

Advanced Analytics and Deep Learning Models

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Critical Issues, Open Challenges, and Possible Countermeasures for the Future

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Different programs have been organized by the government to support the genetic data collection and analytics. For example, “All of US program.” The genetic data have been gathered from around 1 million US people from different background. These collected data are combined with different other records like health records and are utilized for personalized medicine, to improve the health condition, etc. Analyzing these records with different features provides efficient good results in respective (Medicare, biomedical imaging, etc.) applications. In the above applications, a broad variety of different methods, including model systems (e.g., CRISPR-Cas9), can be used to clarify the functions of genes and proteins and to re-examine the relationship between the genotype and the phenotype.¹

Today, due to the reduction in the cost of sequencing genes, the importance of genomic data and genetic analysis has increased. Admirable progress has been made by the genome privacy group. It took, for instance, more than 13 years and an estimated cost of US\$3 billion in 2003 to sequence the first human genome.² The reduction of sequencing costs has been improved with genomics as a research discipline with clear application possibilities. As a result, with the improvement of sequencing technology, it has been increasingly integrated into the study of variant interactions. In order to reduce the cost of genome sequencing (GS) to \$1000, it is necessary to increase the cost and performance by another four to five orders of magnitude. Therefore, the question of economic feasibility ultimately focuses on whether the new method can achieve such a huge improvement. It should be noted that few advantages of whole-GS include any gene can be converted into digital data for analysis by allowing the entire genome of an individual to be sequenced (refer to genetic data analysis in Section 18.5). While this results in a large number of data, in the near future, there will also be great opportunities for other research communities.

Genomic data are increasingly used in a range of fields, including health-care (such as personalized medicine), biomedical sciences (such as modern genome-phenome interaction recognition), and direct-to-consumer (DTC)

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Preprocessing Approach Using BADF Filter in MRI Images for Brain Tumor Detection

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Abstract. The pre-processing approach is the first stage in the diagnostic procedure. This is particularly significant in noisy and fuzzy photos. It is one of the prerequisite procedures for achieving great efficiency in subsequent image processing steps. The initial step toward an automated CAD (Computer Aided Detection) system for a range of medical applications is image pre-processing. This phase in the medical profession is critical in generating promising outcomes that aid doctors in lowering death rates. There are a variety of methods for increasing brain MRI that are both accurate and automated. A basic technique for automated pre-processing is provided in this work. When compared to other filters, this approach employs an Adaptive Diffusion Filter in conjunction with a Boosted Anisotropic Diffusion Filter, which outperforms the current anisotropic diffusion filter. For a total of 20 photos, the necessary labor is put to the test. According to the author, BADF assists the radiologist in doing precise brain examinations, hence minimizing risk factors.

Keywords: Preprocessing · Adaptive histogram equalization · BADF · Bilateral filtering

1 Introduction

In recent years, the medical industry has benefited from the development of information technology and e-health care systems, which enable clinical specialists to give better health care to patients. Because of aberrant cell proliferation within the brain, brain tumors have a negative impact on individuals. It has the potential to impair brain function and perhaps put one's life in danger. Benign tumors and malignant tumors are the two forms of brain tumors that have been recognized. SPECT, MRI, ultrasound, CT, PET, and X-ray are all noninvasive medical imaging modalities commonly used for brain tumor detection [1]. Present research work used MRI images for identifying brain tumor. The goal of this study is to give importance to preprocessing technique which plays a vital role in identifying tumor brain tumors.

