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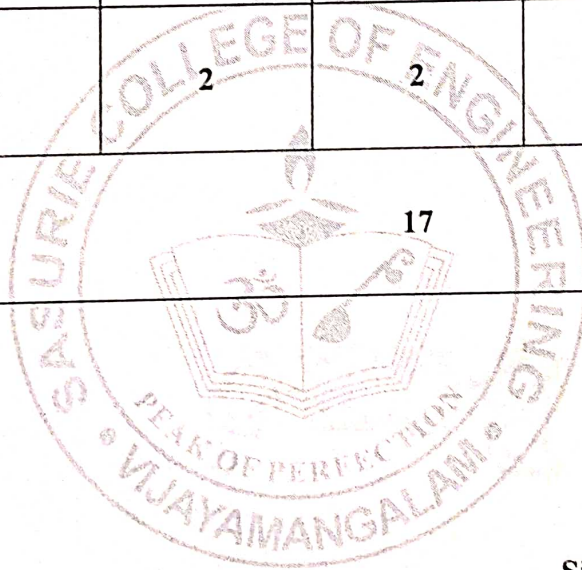
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This is to certify that the total number of Research papers published per faculty in the journals notified on UGC care list during last five years is listed below.

ACADEMIC YEAR	2022-2023	2021-2022	2020-2021	2019-2020	2018-2019
No of Research paper in Journals	2	2	2	6	5
Total No of Research papers in Journals	17				



Signature of the Principal

Dr.M.VIJAYAKUMAR ME., Ph.D.,
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3.3.1 Number of research papers published per teacher in the Journals notified on UGC website during the last five years						
Title of Paper	Name of the author/s	Department of the faculty	Name of journal	Year of publication	ISSN number	Page No
Implementation of non-linear controller for contemporary DC-DC converter	T.S.Sivakumaran	EEE	International Journal on Electrical Engineering and Informatics	2019	2085-6830(print) 2087-5886(web)	5
Optimization Study of Calophyllum Methyl Ester using Statistical Analysis	A.Ramesh	MECH	Theoretical Foundations of Chemical Engineering	2023	1608-3431	6
Cancer Classification Revolution: Employing Advanced Deep CNNs for Multi-Class Detection of Breast Irregularities	P.Maheshwari	ECE	IEEE Xplore	2023	1803-7232	8
Comparative analysis of Yavadunam Tavadunikritya Varganca Yojayet Vedic multiplier for embedded DNN	P.SanthoshKumar	ECE	Indian Academy of Sciences	2022	0253-4096	9
Enhancement of Wear Resistance of Mild Steel using Nano Crystalline CoW Coatings through Electroplating Technique	I.JeenaRajathy	PHYSICS	AIP Conference Proceedings	2022	0094-243X(print) 1551-7616(web)	10
A hybrid technique used in grid integration of photovoltaic system for maximum power point tracking with multilevel inverter	T.S.Sivakumaran	EEE	Transactions of the Institute of Measurement and Control	2021	0142-3312(Print) 1477-0369(online)	11
Nanotechnology for Electrical Energy Systems: Studies on the Energy Storage Capabilities and Energy Utilization Efficiency of Nano materials	E.Nandhakumar	EEE	Handbook of Nanomaterials and Nano composites for Energy and Environmental Applications	2021	ISBN978-3-030-36268-3	12
Heat and mass transmission of an Oldroyd-B fluid through a stratified medium with swimming of motile gyrotactic microorganisms and nanoparticles	K.Mohana	MATHS	Journal of Thermal Analysis and Calorimetry	2020	1388-6150(print) 1588-2926(web)	13
Adaptive neuro-fuzzy inference system based under-frequency load shedding for Tamil Nadu	K.PaulJoshua	EEE	The Journal of Supercomputing	2020	0920-8542(print) 1573-0484(web)	16


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Design and investigation of low-complexity Anurupyena Vedic multiplier for machine learning applications	SanthoshKumar Parameshwaran	ECE	Sadhana-The Indian Academy of Sciences	2020	0256-2499(print) 0973-7677(web)	19
Design and Control Strategies of Quasi-Z. Source Inverter For Photovoltaic Power Generation systems	T.S.Sivakumaran	EEE	IEEEExplore	2020	1803-7232	20
Fault Detection and Diagnosis of Multi-Phase Induction Motor Drives Using MFRF Technique	T.S.Sivakumaran	EEE	IEEEExplore	2020	1803-7232	21
Man of the League Algorithm Based Space Vector Modulated Inverter in Photovoltaic system	T.S.Sivakumaran	EEE	IEEEExplore	2020	1803-7232	22
Implementation of non-linear controller for contemporary DC-DC converter	T.S.Sivakumaran	EEE	International Journal on Electrical Engineering and Informatics	2019	2085-6830(print) 2087-5886(web)	23
Key-Based Functional Obfuscation of Integrated Circuits For a Hardware Security	K.Kavitha	ECE	IEEEExplore	2019	1803-7232	24
Kinetic modeling of augmenting biomethane yield from Poultry litter by mitigating ammonia	MohanrajDhanushkodi	MECH	International Journal of green energy	2018	1543-5075(print) 1543-5073(web)	25
Segmentation of colon and removal of opacied fluid for Virtual colonoscopy	R.Radhakrishnan	ECE	Pattern Analysis and Applications	2018	1433-7541 (print) 1433-755X(web)	26


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Implementation of Non-Linear Controller for Contemporary DC-DC Converter

