and predict their future behavior. This helps the user to be prepared everything one step ahead according to one's preferences, comfort, and convenience. As the man being a social being, requires him to collaborate with each other. Similarly, the smart homes must not be standing individually, but collaborate each other building smart communities and societies. Dr. Mal Bryce pointed out that "our primary economic and social challenge for this first decade of the new millennium is to harness the new economy and create the new community...one that is an exciting place in which to live and work. The new

economy is the Global Knowledge Economy and the new community is the Smart Community". [1]

One of the simplest definitions on the Internet of Things is made by the RFID group as, "The worldwide network of interconnected objects uniquely addressable based on standard communication protocols." [2] There are three components for IoT systems- a) Hardware section which includes the sensors, actuators and the communication sections. b) Middleware is used to analyze the data received from the sensors by doing necessary computations after storing it. c) Presentation to visualize and interpret the data in an easy manner. IoT is used in smart homes, enterprise based applications, providing utilities, smart logistics and transportation and healthcare.

SMART COMMUNITIES

In simple words, a smart community is a "virtual environment composed of networked smart homes located in a local geographic region. It is formed upon the agreement of participating homeowners, with respect to local geographic, terrain, and zoning features."[3] But in a broader sense, we can tell it as a group of a connected object over the ubiquitous network and the objects interact with each other to deliver smart services for all its members. The size of the smart community can vary. They are evolving over time, becoming smarter and smarter.

In technical language, a smart community can be defined as "a multihop network of smart homes that are interconnected through radio frequency following wireless communication standards such as WiFi (IEEE 802.11) and the third generation (3G) of mobile telephony." [4] It is "a cyber-physical system, in which homes are virtually multifunction sensors with individual needs, continuously monitoring the community environment from various aspects; and, when necessary, automatic or human-controlled physical feedback is input to improve community safety, home security, healthcare quality, and emergency response abilities."[4]

The smart homes are built by integrating three domains- the community domain, the home domain and the service domain. The community domain is the connected network of homes where the information from individual homes is disseminated. The home domain consists of a continuous real-time monitoring system the Ambulance, security and environmental networks works as a call

A Study on Millimeter-Wave Vehicular Communication

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ABSTRACT: As driving becomes more automated, since they equipped with more sensors generating even higher data rates. Radars used as object detection, the visual cameras as virtual mirrors, and LIDARs for generating high resolution depth associated range maps. Connected vehicles uses wireless communication to exchange sensor data, to enlarge their sensing range and improve automated driving functions. Conventional technologies DSRC and 4G cellular communications do not support the Gb/s data rates. This article makes the case that Mm-Wave communication is the method for bandwidth connected vehicles. The motivations and challenges associated with using Mm-Wave for V2X communication are highlighted. A solution to one key challenge the overhead of Mm-Wave beam alignment is proposed. The critical feature of this solution is to leverage information derived from the sensors or DSRC as side information for the Mm-Wave communication link configuration.

KEYWORDS: LIDARs, V2V, V2I,V2X, DSRC, 4G. .

I. INTRODUCTION

The number of sensors on vehicles and data rate is increasing. The average number of sensors on a vehicle now is around 100, but their number is expected to double by 2020. Automotive radars and visual cameras are the most common safety sensors found in vehicles. By sensing the existence, position, velocity of other vehicles, automotive radars make it possible to realize adaptive cruise control, blind spot detection, lane change assistance so on. Cameras make better driving security, such as they eliminate blind spots and works as virtual mirrors, and provide better night vision with infrared sensors. Autonomous vehicles heavily rely on LIDARs, which use laser technology to generate HD range maps. The amount of data generated by LIDARs is similar to conventional automotive cameras, which will increase the rate of data generated by a vehicle. Safety algorithms needed to work with more sources of data and higher data volumes.

A major challenge associated with current sensor technologies is that they have a limited sensing range. Considering the radars, cameras, and LIDARs provide information only about the objects within the line of sight, which limits the automation capability of vehicles for better safety measures. An alternative methodology is to have wireless communications which enable cars to exchange information called connected vehicles. Various safety-related applications with improved automation capability are enabled by vehicle connectivity, including forward collision warning, do not pass warning, blind intersection warning, and red light violation warning, which may reduce by more than 80 percent of car crashes.

Two potential benefits of vehicles, Firstly, if a suitable carrier frequency is chosen, cars can communicate in non-line of sight. Second, if a high bandwidth communication link is available, cars can share higher rate raw sensor data. Fully connected vehicles can implement powerful active safety applications, that is, "Bird's Eye View" identified in the Fifth Generation. Shared sensor data can be processed by each vehicle. This has the potential to further improve transportation efficiency and safety.
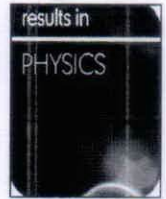
Microarticle

Numerical analysis of circularly polarized modes in coreless photonic crystal fiber

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ARTICLE INFO

ABSTRACT

In this paper, the coreless photonic crystal fiber (CO-PCF) is investigated using finite element. The absence of core in the PCF structure is achieved by applying the permanent twist on its cladding boundary and hence the light propagation path tends to be circularly polarized. The other modes can also be exerted other than the fundamental modes is known as cladding filled modes or super modes.

