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International Journal of Advance Research in Science and Engineering
Volume No.06, Issue No. 12, December 2017
www.ijarse.com
IJARSE
ISSN: 2319-8354

A REVIEW ON GENERATIVE CONVERSATIONAL MODEL

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ABSTRACT

Conversational model or chatbot are the humanlike machine conversational agents. Conversational agents with generative model learn from past conversation to improve the intelligence in responses. In the modern era the conversational agents with generative based have rapid popularity in all domains. With the rapid advance in the Artificial Intelligence, now the machines mimic some of the human behaviour. The main goal of this review paper is to present the overview of conversational model, recent approaches in conversational model and provide more about generative conversational model in a closed domain, generative based framework.

Keywords:Chatbots, Closed domain, Conversational agents, Generative framework.

I. INTRODUCTION

Conversational agent is an interactive agent that conducts conversation via textual and auditory mode. Chatbots are at the peak point of developing area. The conversational agents explore more possibility in the domain of customer engagement to improve the ways of doing business. It is one of the most useful technologies that replacing the traditional models and making apps and websites inessential. A conversational agent is a computer program that have humanlike conversations in its natural format including text or spoken language using artificial intelligence technique such as image and video processing, Natural Language Processing (NLP) and audio analysis. The most interesting feature of the bots is that they learn from the previous interactions and become smarter over the time. Conversational models work in two ways- rule based and smart machine based. Rule based models follow rules to do job and smart machine models are also called cognitive computing, where it uses machine learning to do job and adapt their behaviour based on experience.

II.CONVERSATIONAL MODEL

Conversational model or chatbot are the software program that conduct conversation via text and spoken language.There are two categories of technology handled by chatbots.First one is the rule based work, where the chatbot can use rules and heuristics to do its job. Alternate one is the smart machine based work, where they use machine learning to do work and can learn on their own. While planning a framework for chatbot, we have to consider mainly two things – the questions should come either under open domain or closed domain and the responses from the chatbot should come either under retrieval based system or generative based system. In closed domain there will be a limited set of questions on specific topics and the open domain deals with the questions that can be of any topics. Therefore, it is clear that open domain is very difficult when compared to

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How to Select a Searching Algorithm-A Comparative Study

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Abstract *— Searching is a process of checking whether the required item is available or present in a certain data set. Searching can done based on the key element. A number of searching algorithms have been developed like that sequential search, binary search, tree search and hashing etc.*

Keywords — *Linear search , Binary search, pseudo code, Hashing, Collission, Probing.*

I. Introduction

Every searching algorithm depends on specific problem, property of data and algorithm complexity [2].Following are the three important searching algorithms:

- LINEAR SEARCH,
- BINARY SEARCH AND
- HASHING

This paper compares these three basic searching algorithms and gives a brief description about its applications, advantages and disadvantages etc.

II. Linear search

Linear search technique requires scanning and comparing one by one element of a list with a search key. So the time required by linear search is proportional to the total number of elements in a list. If an element to be searched is located nearer to first element it requires less time as opposed to an element which is located at the end of the list or an element does not exist at all in the list requires maximum time because it requires maximum comparisons.[4]

A function to search a given element X in A[].

INPUT: Given an array A[] of n elements

Table 1: Linear search - pseudo code

```
1. SET I=1
2. CHECK WETHER A[I]=X IF YES GO TO 4
3. IF  I != N THEN SET  I=I+1 AND GO TO 2
   ELSE GO TO 5
4. PRINT "ELEMENT FOUND AT:",I
5. STOP
```


III. Binary search

Binary search algorithm requires all the elements in the given list in ordered manner. It first searches the list with its centre element by comparing it with a given value. If match is found algorithm terminates by returning its position and if no match is found it reduces the search space to the half of the original size. If search element is less than the middle element then only first half of the list is searched and in case if it is greater than the middle element then only second half of the list is searched in next iteration. In either of the case the list to be searched is reduced to half at each iteration of the search process. Following lists the binary search algorithm.[4]

A function to search a given element X in A[].

INPUT: Given a sorted array A[] of n elements

Table 2: Binary search - pseudo code

```
1. COMPARE X WITH THE MIDDLE ELEMENT.
2. IF X MATCHES WITH MIDDLE ELEMENT, WE RETURN THE MID INDEX.
3. ELSE IF X IS GREATER THAN THE MID ELEMENT, THEN X CAN ONLY LIE IN
   RIGHT HALF SUBARRAY AFTER THE MID ELEMENT. SO WE RECUR FOR RIGHT
   HALF.
4. ELSE (X IS SMALLER) RECUR FOR THE LEFT HALF.
```

IV. Hashing

Hashing is the technique used for performing almost constant time search in case of insertion, deletion and find operation. The essence of hashing is to facilitate the next level searching method when compared with the linear or binary search. It is the process of mapping large amount of data item to a smaller table with the help of a hashing function. The advantage of this searching method is its efficiency to hand vast amount of data items in a given collection (i.e. collection size). [3]

A perfect Hash function is a function which when applied to all the members of the set of items to be stored in a hash table, produces a unique set of integers within suitable range. A good hash function minimize collisions by spreading the elements uniformly throughout the table.[5]

International Journal of Pure and Applied Mathematics
Volume 117 No. 10 2017, 25-29
ISSN: 1311-8080 (printed version); ISSN: 1314-3395 (on-line version)
url: http://www.ijpam.eu
doi: 10.12732/ijpam.v117i10.5
Special Issue

Unique PWM cast for Induction Motor Drives with Embracing Non-Deterministic Characteristics and Evaluation Using FPGA