Early detection of a brain tumor is critical for effective therapy. A radiological examination is essential once a brain tumor has been clinically discovered to assess its

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Lung CT Image Enhancement Using Improved Linear Iterative Clustering for Tumor Detection in the Juxta Vascular Region

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Abstract. Lung cancer is one of the most common causes of deaths worldwide. The ability to predict and diagnose cancer has become increasingly significant in recent years. Early identification of lung cancer appears to be the only way to improve patients' survival rates, which is a difficult effort due to the structure of cancer cells, which has most of the cells overlapping each other. For lung cancer prediction and early diagnosis, image processing techniques are commonly used. The goal of this work is to improve lung CT scans so that the tumour may be identified quickly. First, certain enhancement approaches are employed to enhance and remove noise in photos during image pre-processing. Different sections of the photographs are isolated in the next stage, and the tumour is segmented in later stages. The Improved Linear Iterative Clustering methodology (ILIC) is offered as the first step in our suggested method, whereas the existing system used Simple Linear Iterative Clustering (SLIC), which has various shortcomings. The Improved Linear Iterative Clustering (ILIC) technique is widely used in various types of image processing because of its perceptually excellent meaningful qualities. The proposed technique is applied, and it has improved boundary recall, fuzzy boundary robustness, super pixel size setting, and preprocessing performance on lung photographs. Finally, the PSNR, MSE, and SSIM methods are derived in the preprocessing section.

Keywords: ILIC method · PSNR · MSE · SSIM · Lung cancer

1 Introduction

Lung carcinoma is the most prevalent type of cancer that claims the lives of individuals all over the world. Several Computer Aided Diagnosis (CAD) Systems have been created in recent years. Lung disease is the leading cause of death globally, according to the National Cancer Institute, with a recurrence rate of 20.5% after five years. Doctors divide lung cancer into two basic types based on the appearances of cells under a microscopy. Small cell lung cancer and non-small cell lung cancer are the 2 most

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A Hybrid Feature Extraction Method Using SeaLion Optimization for Meningioma Detection from MRI Brain Image

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Abstract. The Brain is the one that has a significant impact on the control and managing of the entire body. The ability to see, hear, think, walk, talk, feel, remember, and a lot more, and also the breathing which is the essential part to stay alive is controlled by the Brain. So it is a crucial part to take care of the brain from various diseases. Tumors, which are collections of abnormal growth of cells, can cause damage to the brain and can be malignant or non-cancerous. Here we are focusing on meningiomas, the majority of meningiomas are benign (non-cancerous) and slow-growing, although some are malignant. The detection of these types of tumors can be a daring task. As technology evolved, there are various methods that can detect brain tumors and even classify their types. The proposed work follows a hybrid feature extraction method that fuses PCA and GIST and also uses the SeaLion algorithm for optimization purposes. With the hybrid feature extraction techniques and the SLnO, the designed method shows a better classification accuracy. The paper includes the workflow of the proposed strategy, the first phase is all about the preprocessing of the image using the CLAHE and the anisotropic diffusion followed by the segmentation in the second phase, uses K-means, then the feature extraction in the third phase. The fourth phase deals with the optimization and finally the classification of inputs. The trials were conducted on 100 images from the human brain and a synthetic MRI dataset, with 25 images being healthy and 75 being problematic. On both training and test imagery, the classification performance was found to be 98.56%.

Keywords: Brain tumor · Detection · Hybrid feature extraction · CLAHE · Anisotropic diffusion · PCA · GIST · Sea Lion

1 Introduction

The brain is the body's most critical organ, and should be cared for and treated in an extensive way. The tumor refers to an abnormal bunch of cells located inside the brain, tumor can be of two classes, benign and malignant tumor [1]. The proposed method mainly focuses on the meningiomas which are perhaps the most frequent benign intracranial tumors, accounting for 10 to 15% of all brain neoplasms, only with a small fraction of malignant tumors. As the technology evolved, detection and identification of

RECENT TRENDS IN BLOCKCHAIN FOR INFORMATION SYSTEMS SECURITY AND PRIVACY



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The Future of Edge Computing with Blockchain Technology: Possibility of Threats, Opportunities, and Challenges