Introduction

In modern optics, the different mechanism of light propagation has been followed. The main features of the light manipulation are referred as polarization [1]. Sofar, many researchers have investigated various polarizations such as liner polarization, elliptical polarization and circular polarization. Among the different types of polarized waves, the circular polarization is considered and preferred for all other better applications of photonics. The same thought has been extended to the special kind of fiber known as Photonic crystal fiber (PCF) [2] which act as deserved candidates for photonic society in various aspects such as Sensing [3,4], THz devices [5] etc. Further, the PCF is supposed for generating the circular polarization which could be done by applying the permanent twist on its cladding boundary and called as coreless PCF

Design and modes calculation

The cross section view of the (CO-PCF) and its mode distribution are shown in Fig. 1. The dimension has been followed by [6] and the permanent twist is applied by the given matrix Eq. (1). The application of stress on the cladding region induces the six spoke effect as shown in Fig. 1(b) such that the cladding region is formed by six layers of hexagonal shape and it exhibits the flower pattern with six wings in a circular pattern. Hence it is said to be circular polarization. The

cladding modes other than the fundamental modes are known as super modes which would be considered for many prominent applications. The tensor matrix to induce the circularly polarized medium over the length of PCF is given by [6],

$$T^{-1} = \begin{bmatrix} (\alpha^2 x^2 + 1) & \alpha^2 xy & -\alpha y \\ \alpha^2 xy & (\alpha^2 y^2 + 1) & \alpha x \\ -\alpha y & \alpha x & 1 \end{bmatrix} \tag{1}$$

Conclusion

This paper has given the method of inducing circular polarization using coreless photonic crystal fiber (CO-PCF). The mode distribution of the fundamental mode for left and right rotation is numerically simulated. Also, the cladding modes or super modes were exhibited to shown the property of CO-PCF. This entire mode pattern with circularly path was achieved by applying permanent twist on its cladding boundary.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.rinp.2019.02.076.

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Microarticle

Exploring magnetic fluid sensor using dual circular core elliptical cladding photonic crystal fiber

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ABSTRACT

The work deals the sensing mechanism of magnetic fluid for various magnetic field strength (Oe). The sensing medium is infiltrated in the given hollow circular hollow channel of photonic crystal fiber(PCF). Using finite element method (FEM), the light interaction between magnetic fluid and silica glass is numerically investigated. By calculating the spectral shift of resonance wavelength for 100 Oe, 120 Oe, 140 Oe and 160 Oe, the sensitivity of the proposed design is achieved.

Introduction

In modern optics, optical sensor has attained more impact as it scaling size in micro range. Particularly, PCF is highly deserved to proposed various kind of sensor such pressure sensor [1], temperature sensor [2], glucose sensor [3], Refractive index sensor [4], salinity sensor [5], blood plasma sensor [6]. In this work, photonic crystal fiber based magnetic fluid is investigated using FEM and its spectral shift decides the sensitivity of magnetic field strength (Oe). The refractive index of magnetic fluid is taken from [7].

Design and numerical investigation

Fig. 1 shows the cross section view of the 2D magnetic field sensor. The dimensions are d, P, r1x, r1y are properly chosen as 1 μm, 2 μm, 0.7 μm, 0.5 μm respectively. The analytes is infiltrated in the blue region.

Fig. 2 shows mode distributions for the proposed structure such as even and odd mode for X and Y- polarization. Fig. 3 portrays the transmission spectrum for different magnetic fluid. The arrows show the electric field distribution in different directions.

The sensitivity is reported by taking the slope spectra shift and peak wavelength for 160 Oe noted as 1440.3nm, 1440 nm with sensitivity of 3125 nm/[RIU] for X-polarization and 2500 nm/[RIU] for y-polarization respectively.
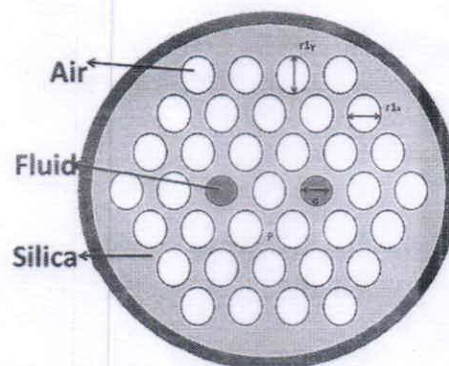
Fig. 1. Cross sectional view of magnetic sensor PCF.