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Abstract
The prime gain of this non-deterministic pulse width modulation (PWM) strategy is that the harmonic power in the output voltage, which is spread over the inclusive choice of the frequency spectrum, is not clustered at a specific frequency. The nonexistence of distinct dominant harmonics helps in the reduction of torque ripples and acoustic noise in drives. The effectiveness in acoustic noise reduction mainly depends on how effectively the non-deterministic characteristics (randomness) are being amalgamated in the PWM strategy. The goal of this paper is to check and implementation of two different topologies for validating the randomness of PWM based induction motor drive. The first topology is a random carrier PWM (RCPWM) with Pseudo Random Binary Sequence (PRBS) bit and is validated. Secondly, a sample exploration of random Pulse Position Pulse Width Modulation (RPPPWM) is made. Simulation is completed for this RPPPWM, RCPWM, and traditionalistic sinusoidal PWM (SPWM) and the performances such as Harmonic Spread Factor (HSF), power density spectrum, harmonic spectrum, and Total Harmonic Distortion (THD) are investigated. Hardware implementation is made using a Field Programmable Gate Array (FPGA) (XC6SLX45) SPARTAN-6 device and the upshots are verified through the VSI based designed prototype.

Keywords: Field Programmable Gate Array (FPGA), Harmonic Spread Factor (HSF), Power Density Spectrum, Random Carrier Pulse Width Modulation (RCPWM), Random Pulse Position Pulse Width Modulation (RPPPWM), Total Harmonic Distortion (THD), Voltage Source Inverter (VSI).

1. Introduction

The significance and the use of Voltage Source Inverters (VSIs) are rising unprecedentedly in industrial applications. The accuracy of the Pulse Width Modulation (PWM) technique helps to attain the vital output voltage and improve the quality on the load side of the inverter and it decides the competence of the drive system. PWM-VSI is becoming the dominant technology in today's industrial environment [1]-[3]. For the last four decades a bulky number of PWM switching pattern generators have been established for meeting the requirements such as the development of a larger fundamental component, maintaining the linearity between fundamental and Modulation Index (M_a), and distortion free output waveforms i.e. lower THD etc. [4]-[6]. Even if the performance requirements are varying for different applications, the VSI based drives are getting attention. For taming the performance and for the eminence of output waveforms, an ingenious PWM theory is presented [7].One of the imperative advantages of this nondeterministic Random Pulse Width Modulation (RPWM) is, without any energy concentration, the dissimilar harmonics can develop non-repetitive spectral characteristics for output waveforms [8]-[9]. Digital signal processor (DSP), Field Programmable Gate Array (FPGA), microcontroller, Complex Programmable Logic Devices (CPLD), and solicitation of specifically integrated circuit technologies pave a revolutionary change in the turf of digital electronics [10]-[11]. On comparing these technologies, FPGA is the better candidates is because of its high speed, flexibility, efficiency and have a high integration density. It is also used as a Programmable System On Chip (PSoC) for

International Journal of Advanced Trends in Engineering and Technology (IJATET)
Impact Factor: 5.965, ISSN (Online): 2456 - 4664
(www.dvpublication.com) Volume 3, Issue 1, 2018

CRYSTALLISATION AND CHARACTERISATION OF NOVEL SEMI ORGANIC NON-LINEAR OPTICAL CRYSTAL: GLYCINIUM OXALATE

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Cite This Article: V. Adeline Premeja, T. R. Beena & T. Jarin, "Crystallisation and Characterisation of Novel Semi Organic Non-Linear Optical Crystal: Glycinium Oxalate", International Journal of Advanced Trends in Engineering and Technology, Volume 3, Issue 1, Page Number 42-53, 2018.

Abstract:

Nonlinear optical amino acid single crystals of pure glycine and glycinium oxalate crystals were successfully grown by slow evaporation solution growth method. The grown crystals were subjected to different characterization studies in order to test its suitability for device fabrication. X-ray diffraction studies were carried out to examine the lattice parameters and crystallinity nature. The presence of various functional groups and their modes of vibration were identified using Fourier Transform Infrared (FTIR) spectral analysis. Optical spectral studies have been carried out to find the band gap and optical constants of the material. The lower cut off wavelength and the transparency region has been analysed using UV-Vis spectral studies. CHNS studies were used to analysethe elemental compositions of the grown crystals. Mechanical strength of the grown samples were tested by Vickers micro hardness and various parameters like work hardening coefficient, elastic stiffness constant and minimum level of indentation load has been calculated. The method adopted for crystal growth and the results obtained through various characterizations are analysed and interpreted in detail.

Key Words: Crystal Growth, Non-Linear Optics, Microhardness & Second Harmonic Generation

1. Introduction:

Nonlinear optical (NLO) materials have been playing a vital role in industrial applications. These materials show a significant impact on laser technology, optical communications and optical data storage etc. Crystals of amino acid complexes with the simple inorganic salts2 exhibit interesting physical properties from the application point of view. Hence in the recent years much of the work has been aimed at synthesizing semi-organic NLO crystals in particular glycine complexes, with better chemical stability, SHG efficiency, laser damage threshold, thermal and mechanical properties [1].

Glycine (NH2CH2COOH amino acetic acid) is the simplest amino acid, which is hydrophilic polar in nature. It is the only protein- forming amino acid without a center of chirality. Glycine helps to trigger the release of oxygen to the energy requiring cell-making process. It is necessary for the manufacture of hormones in the human biological system that builds a strong immune system [2]. Glycine exhibits polymorphism. It grows in many forms; such as the stable n form and y- form and the unstable form. The crystal of a- form is metastable in aqueous solution and it transforms into y-form spontaneously. While glycine can exist as a neutral molecule in the gas phase, it exists as zwitterions in solution and in the solid.

Glycine oxalate, another nonlinear optical crystal, in the family of glycine derivative [3]. The single crystal analysis was performed and they have reported that the glycine molecule exists in the cationic form with a positively charged amino group and an uncharged carboxylic acid group, while the oxalic acid molecule exists in a mono-ionized state in the crystals. The hydrogen bonds that stabilize the molecules are interconnected between the amino and carboxyl groups of adjacent molecules, in a head to tail arrangement. In each layer, the unlike molecules are connected through O-H-O hydrogen bond between the carboxyl group of the amino acid and the carboxylate group of the semi-oxalate ion and their symmetry equivalents.The double layers are held together by possible C-H-O and Vander Waals interactions.