Aswathy S. U., Amit Kumar Tyagi and Shabnam Kumari

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14.1 INTRODUCTION

In conventional cloud computing, all information produced by Internet of Things (IoT) gadgets should be shipped off, and incorporated workers and cloud workers should give stockpiling and registering administrations and then send results back to IoT gadgets. Distributed computing, paying little heed to where and when clients send solicitations to the cloud, will furnish clients with the limitless capacity of processing and capacity accessible on the Internet. Meanwhile, most clients have no clue about where their information or application writing computer programs is put away or run by cloud workers. With the quick extension of the quantity of IoT gadgets, a huge volume of information created by heterogeneous IoT gadgets is communicated to the cloud for processing and capacity administration, requiring high cloud stage effectiveness and an appeal for network transfer speeds and possibly unified danger. In this way, with procedures and IoT gadgets getting more engaged with human existence, the unified distributed computing model can scarcely handle recent concerns, such as concentrated cloud assurance, constant information conveyance and preparing, upholding availability, and so forth.

As a developing design that coordinates distributed computing and IoT, conveyed between focal cloud workers and IoT gadgets to take care of these issues, edge computing is presented. Edge computing will move the limit from the incorporated cloud to the edge workers of the organization for system applications, information stockpiling, and constant information handling and investigation, which will hold the center points of interest of distributed computing and move ongoing control and basic information stockpiling to the edge workers. In any case, insurance and protection concerns—for example, verification, interruption discovery, access control, and so on—in the edge

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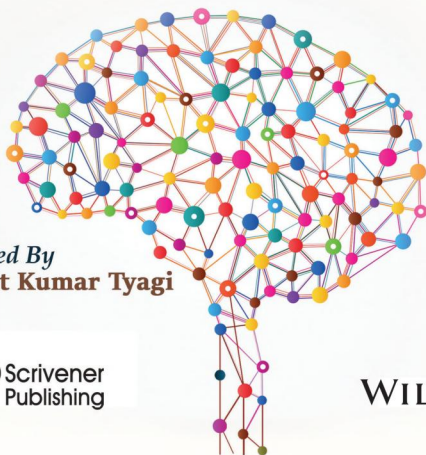
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Computer-Aided Diagnosis of Liver Fibrosis in Hepatitis Patients Using Convolutional Neural Network

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Abstract

Diagnosis of diseases like liver fibrosis is one of the quintessential part in medical areas. With the help of historical data of patient's, the respective need is to make decision for further process. To achieve a greater accuracy and timely decision is always complex due to its dynamic nature, blurriness, and uncertainty associated with that disease. This paper gives the solution for the above-mentioned problem with diagnosis of liver patients. This objective study takes liver image sets over five categories (category A, classic hepatocellular carcinomas [HCCs]; category B, malignant liver tumors; category C, indeterminate masses or mass-like lesions and rare benign liver masses; category D, hemangiomas; and category E, cysts). The proposed CNN model is VGG-16 inspired SegNet which is composed of 13 convolutional layers, three fully connected layers in an encoder-decoder network. This was tested with more than 100 liver image datasets. This paper also compares the system that we propose with the other several classifier model. Training and testing were performed and this achieved an accuracy of 98.3%.

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ADVANCES IN DATA ENGINEERING AND MACHINE LEARNING

SECURITY ISSUES AND PRIVACY CONCERNS IN INDUSTRY 4.0 APPLICATIONS

DAVID
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SECURITY ISSUES AND PRIVACY CONCERNS



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A Hybrid Method for Fake Profile Detection in Social Network Using Artificial Intelligence

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Abstract

Social life for everyone in the present generation has become synonymous with online social networks or social relationships between people who share their interests, activities, experiences or real-life interrelationships. Such media created a drastic shift in how we view our social lives. Making friends and keeping in touch and receiving their messages has become much easier. Yet the rapid development of social networks has led to many problems, such as fake accounts and online impersonation. Controlling these problems is unfeasible. To detect fake profiles, we use an artificial learning technique based on a hybrid model. The research process clearly illustrated the power of the proposed scheme to detect fake profiles with high accuracy. Traditionally, we have different classification methods in place to recognize fake accounts in social networks. Nonetheless, we will increase the accuracy rate of social network fake profile recognition. In this paper, we suggest techniques for Artificial Intelligence and Natural Language Processing (NLP) techniques to increase accuracy of fake profile recognition. We use the Random Forest