Conclusion

The proposed work is for sensing the various magnetic field strength (Oe). The sensitivity of X-polarization has greater than the Y-polarization such as 3125 nm/[RIU] and 2500 nm/[RIU] respectively. All the numerical simulations were performed by finite element method (FEM)

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TECHNICAL REPORT

Evaluation of various benchmark processes with appropriate controller design in LabVIEW platform

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ABSTRACT: Engineering education needs simulation studies and it is the best way of understanding engineering concepts with minimal cost and energy. The main focus of this present work is to provide a workspace especially in LabVIEW for analyzing the performance of the system and to operate them in stable and controlled regions. LabVIEW is a simulation platform which facilitates the simulation of various systems and their response with various controllers programmed using functional blocks that are easy to understand. In this work, the benchmark test systems like DC series motor as first order system, general second order system and a Real time rotary Inverted Pendulum (RIP) model which has been reduced with high order system reduction technique are considered. The test systems are controlled with PID controller tuned by various tuning methods. The PID controller is tuned with conventional methods like Ziegler-Nichols (ZN), Internal Model Control (IMC), and Direct Synthesis (DS) and the responses of the systems are analysed in LabVIEW platform. The common platform has been developed and tested for supporting the performance and analysis of the system with adjustable PID controller parameters like proportional gain K_p, integral time constant T_i and derivative time constant T_d. The performance specifications are phase margin, gain margin, bandwidth, settling time, rise time and integral errors. This LabVIEW platform facilitates the learners to analyze the system effectively with various controllers and their performance parameters are compared easily.

KEYWORDS: Control systems; Overall mechanics design (support structures and materials, vibration analysis etc); Voltage distributions

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Designing and Modelling of a Low-Cost Wireless Telemetry System for Deep Brain Stimulation Studies

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Abstract

Objectives: To design and develop a Wireless device for Deep Brain Stimulation studies in Rat Model. **Methods/ Statistical Analysis**: In order to model the design, we have used ASIC (Application Specified) and Off the Shelf Components that helps the device Cheap and portable. We have designed the device using Allegro PCB Design and OrCad. **Findings**: Before the real time execution in rat models, we tested our device in vitro. Device is observed using oscilloscope. We ensured the life time of the device that can extend up to 90 days. In comparing with other commercial stimulators, this device has long duration of life time with high accuracy in delivering output pulses and less expensive. In order to show the reliability, we have included complete schematics and market price of the components used. **Application/Improvements**: The current device can be made use to deliver Unbalanced Biphasic Output Pulses.

Keywords: Pulse Generator, Stimulator, DBS, ICSS

1. Introduction

The settled remedial mediations in the neurological and mental area are the electrical incitement in the cerebrum, called by "Deep Brain stimulation (DBS)". This system has created from confirmed clinical studies and specialized developments[1]. Different cerebrum related clutters, for example, Parkinson's malady, dystonia, epilepsy or constant agony can be treated through this Brain Stimulation. The utilization of DBS is broadening to mental signs, for example, over the top enthusiastic clutters, Tourette's

disorder, dependence. The human work model of Brain Stimulation framework must be utilized in the wide kind of creatures; this isn't conceivable in little creatures and a noteworthy bottleneck for these most regularly utilized creatures as test[2].

These models which are utilized for the learning of the pathogenetic instruments and different treatments for human development issue and mental disorders, for example, "OCD, have normally been made by neurotoxins, acting specifically on neurons influenced by human infections"[3].

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Evaluation Strategies for Wireless Ultra Wideband Communication Towards Orthopedic Surgical Scheme

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Wireless medical devices shall considerably improve the proficiency and effectiveness in medical segments. Recent wireless inventions enable reduced design, thus becomes inexpensive for manufacturing. Huge quantity of individual information is measured and communicated in wireless manner, consequently safety precautions are needed to be integrated with these wireless technologies. The evaluation strategies for Wireless Ultra Wideband communication towards orthopedic surgical scheme has been explained in this paper. Every devices considered in this paper are identical with each others towards their elementary objective. However, they vary towards different real-world applications. The devices enumerated in this paper have shared operating frequency bands of 2.4 GHz ISM Band and UWB frequency ranging from 3.1 GHz to 10.6 GHz. Every devices entailed here is positioned to fit within the operating frequencies either at 2.4 GHz or 3.1 GHz to 10.6 GHz. This paper targets on protective patient-privacy which is deemed to be energetic characteristics towards isolated patient monitoring schemes. Considering the rise in quantity of feasible wireless medicinal products, this paper targets in the engagement of different wireless standards and measured data on the basis of dissimilar rates. Thus, the foremost significant in this work is towards supplementing the quantity of integration in wireless medical monitoring schemes. Similarly, as the applications of implantable and ingestible wireless medical approaches are becoming increased, they offer easy accessing towards data collecting and data which are previously dreadful, and this has been considered as a vital parameter in this paper. Hence, there becomes bigger possibility towards improving exactness of wireless positioning arrangements. When complications of the system increase the prevailing protocols shall not be appropriate for superior and satisfactory bandwidth pertaining real-time application, thereby few protocols have been worked out to encounter this issue. Therefore, the major contributions in this paper include advanced speediness, superior data rate designs and effective protocols. In this paper, all the structures entailed have the potential to assist doctors for improving the dominance in lives of patients, thus application development is properly discussed for progressing with these implements.

Keywords: Wireless Medical Device, Medical Testing, Medical Imaging, Orthopedics, Monitoring Systems, Computer Aided Surgery, Wireless Medical Devices, Wireless Technologies.