2. Importance of the Work:

The perspective of understanding a system where the hydrogen bonding plays a fundamental role has stimulated this interest. Excellent optical quality, high thermal stability, high laser damage threshold makes glycine oxalate crystals, a strong candidate for NLO applications. Glycine oxalate crystals usually display large nonlinear optical (NLO) response and are potential candidates for applications in the emerging areas of photonics [4]. They also play vital role in second-harmonic generation (SHG), frequency mixing, electro-optic modulation, optical Pere metric oscillation, optical image processing, colour displays, underwater communications and medical diagnostics etc.

3. Experimental:

A glass beaker has been taken and cleaned with acetone and rinsed with double distilled water thoroughly in order to remove the organic and inorganic moistures present. Glycine and oxalic acid salts were weighed in 1:1 ratio and taken separately. Thecompositions were dissolved in 25ml of distilled water and stirred

A REVIEW STUDY - SMART GRID INTEGRATION OF RENEWABLE SOURCES USING EZ AND Z SOURCE INVERTERS

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Abstract
Smart grid uses digital technology to increase reliability, security and efficiency of the electrical systems.. The use of renewable energy is the most important factor in development of smart grid. The voltage source inverter (VSI) and current source inverter (CSI) are used for interfacing renewable sources to grid. The contents of total harmonic distortion (THD) of VSI and CSI inverter is high, hence it requires filter circuits for mitigation. Z-source inverter (ZSI) overcomes the above mentioned limitations of inverters and it delivers a power conversion theory. Total harmonic distortion created by EZ source inverter is less as compared to Z-Source inverter. The EZ-source inverters are the modest alternatives that can be used for cases where better quality of power is required.
This paper reviews the use of Z- source inverter and EZ source inverter in the integration of renewable energy source in the smart grid.

Keywords: Smart Grid, VSI, CSI, ZSI, EZSI

I. INTRODUCTION

The thought of smart grid lies in the integration of information and communication technologies into the existing power system infrastructure to get maximum benefit to the end-user. The objective of implementing smartness in the grid is to increase the reliability, efficiency, customer satisfaction and power quality of the vast electrical distribution network. In India the development of smart grid network is necessary to overcome the current power crises. To attain energy security and address environmental concerns, India is emphasizing on harnessing renewable energy resources. Presently installed generation capacity in the country is about 305GW (Jul'16) which constitute capacity from conventional sources viz. coal (186.2GW), Gas (24.5 GW), Nuclear (5.78GW), and Large Hydro (42.85GW). Balance 44.23GW (14.5%) contribution is from renewable generation capacity which has 26.87GW (62.7%) contribution from wind alone. Government of India is having ambitious plan to achieve 175 GW of renewable generation capacity by 2022 which include 100 GW from Solar, 60 GW from wind and balance from small hydro, Biomass etc. To meet growing demand and to reduce supply demand gap, there is a need of large capacity addition through conventional as well as from renewable energy sources. However, to achieve sustainable growth, energy security is of paramount importance. As the Government of India is having an ambitious plan to achieve 1, 00,000MW Solar and 60,000 MW Wind generations in next five years the importance of smart grid integration of renewable resources is also on the rise. Wind and solar energy offer environmental benefits, low operating costs, and

ISSN NO: 2279-543X

LOW-COST WIRELESS TELEMETRY SYSTEM FOR DEEP BRAIN STIMULATION

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Abstract: *In this paper, a constant current stimulator is developed for Deep Brain Stimulation studies based on Brain-Computer Interface System. The system can deliver the precise amount of current pulse, and the feedback path ensures the system is reliable. The system has a size of 25mm* 35mm and weight of 8.5 grams including the battery which is a perfect suite in animal models. The main feature of this system is a low powered processor, long life of two months, low cost, precision and the compact size. In vitro results proved that the system is ready to use in animal models.*
Keywords: *Deep Brain Stimulation, Current, Pulses, Intracranial Self Stimulation*

1. INTRODUCTION

Deep Brain Stimulation (DBS) is becoming a promising solution for treating Neuropsychological disorders. In many countries, this treatment is an approved and useful therapy for many patients. As the technology acquires a prominent space in our daily life, there is a new perspective to look into this treatment. Brain-Computer Interface is such a type of approach that makes to explore these fields. One of the applications of this technology is in the area of DBS. Studying the animal model using DBS is the most important factor since it is intended to apply in human models [1]

DBS has a history of more than 50 years. So it took a long way to emerge as present [2]. An old way of DBS was using cable connections between the equipment and the subject. There were a lot of issues using cables connections about cable entanglement and breaking of the cables [3]. As a solution to all these, different types of wireless stimulators were introduced. There were many drawbacks related to size, precision, software and lifetime for these wireless stimulators. Though stimulators are available commercially, they are all expensive in nature and so customers are not interested to have this product [4]. In the view of all these factors, we are developing and modelling a new stimulator system that overcomes the limitation of size, weight, precision and lifetime.

2. METHOD

The new wireless stimulator consists of a base station, system and backpack. Here the system can be either a computer or a mobile. This system will be serving as the main controller to the base station and the backpack.

Asian Journal of Applied Science and Technology (AJAST)
Volume 1, Issue 9, Pages 33-36, October 2017

A Review Study of E-Waste Management in India

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Article Received: 03 August 2017 *Article Accepted: 28 September 2017* *Article Published: 05 October 2017*

ABSTRACT

E-waste or Electronic wastes are referred to the electronic goods that are dumped out or unwanted. Each year, around 50 million ton of e-wastes are produced. Depending upon their nature of reaction, there are possibilities for dangers depending upon the situation. Discarded computers, batteries and other electro chemical wastes may results in unwanted results. So it's important to be awake of e wastes in addition to the other physical wastes. The situation is alarming as India generates about 1.5 lakh tones of e-waste annually and almost all of it finds its way into the informal sector as there is no organized alternative available at present. This paper discusses the present scenario of e-waste management and possible e-waste handling strategies in India.