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Abstract: This article presents a analysis, design and implementation of non-linear controllers for fundamental negative super lift Luo-Converter (FNSLLC) for purposes needing the stable power source in battery operated portable devices, floppy/hard disk drives, LED TV, physiotherapy medical instrument, lap-top computers, mother board and fan in central processing unit (CPU) applications etc.,. The FNSLLC is a advanced DC-DC converter topology. The FNSLLC is erratic structure system (ESS) and its dynamic analysis is poor. The linear regulators for FNSLLC are poor operating analysis particularly during large source voltage and load modifications. With the aim of improve the dynamic analysis, load voltage and coil current controls of FNSLLC, a linear quadratic regulator (LQR) plus fuzzy logic controller (FLC) is designed. The LQR is designed for FNSLLC with their state space dynamic equations. The controller formation of this converter consists of two loops like, current loop (CL) and voltage loop (VL). In this study, LQR is act as a inner CL for manipulating the coil current of FNSLLC, but the FLC is act as a VL for controlling the load voltage of FNSLLC. The FLC is developed depending on the same system activities and qualitative linguistic control rules. The performance of FNSLLC using LQR plus FLC is verified at various operating states by building both in MATLAB/Simulink and prototype field programmable array (FPGA) models in comparisons with LQR plus proportional double integral controller (PDIC). The results and time domain specifications analyze are presented to prove the adroit of designed controller in different provinces.

Keywords: Super lift Luo-converter, Linear quadratic regulator, Fuzzy logic regulator, State Space Averaging Modeling.

1. Introduction

In current scenario, the development of automotive application and the digital world, there is an increase order of proficient DC choppers are utilized in many electronic systems such as portable electronic devices and other battery operated appliances, high gain, excellent quality, miniature in size, weightless, little prize, unswerving and capable power sources, which are indicates that the enormous research scope to DC choppers domain. The DC choppers are converting DC input voltage at one level to another level. Also, some its main constraints such as stumpy a.c waves in the voltage and current, good performance and simple structural design are provided so as to attain the precise output voltage regulation beside various constraint based on many applications such as low power source applications [1-2]. In conjectural tip of clarifications, basic DC choppers has obtain the high voltage gain with more duty cycle but in real time high duty cycle operation of choppers has produce serious reverse-recovery and EMI problems [2-3]. Based on above discussion problems, a voltage lift method have been effectively working based on design of DC choppers, in case, 3-sequence of Luo-Converters (LC), be subject to load voltage increases in summation progress. As a result, the super-lift system dramatically raises the voltage gain, in balanced evolution, then the prize of model difficulty, also compare to boost converter output voltage and current ripple should be reduced, where the fundamental negative super-lift Luo-converter (FNSLLC) can do the


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[Home](#) [Theoretical Foundations of Chemical Engineering](#) [Article](#)

Optimization Study of *Calophyllum inophyllum* Methyl Ester using Statistical Analysis

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Volume 57, pages 933–945, (2023) [Cite this article](#)[Theoretical Foundations of Chemical Engineering](#)[Aims and scope](#)[Submit manuscript](#)[Appusamy Ramesh](#) , [Chandrasekaran Krishnaraj](#), [Chokkalingam Senthilkumar](#) & [Pandian Sivakumar](#) 27 Accesses [Explore all metrics](#) →

Abstract

Conventional fuels are the transportation sector's major occupants since they provide more power and efficiency with harmful environmental pollution. Researchers have focused on alternative and suitable solutions over a decade, considering the depletion of conventional fuels and environmental pollution. The present work is trying to explore an alternative solution resulting from *Calophyllum inophyllum* seed oil. This oil is extracted mechanically from seeds and the acid value is found to be very high. Acid esterification of oil is done with diluted H_2SO_4 to reduce the acid oil value of oil to make the oil suitable for the

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[Article](#) [CAS](#) [Google Scholar](#)

- 45 Nde, D.B. and Foncha, A.C., Optimization methods for the extraction of vegetable oils: A review, *Processes*, 2020, vol. 8, no. 2, article no. 209, pp. 1–21. <https://doi.org/10.3390/pr8020209>

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Cancer Classification Revolution: Employing Advanced Deep CNNs for Multi-Class Detection of Breast Irregularities

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Abstract— early detection plays a pivotal role in reducing breast cancer mortality rates significantly. Detecting breast cancer at an early stage can increase positive outcomes by up to 8%. While radiologists analyze breast images using techniques such as mammograms, X-rays, and MRIs, accurately identifying features like micro calcifications, lumps, and masses remains challenging, leading to high false positives and false negatives. Recent advancements in deep learning and image processing offer hope for more advanced tools in early breast cancer diagnosis. This study focuses on constructing a Deep Convolutional Neural Network (CNN) capable of recognizing and categorizing various breast abnormalities, including lumps, asymmetries, calcifications, and carcinomas. Unlike previous research that primarily differentiated between benign and malignant cancers, this approach allows for more specialized disease treatment. The methodology involves transfer learning using a pre-trained model (ResNet50), fine-tuning it with the available dataset, and developing an enhanced deep learning model emphasizing learning speed. The proposed deep learning model achieved an impressive 88% accuracy in classifying masses, calcifications, carcinomas, and asymmetrical mammograms. This progress holds significant promise for improving the overall accuracy of breast cancer diagnosis and subsequent treatment decisions. The study aligns with ongoing efforts to enhance early detection and treatment, potentially saving lives through more efficient medical procedures.

Keywords— Early detection of breast cancer, Breast abnormalities, False positives and false negatives, Image processing, Deep learning, Deep Convolutional Neural Networks (CNNs), Transfer learning, ResNet50.