1. INTRODUCTION

Ultra-wideband (UWB) technologies are employed in recent medical devices because of their lower likelihood in detecting radar systems.[1] Attention towards UWB for exclusive wideband communication and placing them has-risen steeply when Federal Communications Commission (FCC) liberated their notification of inquiries during 1998, as enumerated by R. Chávez-Santiago et al.[8] The representation of a characteristic wideband locating system, in which four or more base station triangulates these 3D position for mobile tags, thereby reference tags are considered to offer location and orientation point towards global coordinate frames (Fig. 1). At this point, the base station (BS) is linked with master processing units, thereby reference tags are necessary for bringing mobile tags towards 3D global coordinate structure. 3D triangulation shared with cutting-edge discovery in UWB receivers helped in mitigating severe necessities required at base station management and alternating sensitivity towards denser interior multipath interference. This is well known. Though the system entailed with appropriate schemes but since it is executed within...

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1

A Prototype Design of RFID Centered Hi-Tech Toll Assortment Plaza

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ABSTRACT

The superhighway of transport has become an extra factor in contemporary road system and the physical toll assortment system has turn out to be old fashion due to its digit of problems. By engaging computerized toll assortment system, driver of motor vehicles require not to stopover at a booth or and excess period for coming up in an extended queue to remunerate the toll. This eases the feeding of fuel; lessen congestion, increase road safety. A Radio-Frequency Identification (RFID) Electronic Toll Assortment (ETA) system is fundamentally aimed for an incessant toll assortment, which has developed an imperative part of intellectual transport scheme. This paper grants the perception of RFID ETA by means of designed scheme. This effort eradicates the requirement for drivers and toll consultants to by hand achieve ticket expenses and toll fee assortments, correspondingly. Data info are also effortlessly swapped among the drivers and toll experts, thereby it is able to abolish probable hominoid inaccuracies for well-organized toll assortment.

Keywords: Radio-Frequency Identification (RFID), Electronic Toll Assortment (ETA), vehicle monitoring, Management center, Monitoring station.

1. INTRODUCTION

This paper defines the RFID grounded toll assortment in demand to decrease the traffic in tollbooths as hold back time. Radio Frequency Identification is an auto identification technology which uses radio frequencies to recognize matters remotely. It does the work of sensing, billing, and accounting for vehicles as they permit through toll (Aniruddha and Kshitiju., 2014).An RFID tag is programmed with information in the form of a code which can be recite over a substantial remoteness so that its matters categorizes the vehicle and develop transaction to be undertaken with respect to the specific tag. It takes the advantages of radio frequencies ability to travel extended ranges with well data competencies and extraordinary speed.

In contemporary era of technology, wherever machineries are actuality widely castoff in all the fields .We are demanding to emulate idea, which will be of pronounced and that can be used in communal transportation scheme. Nowadays an individual has to mobile long space into immensely unidentified terrains for profession, trade or even for travel. As the vehicles are increasing and transportations that are dropping short, currently we see regular traffic jam or long logjams at the toll station coming up for giving the toll. Paying the toll every time over cash or inspection of the pass takes a lot while and nowadays time is more important than money. Therefore this paper aims at minimize the time expended for manual transactions, human effort and air pollution (Wei-Hsun Lee, Shian-Shyong et al., 2008; F.Don., 2004).

2. LITERATURE REVIEW

Tolls has a significant role in supporting road developments if traffic is further than a certain level then the externalities of toll plaza in relations of time wasted, fuel consumed and incremental air pollution makes them an ineffective and counterproductive device for funding road. The objective of this project is to make an automatic toll

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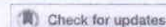
Corrosion of reinforcement in concrete with fly ash and manufactured sand

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ABSTRACT

This research article reports the comprehensive experimental studies conducted on the identification of corrosion mechanism. The study is made in two different types of samples taken from reinforced concrete containing class–F Fly ash and steel bar with different fine aggregates such as river sand and manufactured sand. It also reports the study under different curing conditions to find out corrosion attack on fly ash concrete structure. Cement placed by means of Fly ash, concrete mixes prepared with 20%, 30%, 40% weight of cement and using 16mm diameter steel bar 100mm length with 25 mm clear cover were used as samples. Corrosion process was investigated in embedded steel bar by using Tafel polarization and AC Impedance methods by using ACM Instruments (UK).This study will help in identifying the level of corrosion between the usage of river sand and the manufactured sand.

1. Introduction

Corrosion is the process by which a metal or an alloy deteriorates, because of oxidation, a chemical action that creates iron oxides and that flake away from the base [1]. Corrosion of concrete means degradation of concrete such as spots, cracks, spalling that lead to the loss of strength and dimensions of the concrete member due to corrosion of steel reinforcement embedded in concrete [2,3]. The steel reinforcement in fly ash concrete has received an increasing attention in recent years. Because of fly ash availability in cheaper cost, much more quantity is used in construction Industry. Fly ash is a byproduct of the coal fired thermal power plant which has the combination of (Anthracite, Bituminous-class F), (Lignite, sub bituminous–class C).