Keywords: Electronic waste, Danger, Physical wastes and E-waste management.

1. INTRODUCTION

Electronic industry is the world's largest and innovative industry for its kind. Tons of electronic items are shipped over oceans every year. However, after their usage time they become a complex waste matter. It consists of many hazardous heavy metals, acids, toxic chemicals and non-degradable plastics etc. About 75% of e-wastes are unsure for their purpose or finding ways to use them which include refurbishment, remanufacture and reuse their parts for repair etc. Most e-recyclers were exporting the toxic materials such as leaded glass, mercury lamps etc. to developing countries due to their cheap labor. The main reason for third world countries to consume e-wastes from Europe and USA is poverty. Dismantling process takes much labor. Dismantling not only involve in unscrewing but also shredding, tearing and burning. Circuits are burnt to hunt the valuable metals such as gold, platinum, cadmium etc. But the wire coat of those consists of PVC and PCB which may produce hazardous smoke, and carbon particles and they may lead to lung and skin cancer. A survey led by Ms. Sadhana Tiwari, Mr. Anil Khandekar, Ms. Rashmi Singh,and Dr. Dilip R. Pangavhane found the major contributions of E-waste and proposes effective strategies to tackle the E-waste[1]. The statuses of E waste in India are discussed in [2]. E-waste leads to lot of environmental and health issues which are discussed in [3]-[5]. E waste not only affects the environment but also affect the human health adversely. There are different methods for managing the problems of E waste disposal [6]-[8]. The methods for reusing and recycling of E-waste are described in [10].

2. PROBLEMS FACED

E-waste and pollution is a global problem. The UN suggests that global e-waste is expected to exceed 40 million tons per year. End of product life recycling is highly polluting, non-cost effective and unregulated in most of the countries. The trouble of e-waste not only pollutes the land-fill sites, having serious health implications due to chemical leaching into the water table, eventually making its way to agricultural produce and into people. According to a recent report by the BBC, e-waste pollution is causing severe health concerns for millions of people around the world, mostly in the developing nations of Africa, Europe and Asia. Approximately 23% of deaths in these nations are linked to pollution and other environmental impacts. The report also concluded that more than 200 million people worldwide are at risk of exposure to toxic waste. The use of electrical and electronic equipment (EEE) on the rise, the amount of electrical and electronic waste (e-waste) produced each day is equally growing enormously around the globe. Recycling of valuable elements contained in e-waste such as copper and gold has become a source of income mostly in the informal sector of developing or emerging industrialized countries. However, recycling techniques such as burning cables for retaining the inherent copper expose both adult and child workers as well as their families to a range of hazardous substances.

3. E- WASTE IN INDIA

Consequence of e-wastes in India about 80,000 people working for recycling sector, some villages such as Seelampur has scrap markets where piles of e- wastes are separated for recycling. They separate copper from wires after burning them. Plastic and PVC codes produce noxious smoke which is irritable to eyes and cause respiratory problems. In count acid treatment is given to isolate metals; corrosive acids also released from used batteries of cell phones and computers, according to scientists of Greenpeace recycling of a computer in India costs just 2$ while it is 20$ in US, not only cheap labour but also for the profit from recovered metals of circuit boards such as copper gives earning of 3 to 5 $ per day workers are spending on dismantling e-wastes rather considering their own health (Figure 3.2). However, currently they are building an e-waste recycling plant in Bangalore which was estimated as having the capacity to handle 60,000 tons of e-wastes annually. In India about 2.4% of e-waste was produced from Mumbai, and, Delhi, Bangalore and Chennai are 21.2, 10.1 and 9.1 respectively [2].

Asian Journal of Applied Science and Technology (AJAST)
Volume 1, Issue 8, Pages 56-60, September 2017

FPGA Based Analysis of Non-Deterministic PWM in Induction Motor Drives

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Article Received: 30 August 2017 *Article Accepted: 17 September 2017* *Article Published: 22 September 2017*

ABSTRACT

The foremost privilege of non-deterministic pulse width modulation methods is reduction in the dominant harmonics. There is also a spread out of harmonics in the output voltage at a notable amount. This reduction in dominant harmonics will project in weakening of acoustic noise leading to decrease in torque ripples among the drives. In this article, a Field-Programmable Gate Array (FPGA) based service and corroboration of Pseudo Random Binary Sequence (PRBS) centered Random Carrier PWM (RPWM) for the three-phase Voltage Source Inverter (VSI) fed induction motor drive, are obtainable. First, a full imitation on recital characteristics such as harmonic spectrum, Total Harmonic Distortion (THD), Harmonic Spread Factor (HSF) and power density spectrum, are projected for traditional Sinusoidal PWM (SPWM), RCPWM and RPWM. Furthermore, a hardware prototype has been developed and tested the results with FPGA Sparton-6. The results offer a modest and actual explanation for high-performance AC drives.

Keywords: Field Programmable Gate Array (FPGA), Harmonic Spread Factor (HSF), Power Density Spectrum, Random Pulse Width Modulation (RPWM) and Voltage Source Inverter (VSI).