I. INTRODUCTION

Breast cancer is ranked as the second leading cause of death among women worldwide. It originates when a cluster of cancer cells begins to grow irregularly within the mammary gland. The classification of these cells is based on their unusual growth rate

and how they affect healthy cells, which can potentially disrupt the entire system [1]. Breast cancer, as reported by the World Health Organization (WHO), stands as the most prevalent cancer among women globally, with approximately 2.1 million new cases occurring each year. In 2018, it resulted in the loss of an estimated 627,000 women, constituting roughly 15% of all female cancer-related deaths. Previous research [3, 6] has delved into breast cancer identification and classification through conventional methods, bypassing specific employment of machine learning techniques. The arena of medical imaging, notably in image processing advancements, holds promise for crafting applications tailored to breast cancer diagnosis and classification. Deep learning algorithms leverage neural network layers to adeptly recognize intricate patterns, which has substantial utility within the medical domain. Despite ongoing endeavors to automate breast cancer applications, accurately pinpointing or categorizing breast irregularities remains a formidable challenge.

Deep learning's effectiveness depends significantly on having a substantial amount of training data, which is notoriously challenging to acquire within the medical field. To enhance the accuracy of cancer screening, there is an opportunity for future research in the development of automated breast cancer detection systems. In this particular study, we employed a deep learning model to classify abnormalities.

II. RELATED WORK

Breast self-examination, considered a screening method, involves individuals examining their own breasts. By gently feeling the breast tissue from different angles and using varying pressures, one can detect any irregularities or changes in breast tissue. However, it is the least reliable method for cancer detection. In contrast, mammography has emerged as an alternative and has gained widespread utilization in the medical domain. Yet, relying solely on mammography comes with a notable risk of yielding false positives, often resulting in



Comparative analysis of Yavadunam Tavadunikrtya Varganca Yojayet Vedic multiplier for embedded DNN

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Abstract. Memory and computationally efficient CNNs for mobile and embedded applications have sparked a lot of interest recently. Depth-wise and point-wise convolutions are used in MobileNet. In this paper, a Vedic multiplier based on the Yavadunam sutra is used to reduce hardware resource utilization at all design stages in efficient computational kernels, data pruning, memory compression, and quantization to manage the huge computation and storage difficulties of DNNs. Using the teachings of Vedic math, this multiplier will yield a higher propagation speed, lower computational complexity, reduced propagation delay, and less power consumption than multipliers based on the principles of classical mathematics. A multiplier is a critical component in Digital Signal Processing DSP frameworks, which are key components in the majority of computationally advanced frameworks. As a result, the speed and power utilization of multipliers are two critical parameters. The Vedic multiplier presented in this paper is commonly used to find decimal number squares and cubes. By modifying the existing sutra for binary numbers with the bit reduction technique, the hardware design of the Yavadunam Vedic sutra is proposed. The proposed Vedic multiplier was written in VHDL, which stands for Very High Speed Integrated Circuits Hardware Description Language. On the Spartan FPGA board, the multiplier was implemented using the Xilinx Tool and the system generator instrument. The computational complexity and propagation delay of the Vedic multiplier were lower than those of a regular multiplier.

Keywords. Vedic multiplier; Yavadunam sutra; multiplication; bit reduction technique; Vedic mathematics; binary multiplier.

1. Introduction

Vedic arithmetic is a procedure for performing tedious arithmetic computations in a simple manner. This method was developed in historic India. Vedic mathematics includes unique techniques that are primarily based on 16 sutras or formulae related to mathematics, especially algebra, and geometry. These sutras may be applied to trigonometry, plain and spherical geometry, conics, calculus (differential and critical), and various types of arithmetic. Vedic arithmetic transforms complex calculations into relatively simple ones. Vedic arithmetic is suitable for achieving a low area and computational delay. Consequently, it can be applied to different branches of engineering, including computing and signal processing.

Urdhava Tiryakbhyam is a Sanskrit term that translates as vertically and crosswise. The Urdhava Tiryakbhyam method is suitable for the multiplication of any numbers. The novelty of this approach lies in the generation of partial merchandise. In the aforementioned technique, partial


products are generated concurrently through combinational logic gates. The Urdhava Tiryakbhyam method is specifically used in microprocessors to enable functioning at high clock frequencies. An increase in the switching frequency also causes an increase in the switching times. The increase in the switching time enhances the strength and heat dissipation within the system, which results in decreased operating temperatures.

Another advantage of the Urdhava Tiryakbhyam multiplier is its scalability. The processing electricity can be easily increased by increasing the input and output data bus widths because the aforementioned multiplier has irregular structure. The first author of this paper [1] implemented Anurupyena Vedic multiplier for machine learning applications. In machine learning, DNN plays a vital role. The multipliers and adders are the main components in DNN [2]. Due to its regular structure, the aforementioned multiplier can be easily implemented in VLSI technology with an optimal area. With the increase in the range of enter bits, the gate delay and location of the Urdhava Tiryakbhyam increase very slowly compared with those of other

*For correspondence
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RESEARCH ARTICLE | NOVEMBER 29 2022

Enhancement of wear resistance of mild steel using nano crystalline CoW coatings through electroplating technique

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AIP Conf. Proc.