Fly ash is generally captured by electrostatic precipitators (ESP) before the flue gases reach the chimney which is well accepted as a pozzolonic material used either as a component of ordinary Portland cementor as a mineral admixture in concrete [4]. Fly ash is excellent void filler than Portland cement in concrete . The cost of fly ash is cheaper than OPC. The chemical composition of fly ash consists of 95% to 99% of oxides of silicon, aluminum, calcium in the form of Silicon Oxides (SiO_2), Aluminum Oxides (Al_2O_3), and Calcium Oxides (CaO), Iron Oxides (Fe_2O_3), remaining of trace elements. Carbon content in the fly ash is measured by the Loss on Ignition (LOI). Fly ash occurs as very fine particle having an average diameter less than 10μm with solid and hollow spheres in shape, and have high surface area 300 to 500 sq.m/kg, specific gravity between 1.9 to 2.8, low to medium bulk density 540 to 860 kg/cum without compaction, and 1120 to 1500 kg/cum with compaction and very light texture grey or tan in color.

The quality of fly ash varies depending on the quality of coal which is being used and also depends on the operating condition of the thermal power plant. The main reason for corrosion in fly ash concrete is combination of the mixture of chloride iron (Cl^-)and carbonization [5]. The corrosion of reinforcement in fly ash concrete is the electrochemical process with the presence of oxygen and water [6, 7]. The high alkaline environment (pH>11) protects the steel reinforcement from corrosion. The factors that affect the rate and level of corrosion are pH of the concrete pore water, crack in the concrete, carbonization of cement paste, stray current, design features of concrete, mixture proportions of the concrete, thickness of concrete, concrete cover, and galvanic effect. The concrete deterioration occurs due to rust (Ferric oxides and Ferric hydroxides) formed at the interface between reinforcement and concrete with the rust volume of 3 to 6 times more than Fe iron. Rust creates internal stresses in concrete member [8,9]. Due to Internal stresses cracks will form on the surface of concrete which subsequently damage the concrete structure that finally lead to the collapse of the entire concrete structure. The major contributions behind our work are as follows:

- An experimental study are made on the identification of corrosion mechanism in different types of reinforced concrete containing class – FFly ash and steel bar with different fine aggregates such as river sand and manufactured sand.
- Analyzes is done in different curing conditions to find out corrosion attack on fly ash concrete structure.
- Investigation is carried out the corrosion process in embedded steel bar by using Tafel polarization and AC Impedance methods by using ACM Instruments (UK).
- Inference from the study is carried out such as Tafel polarization and AC Impedance the test results obtained shows 1% to 2%variations.

The rest of this work is summarized as follows: Section 2 demonstrates the materials and methods used in experimental study. Section 3 describes the steel reinforcement corrosion steel mechanism. Section 4 explains the experimental

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Experimental Study of Refrigeration Cycle Using Diffuser Pipe and Application of Nano Particles

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ABSTRACT

Refrigeration is the process of removing heat from a low temperature reservoir. The refrigeration system use liquid refrigerant as the medium which absorbs heat from the space to be cooled. Then it reaches compressor, where it is compressed to high pressure resulting in a high temperature as well. This refrigerant is then passed through the condenser and then through expansion valve, resulted decrease in temperature and pressure, then reaches the evaporator and cycle continued. This paper was experimental investigation and provide proof that COP of a refrigerator is increased by installing the diffuser in the inlet of the compressor and by adding nano particles in to the refrigerant of the system.

Keywords- COP, diffuser, nanoparticles, refrigeration.

1. INTRODUCTION

Today one cannot refuse the use of refrigeration system in our life, not only in kitchen but also in shops, industries and commercial purposes[1].It have estimated about 15% of all electricity produced worldwide is used for refrigeration and air conditioning processes of various kinds. This paper is to provide a proof based by installing the Diffuser in the inlet of the compressor and also to use of nanoparticles in refrigerant in vapor compression refrigeration system is considered the use diffuser pipe can increase the pressure drop at the inlet of the compressor it in turn reduces the work load of compressor. So the power used by the compressor for pressuring gets reduced. The use of nano particles in the refrigerant increase the heat exchange capacity which in turn increases the efficiency and performance of refrigerator. A lot of studies are going on the field of nano particles. Nano particles increase the heat exchange capacity due increase in surface area and also due to the high volume fraction.

2. EXPERIMENTAL SETUP

A. COMPONENTS

The experimental consists of compressor, fan cooled condenser, expansion device and an evaporator section [2, 3]. Capillary tube is used as an expansion device. The Evaporator was of roll bond type which is a plate type evaporator. Service ports are provided at the inlet

of expansion device and compressor for charging the refrigerant. The mass flow rate was measured with the help of flow meter fitted in the line between expansion device and drier unit. The experimental setup was placed on a platform in a constant room temperature.

B. INSTRUMENTATION

The temperatures at evaporator is measured using digital thermocouples. Two digital thermocouples were used for the experimentation. One for obtaining the initial and other for final temperature of water. The pressure at compressor suction, discharge are measured with the help of pressure gauges. The power consumption of the system was measured by a digital Wattmeter. A digital wattmeter is also connected with the experimental setup.