1. INTRODUCTION

Pulse-Width Modulated (PWM) centered Voltage Source Inverters (VSIs) plays a leading role in industry nowadays [1]-[3]. A vast number of PWM switching pattern generators were technologically advanced over prolong years to meet the necessities for distortion with free output waveforms of sinusoidal in nature. Mechanical vibrations and acoustic noise are caused by the conservative, deterministic PWM approaches like Sinusoidal PWM (SPWM), once it is castoff in drives. A significant benefit of non-deterministic modulation methods is non-repetitive, thus spectral structures of the output waveforms effects short of liveliness attention at different harmonics [4]-[7]. Also this retro was unsettled owing to the uprising of technical potentials in the arena of numerical electric switch by micro controller, Digital Signal Processor (DSP), Complex Programmable Logic Devices (CPLD), Field Programmable Gate Array (FPGA) and Application Specific Integrated Circuit (ASIC) technologies. Among all these prospects, FPGA is a noble area needing the benefit of the mobility of a programming resolution and the productivity of an exact style with great addition compactness, in its fast quickness. The Field Programmable Gate Array (FPGA) knowledge offers Programmable System-On-Chip (PSoC) settings for scheming contemporary numerical ASIC controllers for precise assertions.

In engineering drives, Random Pulse Width Modulation (RPWM) realizes the moving of harmonic control from the separate range of the output voltage to the constant range. And proposals about the rewards, that are the action permitted after an unfriendly acoustic noise leads to an automatic vibration [8]-[9].The present Random Carrier PWM (RCPWM) arrangements outcome in poor non-deterministic features. They essentially use a single-frequency triangular carrier and it is upturned to manufacture the chance carrier by a Pseudo-Random Binary Sequence (PRBS) bit chooser. In MCBRCPWM arrangement, it uses the Non-deterministic features [10]. They substitute in an accidental method which is focused on an unchanging prospect of compactness purpose. The arbitrarily controlled carrier is linked through position waveform to produce the RPWM pulses. The Space Vector Modulation algorithm for a three-level inverter is used for fundamental space vector place and it is the approach for choosing and exchanging orders to make regular PWM output waves. The customary plan drive of FPGA application and the useful figure of FPGA and its parameters are assumed. The Five-phase sinusoidal PWM signal at high-speed selection occurrence by means of one-chip programmable gate array (FPGA) is completely recognized that the cohort of sinusoidal PWM expending FPGA can achieve the switching frequency of the inverter at 40 kHz switching frequency that might increase probably for intense drive performances [11]-[12]. The sinusoidal PWM is appreciated on one FPGA chip from Xilinx Inc. to offer supervisory by substituting pulses for inverter side. Even though the industrial community has unstated the PWM unfair torque ripples besides acoustic noises, the deficiency of systematic assessment of standing PWM systems break the supplementary findings. Furthermore, the similarity to non-deterministic PWM devices is as their nature. A flexible, reprogrammable numeral stage might resolve this matter. A systematic learning of recital features such as harmonic spectrum, Total Harmonic Distortion (THD), Harmonic Spread Factor (HSF) and power density spectrum, are existing for equally conformist sinusoidal PWM (SPWM) and RPWM. A FPGA based validation of

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Asian Journal of Applied Science and Technology (AJAST)
Volume 1, Issue 9, Pages 88-91, October 2017

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Nano Generator Intended for Energy Harvesting

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Article Received: 04 August 2017 *Article Accepted: 29 September 2017* *Article Published: 15 October 2017*

ABSTRACT

In this era, immense energy crisis is a core problem. At those places with frequent power outage, gasoline motor generators are used as a solution. Production of more energy using renewable energy resources such as solar energy, wind energy, or hydropower is preferred, but it has limited use and is dependent on weather and topography. As an alternate resource of energy, Nano Generators can be used. Nano generators convert mechanical/thermal energy produced by small-scale physical change into electricity. Harvesting vibration energy from walking, voices, engine vibration, automobile, train, aircraft, wind and many more can be used for powering mobile electronics. Zinc oxide is a unique material that exhibits semiconducting and piezoelectric properties. Nanowire arrays of ZnO can be grown on flexible plastic substrates to form nano-generator. The nano-generator converts random mechanical energy into electric energy using piezoelectric zinc oxide nano wire arrays. The advantage of using nano wires is that tiny physical motions can trigger them and the excitation frequency can be 1Hz to 1000Hz, which is ideal for harvesting random energy in the environment. The voltage generated from a single Nanowire can be as high as 50mV, which is large enough to power many nano-scale devices.

Keywords: Piezoelectric, Nano-Generator, Energy Harvesting, ZnO and Nano Wires.

1. INTRODUCTION

Harvesting renewable energy from our living environment is of critical importance for our long-term energy needs and Sustainable development as it offers a fundamental energy solution for various wearable electronics and wireless sensors without the need for frequent battery replacements. Among these energies, solar, thermal, and mechanical energies are most-common and feasible sources of energy in the ambient environment. Since the self-powering nanotechnology was proposed in 2006, nano scale energy harvesters including piezoelectric and piezoelectric Nano-generators (NGs) have been developed to effectively harvest mechanical and thermal energies in the living environment to power small electronic devices. Usually, for different nano generators, the materials and the design methodologies are different. In order to improve the properties and extend the applications of NGs, is highly desired to develop an integrated device simultaneously harvesting mechanical and thermal energies [2].

Among many functional materials, the poly vinylidene fluoride-co tri-fluoro ethylene (polymer) has both the pyro-electric and piezoelectric properties, which make it ideal material for fabricating hybrid energy cell [5]. Currently, electro spinning process based on electro hydrodynamic deformation have been presented to produce P(VDF-TrFE) fibers, but this involves specialized equipment and high voltages of nearly 10 kV that electrically pole the fibers and the output of the process is again quite low [6]. Development of large-scale P(VDF-TrFE) nano-generator with a low-cost fabrication method has remained a major challenge. In this paper, we demonstrate a high performance flexible P(VDF-TrFE) nano-generator based on P(VDF-TrFE) nanowire array [7]. The piezoelectric and pyro-electric output electric signals of the flexible hybrid nano-generator were measured respectively, and output voltages were successfully integrated together. As a demonstrated application, the output electricity was used to power a large-scale liquid crystal display screen.