<https://doi.org/10.1063/1.5111111>

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enhancing its wear resistance and corrosion resistance. In the current research work, nano structured thin layer of CoW metal alloy is deposited on the surface of mild steel through electroplating technique to enhance the mechanical properties of mild steel. The procedure is carried out at constant current density of 10 mA/cm², over a period of 60 minutes at the pH value of 6. All the coated samples were subjected to the structural and mechanical characterizations like field emission scanning electron microscope (FESEM), energy dispersive X-ray analysis (EDS), X-ray diffraction pattern (XRD) and wear analysis. The structural analysis of CoW coated mild steel reveals that the CoW coatings are crack free, bright and uniform and all the coatings exhibited the 90% of Cobalt content with 10% of Tungsten content. Through XRD result, it was concluded that all the coatings exhibited crystalline nature and found that the crystalline size was in the few tenths of nanometer with cubic crystalline structure. The wear behavior of CoW coated mild steel was analyzed using pin on disc method and it is

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A hybrid technique used in grid integration of photovoltaic system for maximum power point tracking with multilevel inverter

S. Saravanan¹ and T. S. Sivakumaran²

Abstract

A new hybrid technique for grid integration of solar photovoltaic system using modified incremental conductance maximum power point tracking algorithm with multi-output converter and multilevel inverter is proposed in the paper. The proposed hybrid technique is the joint execution of improved dolphin echolocation algorithm and gradient boosting decision trees and this way the proposed technique is named as IDE-GBDT technique. The novelty of the proposed work is the dolphin echolocation algorithm, which is integrated by the crossover and the mutation function so it is named as IDE. In the proposed technique, the multi-output converter is the combination of boost converter and switched capacitor function to generate different self-balanced output voltages. The utilization of multilevel inverter in the proposed system provides better quality of output voltage and current waveform thereby reducing the size of passive filters. Also, eliminates the requirement of bulky transformers for grid integration. Multicarrier unipolar phase disposition pulse width modulation technique is employed for triggering the switches of the multilevel inverter. The maximum power point tracking algorithm uses the estimated active power output of the generator as its input and generates command speed so that maximum power is transferred to the dc link. This control system also incorporates a loss minimization approach to minimize the losses in the generator and hence to improve the efficiency of the photovoltaic system. Finally, the performance of the proposed maximum power point tracking control of wind and photovoltaic power generation schemes is executed in Matrix Laboratory/Simulink working platform and the execution is assessed with the existing techniques. The proposed technique is compared with the existing techniques and the observed total harmonic distortion of the proposed technique in all the cases is 0.67%, 0.51%, 0.58%, 0.63%, 0.92%, and 1.03% and the total harmonic distortion is found to be very less compared with existing techniques.

Keywords

Solar photovoltaic system, multi-output converter, multilevel inverter, output voltage and current waveform, switches, efficiency

Introduction

The natural resources on Earth are shrinking day by day for satisfying the increasing power demand. So, the power department is observing modified energy resources that can deal with the problem of global warming. From photovoltaics, energy is extracted in terms of climatic conditions. The system has an optimal operating point called maximum power point to extract the maximum power of photovoltaic module; the photovoltaic panel must be adapted to the load. This is done by using a boost converter or fuzzy logic controller to maximize power (Bahrami et al., 2019; Prabakaran and Palanisamy, 2017; Rakhshan et al., 2018). An inverter from photovoltaic generator is used to drive induction motor with maximum power. The frequency and output voltage can be adjusted. It is essential to control the output voltage of the inverter in many applications. Maximum power and maximum voltage applications are normally utilized by multilevel inverters (Mythili et al., 2020). The main performance of a multilevel inverter is its capability to perform power conversion at several small voltage levels and reduce the harmonic content on output voltage. To achieve the good performance of low total harmonic distortion there are many inverter

topologies that have been recommended (Mokhtari and Rekioua, 2018). The multilevel inverter topology subject by diodes is mainly used for maximum voltage applications in industry. To control the flow of power is very difficult because a high number of levels have disadvantages of requiring excessive clamping diodes (Barrera-Cardenas and Molinas, 2012; Ji et al., 2011).

Various control techniques, like proportional integral control, linear quadratic Gaussian control, optimal control, slider mode control, predictive control, diffuse control, and so on are most commonly used techniques of maximum power point tracking (Srinivas and Sreeraj, 2016; Rahmani and Li, 2017). Although the aforementioned alternative energy systems are

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[Handbook of Nanomaterials and Nanocomposites for Energy and Environmental Applications](#)

[Amuthameena Subramanian](#), [Baskaran Balraj](#) & [Nandakumar Easwaramoorthy](#)

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Abstract

Nanotechnologies offer the possibilities to upgrade energy productivity and storage over all the fields of industry. The economically controlled sustainable power source production through new technological arrangements and advanced production techniques are the current need. For the past few decades, all industries and every individual are consuming more amount of electrical energy. The demand on electrical energy is rapidly increasing

Heat and mass transmission of an Oldroyd-B nanofluid flow through a stratified medium with swimming of motile gyrotactic microorganisms and nanoparticles


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Abstract

This paper focuses on the research of motile microorganism rates in the bioconvective Oldroyd-B nanofluid flow over a vertical stretching sheet with mixed convection and inclined magnetic field. Additionally, interesting characteristics of thermophoresis, Brownian motion, viscous dissipation, Joule heating, and stratification are examined.