3. EXPERIMENTAL PROCEDURE

A. CONSTRUCTION OF DIFFUSER

Diffuser is to increase pressure of refrigerant before entering the compressor so as to reduce the workload of compressor. The design of diffuser is assessed from Yicai Liu, et al. [3]. Then conducted an experimental study on house hold Refrigerator with a diffuser pipe. Material used for making diffuser pipe is copper. The mould of the diffuser was first prepared in the lathe.The copper sheet was then wound around this mould and hammered till the shape of the diffuser was obtained. Then the open end of the diffuser was then brazed. So

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Energy and exergy analysis, drying kinetics, modeling and quality parameters of microwave-dried turmeric slices

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Abstract

The aim of this study was to evaluate the effect of curing and microwave power levels on energy analysis, drying characteristics, modeling and quality parameters of turmeric slices in microwave dryer. Drying experiments were carried out for fresh and cured turmeric slices. Four microwave power levels of 30%, 50%, 80% and 100% with the total output power of 900 W were used for this study. From the drying rate curve, it was observed that the drying process mainly takes place in the warming up and falling rate periods. Among the eight models evaluated in the study, Midilli et al. and Page model had a good agreement with the experimental data. Moisture diffusivity values increased (1.83×10^{-08} to 1.59×10^{-07} m^2/s) as the microwave power level increases. From the energy analysis, it was found that specific moisture extraction rate and specific energy consumption values varied in the range of 0.146–0.395 kg/kWh and 9.1093–24.6093 MJ/kg, respectively. Energy efficiency values (9.24–24.75%) were found to be higher than the exergy efficiency values (2.18–12.77%). Quality parameters such as color value and curcumin content of the fresh samples were found to be higher when compared to cured samples. SEM analysis revealed the porous internal structure of the dried samples. From this study, it is revealed that curing of turmeric slices has negligible effect on the parameters analyzed. A moderate microwave power level would be suitable for turmeric drying to produce high-quality product with lesser energy consumption.

Keywords Microwave drying · Drying kinetics · Energy and exergy analysis · Modeling · Quality parameters

Introduction

Turmeric, an Indian spice (Curcuma Longa), is a perennial rhizomatous erect herb from the *Zingiberaceae* family which belongs to the class of *Monocotyledons* [1]. The bright yellow color of turmeric is due to the presence of fat-soluble, polyphenolic pigments known as curcuminoids. Curcumin is the principal curcuminoid compound along with demethoxycurcumin and bisdemethoxycurcumin. Apart from the use of turmeric as a spice and coloring agent, it has anti-inflammatory and anticancer activities with high potential to prevent and treat various diseases

[2]. Among the various preservation techniques employed in agricultural processing, drying is one of the oldest and most commonly used method. In India, most of the post-harvest losses of the agricultural products are mainly due to the lack of efficient drying techniques [3]. Drying is an important unit operation that forms an integral part of many food processing systems. Sun drying is the most commonly used method for drying of turmeric fingers for powder production and storage. Even though this method has an advantage of utilizing the cheapest source of energy from sun, it has some limitations such as long drying time (10–15 days), non-uniformity in product quality, post-harvest losses by insects and birds and chances for microbial attack due to its higher initial moisture content (70–80%). Alternative to the sun drying method evolved the mechanical air dryers with higher product quality and lower energy efficiency. Singh et al. [4] evaluated the mechanical air drying of turmeric rhizomes at various temperatures and air velocities. They found that better
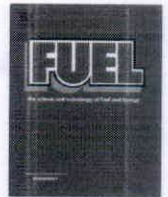
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Full Length Article

Experimental investigation on performance, combustion and emission analysis of a direct injection diesel engine fuelled with rapeseed oil biodiesel

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ABSTRACT

Depletion of fossil fuel resources and continuous release of greenhouse gasses to the environment forces the researchers to develop alternative fuel technologies that are environmentally more acceptable. Trans-esterified vegetable oil derivatives also called 'biodiesel' appear to be the most convenient method of utilizing bio-origin vegetable oils as replacement fuels in diesel engines. In the present study, biodiesel was prepared from non-edible rapeseed oil through the *trans*-esterification process and the property of biodiesel was compared with standard diesel fuel. The methyl esters of vegetable oils cope well with the existing engine hardware and do not require noticeable modification. Experiments were carried out to analyse the performance, combustion and emission characteristics of a four stroke, single cylinder 5.95 kW, direct injection diesel engine fuelled with diesel, rapeseed oil biodiesel and diesel–biodiesel blends at a constant injection pressure of 200 bar. The performance parameters such as brake thermal efficiency, brake specific energy consumption, exhaust gas temperature and combustion characteristics such as in-cylinder pressure, heat release and ignition delay of the engine were evaluated. Unburned hydrocarbon, carbon monoxide, oxides of nitrogen and smoke emission of the engine were also measured for all the test fuels. The results of the experimental investigation with biodiesel blends were compared with that of baseline diesel. The test results revealed that B25 blend can be used in the diesel without making any modification in the engine with acceptable thermal efficiency and improved exhaust emissions.

1. Introduction

Energy consumption is growing exponentially due to rapid progress in the living standards of mankind. Nowadays, the fossil fuels play a major role in the mobility, industrial sectors, and agricultural sectors. Meanwhile, the availability of petroleum resources is limited in nature and they are getting depleted day by day [1–3]. Furthermore, problems related to the environment are the most important consequences of consumption of more fossil fuels. The issue of energy security and environment issues made countries and researchers to look for alternate means of renewable as well as environment-friendly fuels. The most promising and economically viable alternative narrow downs to bio-fuels [4,5]. Various sectors are looking for alternative fuels because of the energy crisis and the fear of society for depleting earth's non-renewable resources. Among various fuel alternatives, vegetable oils and their derivatives are widely preferred [6].