2. PROPOSED SYSTEM

A tribo electric nano generator is an energy-harvesting device that converts the external mechanical energy into electricity by a conjunction of tribo electric effect and electrostatic induction. This new type of nano generator was firstly demonstrated in Prof. Zhong Lin Wang's group at Georgia Institute of Technology in the year of 2012. In power generation unit, at the inner circuit, a potential is created by the tribo electric effect due to the charge transfer between two thin organic/inorganic films that exhibit opposite tribo-polarity; in the outer circuit, electrons are driven to flow between two electrodes attached on the backsides of the films in order to balance the potential. Since the most useful materials for TENG are organic, it is also named organic nano generator, which is the first of using organic materials for harvesting mechanical energy [1].

The output power density of TENG has increased for five orders of magnitude within 12 months. The power density attains 313 W/m^2, volume density attains 490 kW/m^3, and a conversion efficiency of 60% has been demonstrated. Besides the unprecedented output performance, this new energy technology also has a number of other advantages, such as low cost in manufacturing and fabrication, excellent robustness and reliability, environmental-friendly, and so on. The tribo electric nano generator can be applied to harvest all kind mechanical energy that is available but wasted in our daily life, such as human motion, walking, vibration, mechanical triggering, rotating tire, wind, flowing water and more. The tribo electric nano generator has three basic operation modes: vertical contact-separation mode, in-plane sliding mode, and single-electrode mode. They have different

Asian Journal of Applied Science and Technology (AJAST)
Volume 1, Issue 9, Pages 95-97, October 2017

SFCL Technology for Generator Protection

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Article Received: 04 August 2017 Article Accepted: 29 September 2017 Article Published: 20 October 2017

ABSTRACT

Power is the basic need for the economic development of any country. The availability of electricity has been the most powerful vehicle of introducing economic development and social changes throughout the world. The aim of this paper is to present a simulation model to reduce the internal fault currents of large synchronous generators. Due to the increased fault-level currents, superconducting fault current limiter (SFCL) is more likely to penetrate into a low voltage and medium voltage transmission network to improve their stability and lower the electric devices capacity. In this paper, a simulation model for resistive type SFCL using Mat lab/Simulink software is shown.

Keywords: Brushless excitation, Fault current controllers (FCC), Superconducting fault current limiter (SFCL), High-temperature superconductivity (HTS).

1. INTRODUCTION

Power is the basic need for the economic development of any country. The availability of electricity has been the most powerful vehicle of introducing economic development and social changes throughout the world. The process of modernization increase in productivity in industry and agriculture, improvement in the standard of living of people depends upon the adequate supply of electric energy. Thus, national planning processes give priority to programs relating to the generation transmission and distribution of electric energy.

After independence, more importance has been laid on strengthening and modernization of transmission and distribution system along with growth of power generation facilities. Now the installed generating capacity in India has increased multifold from a level of 1300MW in 1947 to 115545MW today [1]. Also the per capita consumption is increased from a level 15.60KWh to 606.20KWh during the year 1950 to 2005 and the actual generation has also increased from 5 billion units in 1950 to 600 billion units today.

Synchronous generators are very important elements in power systems since they are in-charge of providing an uninterrupted power supply to the consumers. Therefore, their reliability and good functioning are crucial [1]. The construction as well as maintenance cost is high depending upon the complexity and the size of the generators. The important role of generators in the power system and the high cost of repair in case of damage require a good protection system against faults. It must be protected against the damage caused by abnormal conditions in the electrical network or in the generator itself. Generators are protected against external faults by several circuit breakers that isolate all faults that occur in the network (i.e. transformers, buses, lines, etc.). At the same time, the generators must be protected against faults that occur inside the machine. There are several ways to detect these faults and avoid the damages caused by them.

Detection of single line to ground faults depends on the generator grounding type, which can be classified into low and high impedance grounding. In case of low impedance grounding, a differential relay can detect and provide protection of only about, 95% of the windings [2]. However, for high impedance grounding, ground faults are not normally detectable by the differential relay because the fault current is usually less than the sensitivity of the relay. In such case, an over-voltage relay connected across the grounding resistor has been used to sense the zero sequence voltage. Various generation schemes like nano generators have been implemented as a part technological revolution to overcome power scarcity [8].

Conventional protection device installed for the protection of excessive fault current in electric power systems especially at the high voltage substation level, are the circuit breaker tripped by over current protection relay which has a responds time delay that allows initial two or three fault current cycle to pass through before getting activated [3,4]. Shunt reactors (inductors) are used in many cases to decrease fault current. These devices have fixed impedance so they introduce a continuous load, which reduces system efficiency and in some cases can impair system stability. Fault current limiters (FCLs) and fault current controllers (FCCs) with the capability of rapidly increasing their impedance, and thus limiting high fault currents are being developed. A significant advantage of proposed FCL technologies is the ability to remain virtually invisible to the grid under nominal operation, introducing negligible impedance in the power system until a fault event occurs. Ideally, once the limiting action is no longer needed, an FCL quickly returns to its nominal low impedance state [7].

New method is introduced as SFCL (Super conducting fault current limiter). In this, a lengthy super conductor wire inserted in series with transmission line or distribution feeder to limit fault current by increasing resistance. The SFCL can limit fault current [illegible] fault.