[Article](#) [CAS](#) [Google Scholar](#)

49. Conte M, Prohini PP, Passerini S (2004) Overview of energy/hydrogen storage: state-of-the-art of the technologies and prospects for nanomaterials. Mater Sci Eng B 108(1–2):2–8

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Leticia Myriam Torres-Martínez

every year. The storage of electrical energy is a challenging issue in energy sector. Current utilized batteries are not that much reliable for long time storage. Implementing nanotechnology to the energy storage is the current interest of research. Supercapacitors, Li-ion batteries, and hydrogen storage are the most recent technologies in the energy sector. There are several ways to fabricate the electrodes for the energy storage devices. Nano-based components like light-emitting diode provide efficient usage of electrical energy. This chapter is proposed to review the past, current and future role of different nanomaterials in the energy sector.

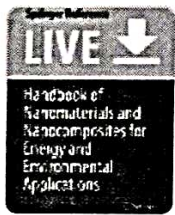
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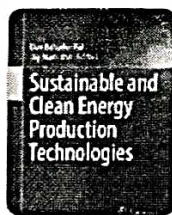
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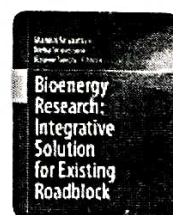
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Adaptive neuro-fuzzy inference system based under-frequency load shedding for Tamil Nadu

K. Paul Joshua¹ · J. Mohanalin² · S. T. Jaya Christa³

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Abstract Under-frequency load shedding (UFLS) is a popular technique around the world, especially in India for maximizing the power system stability and to avoid blackout in case of contingency. Electricity demand–supply gap due to generation failure is the main cause for power shortage, which leads to frequency degradation and major collapse of the whole system. Load shedding helps utility to restore the system stability. But the traditional load shedding methods shed incorrect as well as excess load which increases economic loss to utility and discomfort to customers. In this paper, an adaptive neuro-fuzzy inference system (ANFIS) based UFLS controller using back-propagation and least-square estimation algorithm is simulated and tested for Tamil Nadu power system, a leading industrialized state of India with an objective to shed minimum possible load. The simulations are carried out using MATLAB toolbox. The performance of the proposed ANFIS based UFLS controller is compared with an artificial neural network (ANN) based controller. The comparison of ANN and ANFIS based UFLS shows that by using the proposed ANFIS controller, the amount of load shed could be reduced between 83 and 1264 MW for various generation–load scenarios, which significantly benefits both utility and customers to enhance energy security and revenue up to 7.5 million INR per hour.

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Similarity transformations are employed to reduce the mathematical model to higher-order ODE. The convergent series solution is applied to solve the nonlinear differential system. The analysis of temperature, velocity, motile microorganisms' density, and nanoparticle concentration are represented through graphs. Local Nusselt number, density number of motile microorganisms, and Sherwood number are examined via contour plots.

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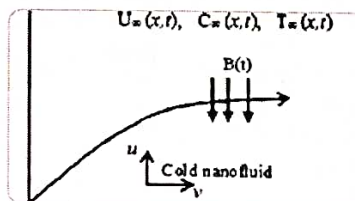
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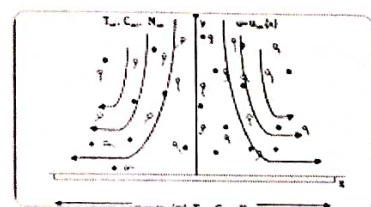
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Design and investigation of low-complexity Anurupyena Vedic multiplier for machine learning applications

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Abstract. The current world of computers is based on machine learning and profound learning towards artificial intelligence. In recent investigations, parallelisms are used to solve difficult problems. For the implementation of the FPGA, new architectures have been built using design techniques VLSI and parallel computing technologies. Research on reconfigurable computing, machine learning and signal processing should be constantly monitored in the development of artificial intelligence. Energy-restricted computer devices should be continuously developed to support algorithms in the machine learning process. In machine learning algorithms, multipliers and adders play a significant role. In ALU, Convolutionary Neural Network (CNN) and Deep Neural Networks (DNN), the multiplier is an energy-consuming factor of signal processing. In this project, for the DNN, the high-speed Vedic multiplier has been introduced. The versions of the parallel-parallel (PP), serial-parallel (SP) and two-speed (TS) multipliers are compared to the standard 64-, 32- and 16-bit models. The results are obtained for an Intel Cyclone V 5CSEMA5U23C6 FPGA, using the Intel Quartus 17.0 software suite.

Keywords. Binary multiplication; Vedic mathematics; Nikhilam Navatashcaramam Dashatah; Urdhava Triyagbhyam; Anurupyena sutra.

1. Introduction

A technique that gives a simple solution to complex problems is Vedic mathematics. In [1], Moss has introduced a serial-parallel two-speed radix-4 multiplier to speed up applications such as digital filters, artificial neural networks and other algorithms for machine learning. For zero and non-zero recoveries, a two-speed multiplier is used with different critical paths. In [2] the author deals with AddNet, which uses shifted values at k levels in neural networks as multipliers for weight modification. In the case of a neural network architecture and ternary weight data, this paper [3] shows that the extreme performance implementation of the neural network inference can be achieved by customizing the data path and routing to eliminate unnecessary computations and data movement.

2. Existing Anurupyena algorithm

Anurupyena is a Nikhilam sutra's sub-sutra. The shortcut methods for multiplying numbers are provided [4]. A new Vedic hybrid multiplier combining Karatsuba and Urdhava

Tiryagbhyam algorithms has been developed in [5]. A new algorithm based on Nikhilam sutra was suggested with the bit reduction technique in [5–7]. A generic architecture was generally proposed for the Nikhilam sutra [8, 9]; the Anurupyena method is used only when the multiplicands are in the same range in mental calculations.

3. Proposed Anurupyena algorithm

The Anurupyena algorithm is modified in this analysis, so that decimal numbers can be multiplied in any range even if they are not near the basic value. The amendment was also made to incorporate the hardware of the Anurupyena algorithm.