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Internet of Things, Artificial Intelligence and Blockchain Technology

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Chapter 3

Cyber-Resilient Energy Infrastructure and IoT



Divya M. Menon , S. Sindhu , M. R. Manu , and Soumya Varma 

The electricity ecosystem has always been complex and heavily interconnected with a range of electrical and networking components. The electrical grid comprises of generating stations, transmission lines and distribution lines. The primary task performed in conventional power grid consists of three major parts: generating plant for electric power, transmission and distribution of the electric power to consumers both industrial and household. Power generation includes generation of electricity using renewable sources as well as from non-renewable sources. The generated power is sent to substations and from substations, it is then transmitted to different customers (Liu et al., 2018). The supply and demand for electricity have increased significantly with the traditional grid, and hence modernization of grid needs to be prioritized. Energy system continues to deploy innovative technologies in the field of generation, transmission and distribution to improve the performance and to maintain environmental sustainability in the grid. The increasing dependence of electricity in our everyday life and growing need for power quality have motivated the industry to develop a better power grid (P. Ganguly et al., 2019). Modernizing the grid to make it smart grid refers to computerising the traditional power grid by incorporating cutting-edge technologies. The advanced technologies in smart grid include advanced sensors known as phasor measurement units (PMUs), smart meters, relays and automated feeder switches. Smart grid is a grid automation technology that permits consumers to participate in the system. The gradual transition from the traditional power grid to the reliable smart grid promises to bring out a change in the entire power infrastructure and their relationships with all stakeholders involved in the power system. However, the introduction of these digital

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Concepts, Applications, and Case Studies

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Detection of Moving Objects in a Metro Rail CCTV Video Using YOLO Object Detection Models



A. Abhinand, Jaison Mulerikkal, Anil Antony, P. A. Aparna,
and Anu C. Jaison

Abstract Most of the people in India give less care to safety rules. As we all know passengers are not allowed to cross the yellow line in metro stations, there arises a need for an alert system. The proposed system focuses on the detection of moving objects from stationary surveillance cameras in metro stations and alerts when an object crosses the yellow line. For the detection of an object, YOLO object detection models are used. To make it simple, pre-trained models are used for object detection in this project. The processing steps of motion detection for video surveillance include detection of motion, classification and object detection, behavior understanding, and activity recognition. The system works in real time with more accuracy than previous models available. The color detection method is used for detecting the yellow lines in the metro stations and since the camera is static, line detection is performed only on the first frame which further reduces the time of detection of objects. An emergency alert is given to the authorities/ passengers in the form of sound signals once the object crosses the yellow line in the stations.

Keywords Object detection · YOLO · Convolutional neural network

1 Introduction

Digital image processing is one of the principal explored handles these days. The ever-expanding requirement for reconnaissance frameworks has additionally made this field the motivation behind accentuation. Reconnaissance frameworks are utilized for security reasons, knowledge assembling, and loads of individual necessities. Article following and discovery are the entire of the apparent multitude of most strides in these frameworks. Various methods are utilized for this undertaking and exploration

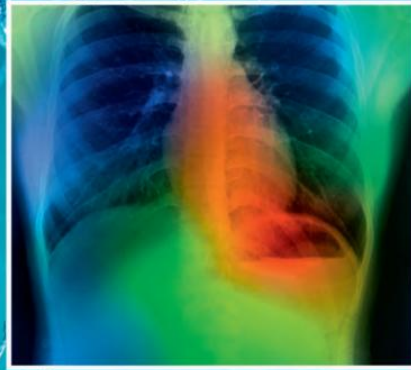
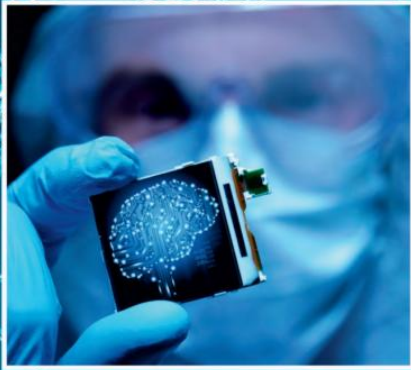
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Biomedical data visualization and clinical decision-making in rodents using a multi-usage wireless brain stimulator with a novel embedded design