AJAST

Asian Journal of Applied Science and Technology (AJAST)

(Open Access Quarterly International Journal) Volume 1, Issue 9, Pages 526-533, 2017

A Novel Random Carrier Frequency Modulation Technique for Drive Applications

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Article Received: 15 August 2017 Article Accepted: 30 November 2017 Article Published: 30 December 2017

ABSTRACT

In high power usages, dc/dc converters have been extensively employed. Most of the converters are controlled by a constant switching frequency pulse width modulation (PWM) technique that results in significant harmonic intensity at the switching frequency. This will cause high EMI and will affect the nearby electronic devices. The traditional ways to overcome this problem include adding EMI filter or using EMI shielding. However, these methods will increase the component counts and cost. RPWM technique can well distribute the harmonic cluster to adjacent frequencies as compared with conventional PWM technique (diagonal PWM switching without random PWM). Like any other deterministic random PWM methods Diagonal switching PWM technique produces predictable harmonic components of objectionable magnitude. Harmonic causes switching losses, excessive stress on the switching devices and thus reduces the efficiency. The scheme has been investigated with the intention of distributing the harmonic power. Hence, an improved overall better performance is obtained.

Keywords: HSF, THD, PWM, RPWM, Novel ZVZCS, PRBS and RCFPWM Technique.

1. INTRODUCTION

Today power converters are the indispensable tool in any industry. Drives are playing major role in industries and hence their associated converter circuits and control strategies get importance. In power electronics wide range of converters are available. To name few, the basic single phase full wave phase controlled rectifiers, three phase rectifiers, Pulse Width Modulated (PWM) inverters, Vienne rectifiers, Multilevel inverters, Luo converters, Resonant converters etc. Researches are in full stream for further advancement of power converters. Harmonics play a major role in the performance of any power electronic converter. The presence of harmonic will degrade the performance of power converter and it will cause Acoustic noise, Mechanical vibration and EMI. So the necessity of harmonic dispersion becomes mandatory in power electronic convertors to reduce the Acoustic noise, Mechanical vibration and EMI.

2. RANDOM PWM TECHNIQUES

Random PWM techniques have been established for several years. These random PWM methods have the improvement of spreading the harmonic cluster to adjacent frequencies, and thereby sinking EMI filter size or removing it. However, random PWM techniques consequence in the rise of switching counts. This is particularly significant to an isolated full-bridge dc/dc converter since there are four power devices on the primary side and with the rise of switching counts the losses will increase significantly. Lim Y. C., et al. have presented a pseudorandom carrier modulation scheme and its harmonic spectra spread effect. The pseudo random carrier of the projected scheme are produced through the random synthesis of the two triangular carriers, each of the same fixed frequency, but of opposite phase [1]-[3].

Drissi et al. have survived on electric drives based discontinuous random space vector modulation for Inverter.

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World Applied Sciences Journal 35 (2): 325-329, 2017
ISSN 1818-4952

DOI: 10.5829/idosi.wasj.2017.325.329

Enhancement of Efficiency in Nanocoated Induction Motor

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Abstract: Three Phase Induction motors consumes 60% - 65% of industrial electricity. 1% increase in efficiency of all the motors in india will save the power of 500 MW powers. Lots of research work has been carried out by the researches to control the power consumption in all electrical applications more specifically in high voltage applications. In recent days, it has shown that the mixing of nanofillers to enamel can improve the mechanical, electrical and thermal properties. In this work Al_2O_3 has been used as nanofillers for coating the winding of induction motor with enamel. The nanofluids are prepared by ball milling method and particle size of the Al_2O_3 analyzed by Scanning Electron Microscope (SEM). The performance of nanofillers with enamel-coated induction motor is analyzed by the different tests such as open circuit test, short circuit test and load test. It was conformed that the efficiency of the three-phase squirrel cage induction motor coated with enamel filled with Al_2O_3 nanofillers was increased by 3-4% when compared to that of the three phase squirrel cage induction motor coated with pure enamel filled.

Key words: Three phase induction Motor · Nanofillers · Al_2O_3 · Performance analysis

INTRODUCTION

Induction motors are widely used in latches, centrifugal pumps, grinders, drilling machines, printing machines and so on. The efficiency of the induction motors mainly depends on the insulation used [1] [2]. Generally in motors, enamel is used for impregnation, Coating and adhesion. In the resent years solid dielectric are commonly used as insulation for electrical equipment, as these solid dielectric elements have the properties to withstand high electric field and improves efficiency. This characteristics of solid dielectric element will be further improved by reinforcing nanoparticles [3].

The broad application of mineral oil for high voltage insulation and power equipment cooling has promoted research work to improve the characteristics of dielectric and cooling property through nanotechnology after significant research improvement in nanodielectrics. A contemporary instance of this research work is the preparation of dielectric nanofluids. A fluid with dispersion of nanoparticles and is named as nanofluid, a term conferred by Choi at Argonne National Lab in 1995 [4].

The efficiency of the normal three-phase squirrel cage induction motor can be improved by nanofillers with enamel, which is coated on the winding of the motor [5]. It was a well-known fact that the working temperature of an electric machine has a very strong relationship with the life period of the insulation [6]. The insulating enamel mostly used for coating the machine windings were organic in nature, which adversely affected by thermal decomposition and this can be analyzed by heat run test.

The dielectric losses will depend upon the breakdown strength, type of applied voltage, partial discharge characteristics, intensity of electrical field and frequency.

Synthesis and Preparation-Nanocomposites

Synthesis of Nanparticle: Al_2O_3 nanoparticle was synthesized using ball mill. A ball mill is used to grind materials into extremely fine powder to use in lubricants, paints, pyrotechnics and ceramics. Tungsten carbide balls were used as the grinding media. The inner walls of the vial are also coated with a layer of tungsten carbide because of its high hardness, wear resistance and impact strength. Milling was done at the rate of 300rpm under

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International Journal of Advance Research in Science and Engineering
Volume No.06, Issue No. 12, December 2017
www.ijarse.com
IJARSE
ISSN: 2319-8354

A Comparative Study of Segmentation and Classification Techniques in WBC

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ABSTRACT

The immune system in our body is made up of a of cells, tissues, and organs that work together to protect from the virus. One of the important cells involved is white blood cells, which is also known as leukocytes. The white blood cells are classified into Monocots, Neutrophils, Basophils, Eosinophils, and Lymphocytes. The variation of counts in the white blood cells leads some other disease. Suppose you have any disease, you wanted to test for blood very effective and accurate manner. Basically, test for blood diagnosing is based on the count of White blood cells. Now, these days the manual method for blood test takes more tedious and inefficient. So use our computer science knowledge to remove the error in the medical fields. In this paper discuss the various techniques in white blood cells segmentation and classification using machine learning. It gives deep knowledge which can be used in cell segmentation and classification process.