X and Y are two numbers defined by the base numbers. B is the base number, X_d is shortfall of X and Y is shortfall of Y . The deficiencies (shortfall) can be positive or negative. If the number is greater than the base value the shortfall is positive, while the shortfall is negative if the number is less than the basic value. For a 4-bit combination, except for "10," the deficiency is negative. This combination is presented with examples in table 1.

The provided N -bit numbers are divided according to their fundamental value into four groups. If the number starts with "00" it is in the first group, and the common base value k is 01. If the number begins with "01" or "10"

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Design And Control Strategies of Quasi – Z Source Inverter For Photovoltaic Power Generation Systems

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Abstract - The fast decreasing fossil fuel and emission of carbon dioxide pollution leads the researcher to go with alternative energy resource to utilize the power demand and leads the research in the area of power converters. This research work focused on the maximum utilization of PV systems integrated with quasi z source inverter topology. The z source inverter plays a prominent role in PV fed converter, existing much more topology are derived from z source. A few topologies like quasi z source utilizing less number of passive components. Such topology has copious advantages like, voltage boosting capability, reduced inrush current at startup, which might destroy the devices can be avoided. The research work focus on the design and control strategies of quasi z source inverter with PI and FLC controller. The setup is implemented in Matlab/Simulink and to validate the proposed module a laboratory prototype is modeled and designed with FPGA Spartan 6 with power rated 0.8kW with PV volt of 60V and ac output voltage of 220V.

Keywords - PV panel, Quasi Z source inverter, performance analysis, PI and FLC controller.

I. INTRODUCTION

In recent years, due to power outage crisis, the alternate energy sources such as wind, PV cell, fuel cell, plays a prominent role in commercial and domestic applications. Whereas PV cell and fuel cell, can deliver only dc voltage, in such way we need to converter dc to ac so an inverter interface has to be needed to comprise such needs. While PV power harvesting becoming more and more popular, the applications and research studies of Z source and Quasi z source based PV power systems due to the advantages like large power-scale application and capable of connecting with high-voltage grid-tie demands. A modified quasi z source inverter with symmetrical voltage level for three level inverter with APOD scheme is proposed [1]. A detailed study on fluctuation problem in stray capacitance in PV panels and adopted with CMV technique [2]. Novel dual switching frequency modulation implemented for quasi z source inverter with SPWM modulation [3]. Reduced switching technique for CBMLI is proposed with LS-PD-PWM scheme and comparison with PI and FLC controllers [4]. Steady state analysis and stress analysis frequency analysis for sl quasi z source inverter were made [5]. Proposed modified SVPWM scheme for reducing fundamental cycle, for reducing switching loss [6]. A detailed analysis was carried out with CCM and DCM strategies for quasi z source inverter [7]. A series of z source inverter is proposed and to overcome

voltage stress, increase boost factor, voltage boost ability [8]. Proposed water pumping system for remote areas, with a wind driven quasi z source network and reported that the efficiency and reliability of system improved [9]. Discrete time average model based predictive control is adopted for quasi z source inverter [10]. Proposed a new topology of enhanced boost quasi z source inverter compared with switched impedance network [11]. Performance of BLDCM for centrifugal pump with quasi z source inverter to developed water pumping control [12]. Different switching scheme adopted for z source inverter with sine and trapezoidal scheme [13]. A dual cascaded SL quasi MLI is proposed for medium voltage application with low switching frequency operation [14]. Proposed a quasi z source inverter with automatic output power ratio constraint based MPPT algorithm [15].

In this research work design and control strategies of quasi z source inverter for photovoltaic power generation is proposed. The system is built and to validate the effectiveness the proposed system undergone with PI and FLC controller were compared. The simulation is carried out using Matlab/simulink and results are validated.

II. SYSTEM ANALYSIS OF QUASI-Z-SOURCE INVERTER TOPOLOGY

Quasi Z source inverter is derived from the traditional z source inverter family. The unique features of this quasi z source inverter are the usage of limited numbers of passive components this lead the topology to boost ability. The figure 1 shows the quasi z source inverter with PV connected.

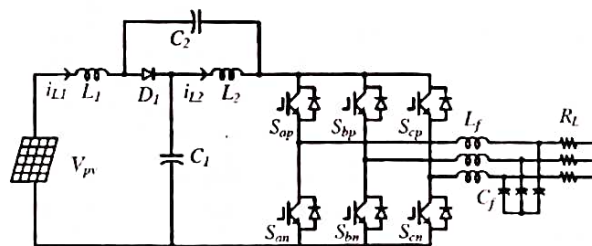


Fig 1: PV fed quasi-Z-source inverter

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Fault Detection and Diagnosis of Multi-Phase Induction Motor Drives Using MFRF Technique

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Abstract— In the dissertation, a hybrid technique based on detection and diagnosis of fault in multi-phase induction motor (IM) is performed. The present technique is the hybridization of Moth Flame optimization (MFO) and Random Forest algorithm (RFA) and it is named as MFRF method. The multiphase IM is evaluated under normal conditions in the initial period. The fault is maintained in multi-phase IM as well as characteristics of system are observed. In the defective period, signals are scaled, that may seen as waveforms are distorted. Distorted waveforms are made up of various frequency methods are required to represent as frequency of time domain as evaluation of failure. IM. The proposed technique is performed in MATLAB/Simulink platform. Implementation of established technique is contrasted to existing methods, like ANN, S-Transform and GBDT. The statistical measures are determined to demonstrate the successfulness of established technique, like precision, sensitivity and specificity, mean median and standard deviation.