Researchers from all over the world started proposing various

methods to use vegetable oils in internal combustion engines. These methods include pyrolysis, micro-emulsification, direct blending with diesel, transesterification, etc. [7,8]. Haldar et al. [9] tested the Putranjiva, Jatropha and Karanja oils in a Ricardo variable compression ignition engine to investigate and compare the results of performance and emission properties. It was found that the non-edible oil of Jatropha gives the best performance and emissions results at all the load conditions compared with other vegetable oils. Saravanan et al. [10] have investigated the feasibility study of crude rice bran oil as a diesel substitute in a compression ignition engine without any modifications. They reported that thermal efficiency of the engine with rice bran oil is slightly lesser than diesel, but resulted in better emission characteristics.

Naga Prasad et al. [11] investigated the compression ignition engine with neat castor oil and its blends with diesel and found that the performance characteristics are reduced to those of diesel. But they also found that the emission characteristics are increased at the rated load

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Experiment on carbon dioxide removal from flue gas

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Abstract

Reducing CO_2 emissions for addressing climate change concerns is becoming increasingly important as the CO_2 concentration in the atmosphere has increased rapidly since the industrial revolution. Carbon capture and storage is the process of capturing waste carbon dioxide (CO_2) from large point sources, such as fossil fuel power plants, transporting it to a storage site, and depositing it where it will not enter the atmosphere, normally an underground geological formation. The aim is to prevent the release of large quantities of CO_2 into atmosphere. This paper aims at manufacturing of a simple and useful unit of capture the carbon dioxide. The air with carbon dioxide is made to flow through the reaction chamber using an axial flow fan and NaOH is sprayed using a nozzle. The NaOH reacts with CO_2 and form Na_2CO_3, and is collected in a tray. The maximum absorption rate of CO_2 is found to be at NaOH solution molar concentration of 5.

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A review on analysis of HHO gas in IC engines

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Abstract

The over usage of fossil fuel and the resulting drastic increase in pollution levels has made us realize the need for a new sustainable fuel which does not cause pollution. This search ended up with an innovative idea of using Brown gas as a fuel enhancer in internal combustion engines which uses fossil fuels as a primary source for combustion. Many developments have been made in this area with several experiments on gasoline as well as diesel internal combustion engines till now using HHO gas or brown gas as a fuel performance enhancer. This work involves the review of various developments which has taken place in this field. With the addition of HHO gas there was a net increase in brake power ranging from (2% to 5.7%) and increase in brake thermal efficiency which ranges from (10.26% to 34.9%). A decrease in specific fuel consumption was observed which ranged from (20% to 30%) along with a decrease in CO and HC emissions on an average of 18%and 14%respectively.

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8

Design & Development of a Gear based Conveyor System

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Abstract— Conveyors are used for transmitting raw materials, finished products, by products of some process etc. from one place to another. Conveyors are widely used in many process industries and manufacturing shops. Some of the commonly used conveyors systems are belt conveyors, roller conveyors, screw conveyors, pipeline conveyors, and monorail and trolley conveyors. Conveyors are useful when loads are uniform, material moves continuously, routes do not vary and movement rate is relatively fixed. Proper selection and design of the conveyor system is necessary for the efficient working of the process. In this paper modification of an existing conveyor system is done. The conveyor system is used in phosphoric acid plant to transfer gypsum to temporary storage. The work includes examining the existing system and collection of data, analysing the problems related to the existing system, suggestion of an improved design for better efficiency and life.

Key words: Conveyor, Process, Chain, Gear, Coupling, Design

I. INTRODUCTION

Conveyors are rotating machines raw material, semi-finished and finished materials. Normally conveyors are used for short distance applications. Conveyors primarily perform the movement of uniform loads between fixed points. Different types of conveyors are belt conveyors, roller conveyors, screw conveyors, pipe line conveyors, and monorail and trolley conveyors. Conveyors are useful when

- Loads are uniform.
- Materials move continuously, routes do not vary.
- Movement rate is relatively fixed.

Conveyors have three parts. Rotor, idler and the belt. The rotor connects with the motor by using coupling, chains. For longer belts a weight is added to the lower portion of belt to maintain tension in belt.

II. CONVEYORS USED IN PHOSPORIC ACID PLANT

In PAP the materials are transmitted by using conveyors for solid/powder materials, fluid materials are passed by pipe lines. Different conveyors used in PAP are mentioned below.

- Belt conveyors for transmitting rock phosphate from barge to grinding mill.
- Bucket conveyors to transmit fine phosphate from grinding mill.
- Screw conveyor to transmit fine phosphate from Libra feeder to attack tank.
- Gypsum conveyors to transfer the by-product gypsum to temporary storage.

A conveyor system is a common piece of mechanical handling equipment that moves materials from one location to another. Conveyors are especially useful in applications involving transportation of heavy or bulky materials. Conveyor system allows quick and efficient transportation for a wide variety of materials, which makes them very popular in material handling and packing industries. Many kinds of conveyor systems are available, and are used according to various needs of industries.