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1. Introduction

Over the past few years, the rate relating to investigation concerning neuroscience has expanded significantly. Utilizing a mixture of professional as well as neurophysiological ideas of the whole nerve systems, a comprehensive and new series of health-related digital devices has been introduced to employ substantial backlink sets of neurons effectively. Within the Indian condition, BCI is considered indefinitely in the point of the early stages of time. There are no significant advancements as well as investigation provisions to extend this entire domain successfully. Therefore we are aware that all these efforts are extremely important for a young budding technologist to effectively incline their visions in addition to aspirations to BCI [1]. BCI serves as an interactive solution that typically interprets the activities of the brain into instructions so as to obtain visualization over computer or any other device and gadgets. However, only a useful BCI makes it possible for individual users to act upon their surroundings by utilizing determination based activities of the brain, without employing external nervous system as well as muscle tissues. The most vital intention of BCI investigation would be to improve the techniques that

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Interval-Valued Fuzzy Trees and Cycles



Ann Mary Philip , Sunny Joseph Kalayathankal ,
and Joseph Varghese Kureethara 

Abstract Interval-valued fuzzy tree (IVFT) and interval-valued fuzzy cycle (IVFC) are defined in this chapter. We characterize interval-valued fuzzy trees. We also prove that if G is an IVFG whose underlying crisp graph is not a tree then G is an IVFT if and only if G contains only α strong arcs and *weak* arcs. It is shown that an IVFG G whose underlying crisp graph is a cycle is an IVFC if and only if G has at least two β strong arcs.

1 Introduction

Graph theory is prominent branch of mathematics that helped grow the science of optimization. It creatively engages the theory of sets and logical reasoning. The impact of graph theory in the field of computer science and decision sciences is tremendous. The introduction fuzzy set theory Zadeh and the subsequent introduction of fuzzy graphs [9] had unimaginable impact in the world of applied computing and decision making. Fuzzy graphs were studied in various levels in the past five decades.

Recently, Das et al. [2] introduced fuzzy chordal graph and its properties. This shows relevance of fuzzy graphs even though fuzzy graph was introduced by Rosenfeld in 1975 [9]. He defined fuzzy trees and connectedness [9]. Sunitha and Vijayakumar studied it in detail and obtained a characterization of it [10]. Types of arcs in a fuzzy tree were discussed by Mathew and Sunitha [3]. Fuzzy cycle was defined by Mordeson and Nair [4]. Here, in this chapter, we define interval-valued fuzzy tree and cycle and study it in detail. The chapter is divided into five sections. After

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Handbook of Research on Advances and Applications of Fuzzy Sets and Logic

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Chapter 11

Fuzzy Integral Representation Associated With Spectral Measure

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ABSTRACT

One of the most ubiquitous constructions in functional analysis is the spectral measure. The aim of this chapter is to develop the possibility to use the fuzzy spectral measure to define spectral representation theorems. Firstly, the authors introduce the fuzzy spectral measure and examine some of its properties. Furthermore, they elucidate fuzzy Hilbert space, the fuzzy normal, bounded, and adjoint operator on it. Finally, they establish the main result of this study which states that for a given fuzzy integral representation of $C(X)$, there is a unique fuzzy spectral measure E on the Borel subsets of X .

INTRODUCTION

Since the introduction of the fuzzy set by Zadeh in 1965, many research works have been dedicated to developing various aspects of the theory and its applications (Zadeh, 1965). Katsaras, in 1984, first introduced the concept of the fuzzy norm on a linear space (Katsaras, 1984). Later many authors like Felbin (1992), Cheng and Mordeson (1994) and Bag and Samanta (2015) have given different definitions of fuzzy normed spaces. In 2009, Goudarzi and Vaezpour introduced the definition of Fuzzy Hilbert

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