Keywords—Induction motor, fault detection, random forest algorithm, Moth flame optimization, ball bearing, inner race

I. INTRODUCTION

Being recommend the measures of economy and technology proven as three-phase machines control the speed in applications of market drive. But, current attempt has made with highpoint the benefits of various phase machines as well as get niche methods where they may finish to three-phase standards. Hence tolerance of failure implement as phase of redundant in single characteristics machines as various phase, industry has initially focused as maximum-reliability methods like aerospace, traction or systems of wind energy consists of machines to winding in three-phase as various phase [4]. To the applications of mind, various operations has focused in evolution of maximum-performance control methods of fault in machines as induction (IMs) as well as synchronous machines as permanent magnet (PMSMs) [5]. Diagnosis of failures in electrical machines may utilize to notice as emerging failures, and leads to rapid unplanned maintenance of corrective, short downtimes as well as reduction of side-effects in harmful [6]. Most types of failure (e.g. rotor bars broken or failure between turns, to name a little) must be considered in account and relate as detection of high times may allowed. Next, the objective of failure observation is implement as any tolerance methods to failure defined [7]. detection of fault should focus on Open Phase fault (OPFs) [8] and times of detection as short as sufficient (generally lower than unique period of fundamental). Hence the detection of failure technique is contrasted to maximum execution as control of superior failure, namely: detection time as short (R1), locate the failure capacity (R2), methods of non-invasive and eliminate additional hardware (R3), eliminate complex methods to high cost of calculation

(R4), be individualistic of parameter machine, control method and conditions of operating method (R5) [9-12].

Although it has few techniques of FD in literature on multiphase units, no one meet the techniques as aforementioned methods [13]. Method of detecting dissymmetry in stator resistance as seven-phase of IM is introduced [14]. Therefore, this technique depends on methods of control (R5 is insufficient). Requirement of R3 is breached [15-16], in case of extra measurements of voltage are required to notice short circuits between turns. Due to the view of failure detection technique is suggested [17] along to finite failure of tolerance control. To implement the viewer as cost of calculation based on parameter of machines. Subsequently, requirements of R4 and R5 are not met to this technique. To view the point as superior- failure control, OPF has situation of favorable studied failure nevertheless methods of control [17-20]. Hence, there is no technique to detect this way of failure that meets the conditions mentioned above.

II. RECENT RESEARCH WORKS: A BRIEF REVIEW

Several investigation methods in bibliography which depends on diagnosis of failures in induction machines of various phase utilized as various techniques and various points of view. Here a part of the works is examined. Due to evaluation of signal as quaternion, J. Contreras-Iernandez et al. [21] has presented a new engine fault detection method. To maintain the rotation of quaternion and implies statistics rotation of quaternion, like mean, the shadows of clusters and the prominence of clusters to obtain their functions, and employ to allocate the state of motor utilize the algorithm as classification of tree. Its strategy was experimentally validated and contrasted to another technique demonstrate as organization technique as detection of characteristics and recognition and allocation of engine failures. M. Singh and A. Shaik [22] have used the detection, allocation and position of defective bearings as induction motor in three-phase employ as Vector Stock-well transformer and support machine. Stock-well transformation was performed to signals of stator current remove the series as characteristics time and domain frequency. Due to the score of Fisher rating the place uncorrelated maximum-ranking characteristics was selected. These characteristics were change to allocate failures, like ball, cage and outer stroke failures, employ as support vector machine. The characteristic of Stock-well transformation was utilized after the identification of failures, to place the bearing as defective, i.e. fan side or motor burden side.

A. Background of the Research Work

Analysis of current investigation displays the observation of failures in motor of induction as significant factor of contribution. Earlier diagnosis of failure is most significant to eliminate the effects of catastrophic in

Man of the League Algorithm Based Space Vector Modulated Inverter in Photovoltaic System

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Abstract—This paper proposes an ideal MLA based direct-current vector to control plot of GS-VSC. It is hold steady dc capacitor voltages to enhance the receptive power pay and to strengthen the converter straight adjustment limit.

Keyword—Adaptive control, Optimal design, Power electronic, Stimulator, Boost converter, DC-DC converters, Design optimization methodology.

1. INTRODUCTION

The sustainable power source framework is a commendable elective answer of ordinary influence age and it is utilized to yield rich, clean, and discharge free vitality. These days, broadly utilized inexhaustible power sources, for example, sun oriented cells, hydrogen-energy components and wind vitality transformation framework use control hardware interface [1] as fundamental components for the lattice joining.

Amid the accessibility of daylight, support DC/DC converter and the framework side voltage source converter (GS-VSC) can change sunlight based vitality into nearby burden and utility lattice. In any case, without daylight, the power required for neighborhood loads is ingested straightforwardly from the primary AC framework. Since GS-VSC has been found generally toward the finish of the feeder, responsive power remuneration turns out to be increasingly compelling for burden side client voltage support. In matrix associated condition, the business inverters for the most part infuse dynamic power just to the lattice [2], [3]. Then again, it is conceivable to incorporate power quality capacities by remunerating receptive intensity of the neighborhood loads. The responsive power ability of the voltage source inverter is restricted by the current-conveying limit of the Insulated Gate Bipolar Transistor (IGBT) and dc-connect voltage. Since PV yield control is in every case not as much as inverter appraised control, its extraordinary limit can be used for the receptive power supply [4], [5].