III. PROBLEMS FOUND IN CONVEYORS

Here the aim is to optimize the mechanical maintenance and improve the operational efficiency of conveyors especially belt conveyors some repeated problem of belt conveyor (rock phosphate conveyor-conveyor & gypsum conveyor-conveyor). By comparing the problems occurred in Rock phosphate-conveyors as well as Gypsum-conveyors, it is found that following problems occurred continuously in G-conveyors.

- Belt problem (belt broken)
- Bearing damaged
- Connecting chain broken.

	EQUIPMENT	GEAR BOX DETAIL	INPUT SHAFT BEARING & OIL SEAL	OUTPUT SHAFT BEARING & OIL SEAL	SPROCKETS	COUPLING
1	G3	U 800 RADICON RATIO 30:1 LH	7313 2- Nos 275*300*37	7216 -2Nos 300*375*37	36:57 1" pitch TRIPLEX	F 70 Tyre coupling
2	G4	U 800 GREAVES RATIO 30:1 LH	31313 -2Nos 275*300*37	32216 -2Nos 300*375*37	36:57 1" pitch TRIPLEX	F 70 Tyre coupling
3	G1	U 700 RADICON RATIO 30:1 RH	7312 -2 Nos 200*275*10	7215 -2 Nos 275*350*10	19:38 1" pitch DUPLEX	F 70 Tyre coupling
4	G2	U 700 GREAVES RATIO 30:1 RH	31313 -2Nos 200*275*10	32214 -2Nos 90*70*10	19:38 1" pitch DUPLEX	F 70 Tyre coupling

Table: 1 Existing Design

22

3(b)

Voltage Controlled DC-DC Converter for Enhancing Waste Heat Recovery

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Abstract- The waste heat is a main concern that effect the efficiency of almost all the equipment's we come across. The waste heat retrieval using thermoelectric modules(TEM) can increase the efficiency of the overall system, not in a high amount but 3% to 7%. The efficiency and output voltage profile of TEM is very low. Appropriate power control circuitry is needed to utilize this waste heat. The paper discusses a voltage controlled single switch converter, to utilize the heat recovered for low voltage DC (LVDC) applications. A hybrid topology incorporating a SEPIC and Boost converter . The converter is suitable for TEM applications. The voltage control is simpler and is implemented using PI controller. The TEM is modelled and the closed loop converter is simulated MATLAB\SIMULINK.

Index Terms- Thermoelectric Module (TEM) ; PCU ; LVDC ; SEPIC.

1. INTRODUCTION

The demand for electricity is increasing day by day. In the recent years with the advancement of electronic equipment's there is a transition from AC to DC power usage. Today DC loads have substituted most of the conventional AC loads in our private houses and larger (commercial and office) buildings. DC power is produced locally and consumed locally. In a developing country like India the main beneficiaries of the LVDC is the household utilities. The installations of parallel networks of AC and LVDC distribution systems is a conceivable "transition solution". It is possible to connect different DC sources to a DC grid without a synchronization procedure. This enable the integration of different renewable sources. This paper deals with the production of LVDC using the waste heat recovery.

Heating is a major problem which we are concern with most of the equipment's, what if the wasted heat can be used as the useful energy?. In the day to day life in houses and commercial buildings a lot of heat is emitted from refrigerator , water heater , air conditioner and among others as waste heat. Recovering this heat into usable electricity would save a significant amount of money through increasing efficiency. The increase in efficiency is not a huge amount but only a 3% to 7% increase. Even this increase in efficiency is beneficial as it is from a free source and can contribute to the overall system efficiency.

Due to the prevalence of semiconductor the thermoelectric material was made with n and p type structures . Several thermoelectric materials are connected in series to increase the operating voltage

TEGs generate electrical energy using Seebeck effect from a temperature gradient.
There are mainly four basic components in a TEM. Heat source , TE element , cold side and a Power control unit (DC-DC converter). Various mathematical model for the TEM has evolved over time. Models have been developed to simulate there behaviour and analyse the performance.[1],[2] Equivalent circuit SPICE models of TEMs have been recently developed [3][4], which are suitable for simulation of power-electronics applications. A simple model of TEM using MATLAB/SIMULINK is build in this paper. In order to integrate the TEM with DC grid of 48v a voltage controlled DC DC converter is necessary. Several topologies of boost converter has evolved over time. Basic energy storing elements, in conjunction with switch(es) and diode(s) are utilized in the circuit. Various topologies are incorporating switched capacitor cell [5], switched inductor cells[7] or coupled inductor[9] in the conventional topologies.

The main constraints on the selection of converter are switch stress, current ripple and EMI. A SEPIC converter is a topology that make a compromise on all these constraints. Various modifications on the SEPIC converter has been introduced in order to increase the step up capability[11] and also for power factor correction[12]. Introduction of diode capacitor[13] in the converter topologies provides an added advantage of reducing the switch stress. Hybrid topology[14] is in which different converter are connected in a hybrid fashion. This helps to extract the advantages of both the converters. The paper is dealing with DC DC converter which is a hybrid topology of Sepic and Boost converter with diode capacitor technique a