Keywords: Blood Smear Microscopic Images means Clustering, BLOB analysis, Fuzzy C means, Snake contours, Machine learning.

I.INTRODUCTION

We know that blood is a fluid tissue having the complex structure. The blood cells are basically three types, they are Red blood cells, white blood cells, and platelets [1]. The red blood cells contain hemoglobin which carries oxygen through the body. The main duty of platelet is clotting the blood, which has disc- shape having 2-4 um diameters. White blood cells play the important role in immunity of the human body, which is also known as leucocytes. The process of development and maturation of leucocytes is called leucopoiesis. The infants up to one year of age have 6000-16,000/l of white blood cell count in blood. In case of adults contain 4000-11,000/l of counts in blood [3]. So according to the different age domain, the count of white blood cells is different. The eosinophils in white blood cell have min role in allergic reactions, while basophils have the functions for allergic responses. Like this, each type of white blood cells has different function for the immune system. The automatic white blood count cells detection is the very difficult process. The accuracy of feature extraction also depends on the segmentation and classification. The classification of white blood cells has some have some common steps. First, we wanted to collect the digital image of blood cells. After that do some enhancement techniques and extract the feature [1]. Finally, the extracted feature is segmented and classified into the different group. The above-mentioned steps are used in every method in different ways. In this paper have the review about the white blood cells segmentation and classification.

Journal of Electrical Engineering
www.jee.ro

Evaluation Methods for Incorporating Non-Deterministic Characteristics in PWM Strategy of Induction Motor Drives and FPGA Based Experimental Implementation

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Abstract –The primary advantages of non-deterministic pulse width modulation (PWM) strategies are that the harmonic power in the output voltage is spreaded over wider range in the frequency spectrum and does not get grouped at definite frequencies. This absence of distinct dominant harmonics results generally in reduction of acoustic noise and torque ripples in the drives. The effectiveness in acoustic noise reduction is contingent on how efficiently the non-deterministic characteristics (randomness) are being incorporated in the PWM strategy. This paper proposes two dissimilar approaches to integrate the randomness in the PWM suitable for induction motor drive. Primarily, a Pseudo Random Binary Sequence (PRBS) bit based random carrier PWM (RCPWM) is deliberated. Then, a comprehensive investigation of performance of random pulse position pulse width modulation (RPPPWM) is worked out. A comprehensive simulation study on performance characteristics such as harmonic spectrum, total harmonic distortion (THD), harmonic spread factor (HSF) and power density spectrum, are presented for conventional sinusoidal PWM (SPWM), RCPWM and RPPPWM. The results are validated through the prototype VSI designed. The implemented pulse width modulators using a SPARTAN-6 field programmable gate array (FPGA) (XC6SLX45) device corroborate the simulation study and hint the triumphing one.

Keywords: Field programmable gate array (FPGA), harmonic spread factor (HSF), power density spectrum, random carrier pulse width modulation (RCPWM), random pulse position pulse width modulation (RPPPWM), total harmonic distortion (THD) and voltage source inverter (VSI).

1. INTRODUCTION

The prominence and the exploitation of voltage source inverters (VSIs) are developing unprecedentedly in industrial applications. The theory involved in pulse width modulation (PWM) technique, which is employed to attain the required output voltage and quality in the load side of the inverter, decides the competence of the drive system. PWM-VSI has developed as a dominant technology in today's industrial environment [1]-[5]. An enormous number of PWM switching pattern generators have been developed over the last four decades to encounter the requirements, primarily, distortion free output waveforms i.e. lower total harmonic distortion (THD), development of larger fundamental component, upholding the linearity between fundamental and modulation index (M_a) etc. [6]-[10]. Even though the performance requirements diverge with the applications, the requirements of VSI based drives are noticed prominently. The performance and the quality of output waveforms can be improved through an ingenious PWM theory [11]-[12]. An imperative advantage of random (nondeterministic) pulse width modulation (RPWM) techniques is non-repetitive spectral characteristics of the output waveforms without energy concentration at distinct harmonics [13]-[15].

Moreover, this period is outstanding due to the revolution of technological possibilities in the field of digital electronic control by micro controller, digital signal processor (DSP), complex programmable logic devices (CPLD), field programmable gate array (FPGA) and application specific integrated circuit (ASIC) technologies [16]-[17]. Among all these likelihoods, FPGA is a good candidate having the advantage of the flexibility in the programming solution and the efficiency of a specific architecture with higher integration density and higher speed. The FPGA technology delivers the programmable system-on-chip (PSoC) environments for designing modern digital ASIC controllers for specific applications.

A.M.Trzynadlowski *et al.*, have developed a RPWM technique to reduce acoustic noise and mechanical vibration [18]. The random switching is based on a uniform probability density function. The preeminence of the RPWM techniques over the deterministic PWM methods is studied. Thomas G. Habetler and Deepakraj M. Divan have introduced an acoustic noise reduction option using a randomly modulated carrier [19]. The randomly modulated carrier is compared with reference waveform to produce the RPWM pulses. In this technique, random signal is used as the modulating function, the effects of its magnitude and varying speed (or bandwidth) on the inverter output harmonic distributed characteristics are analyzed.

The design and development of dynamic partially reconfigurable PWM (DPRPWM) controller for three-phase VSIs in a single Xilinx Spartan 3 XCS400PQ208 FPGA has been developed [20]. A structure of FPGA-based three-level space vector modulation (SVM) inverter has been proposed [21]. This SVM algorithm for three-level