The responsive power, voltage control and music current pay technique are introduced for appropriation age frameworks in [6], [7]. The lattice associated control quality compensator with circulation age can control the dynamic power stream, yet in addition can relieve load unbalance, sounds, and oversee power by utilizing Instantaneous Reactive Power (IRP) hypothesis and the Synchronous Reference Frame (SRF) hypothesis. These hypotheses are for the most part tended to in the writing [8].

The presentation of a GS-VSC in AC frame work depends on kind of converter topologies as well as on how the converter has been controlled. Expectedly, controlling of a GS-VSC in AC framework just as the converter in

STATCOM utilizes the customary decoupled d-q vector control conspire [9] & [10]. The execution of the controller has not been concentrated in detail, when the converter works past the direct regulation cutoff [11], [12]. The assessment of this work demonstrates that there is a constraint in the customary standard GS-VSC vector control procedure, and it could result in enormous motions in the GS-VSC matrix frameworks, especially when the converter works over its straight adjustment limit. This paper introduces an ideal MLA based direct-current vector control plot for a GS-VSC. The reason for the proposed control conspire is to hold a steady dc capacitor voltages to improve the receptive power pay, and to upgrade the framework strength both inside and past the converter straight adjustment limit. The remainder of the paper has been sorted out as purses: the arrangement and distinctive working methods of a test framework are engaged in Section 2. Section 3 proposes an ideal control plot dependent on an immediate current vector control setup of GS-VSC. The exhibition and the examination investigation of the ordinary and the proposed control systems are given in Section 4. At last, the section 5 is finished up with the outline of the primary concerns.

II. SYSTEM CONFIGURATION AND OPERATION

A. AC System And Circuit Configuration

The schematic outline of the AC framework is appeared in Fig. 1. PV side DC/DC support converter works utilizing gradual conductance based Maximum Power Point Tracking (MPPT) strategy [13], though network side inverter GS-VSC utilizes the proposed MLA based ideal space vector tweaked control.

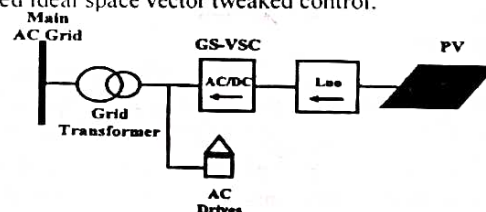


Fig. 1. Layout of AC system for integration of PV

B. Operating Modes

The essential target of this proposed work is to separate greatest measure of vitality from the PV module that improves the framework solidness and productivity with the help of ideal control strategy. Power stream model of the proposed AC smaller scale arrange is characterized into three diverse working modes.

Mode-I: While there is no AC nearby burden request at the Point of Common Coupling (PCC), whatever the electric power created by PV module is totally bolstered into the principle AC lattice.

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Implementation of Non-Linear Controller for Contemporary DC-DC Converter

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Abstract: This article presents a analysis, design and implementation of non-linear controllers for fundamental negative super lift Luo-Converter (FNSLLC) for purposes needing the stable power source in battery operated portable devices, floppy/hard disk drives, LED TV, physiotherapy medical instrument, lap-top computers, mother board and fan in central processing unit (CPU) applications etc.,. The FNSLLC is a advanced DC-DC converter topology. The FNSLLC is erratic structure system (ESS) and its dynamic analysis is poor. The linear regulators for FNSLLC are poor operating analysis particularly during large source voltage and load modifications. With the aim of improve the dynamic analysis, load voltage and coil current controls of FNSLLC, a linear quadratic regulator (LQR) plus fuzzy logic controller (FLC) is designed. The LQR is designed for FNSLLC with their state space dynamic equations. The controller formation of this converter consists of two loops like, current loop (CL) and voltage loop (VL). In this study, LQR is act as a inner CL for manipulating the coil current of FNSLLC, but the FLC is act as a VL for controlling the load voltage of FNSLLC. The FLC is developed depending on the same system activities and qualitative linguistic control rules. The performance of FNSLLC using LQR plus FLC is verified at various operating states by building both in MATLAB/Simulink and prototype field programmable array (FPGA) models in comparisons with LQR plus proportional double integral controller (PDIC). The results and time domain specifications analyze are presented to prove the adroit of designed controller in different provinces.

Keywords: Super lift Luo-converter, Linear quadratic regulator, Fuzzy logic regulator, State Space Averaging Modeling.

1. Introduction

In current scenario, the development of automotive application and the digital world, there is an increase order of proficient DC choppers are utilized in many electronic systems such as portable electronic devices and other battery operated appliances, high gain, excellent quality, miniature in size, weightless, little prize, unswerving and capable power sources, which are indicates that the enormous research scope to DC choppers domain. The DC choppers are converting DC input voltage at one level to another level. Also, some its main constraints such as stumpy a.c waves in the voltage and current, good performance and simple structural design are provided so as to attain the precise output voltage regulation beside various constraint based on many applications such as low power source applications [1-2]. In conjectural tip of clarifications, basic DC choppers has obtain the high voltage gain with more duty cycle but in real time high duty cycle operation of choppers has produce serious reverse-recovery and EMI problems [2-3]. Based on above discussion problems, a voltage lift method have been effectively working based on design of DC choppers, in case, 3-sequence of Luo-Converters (LC), be subject to load voltage increases in summation progress. As a result, the super-lift system dramatically raises the voltage gain, in balanced evolution, then the prize of model difficulty, also compare to boost converter output voltage and current ripple should be reduced, where the fundamental negative super-lift Luo-converter (FNSLLC) can do the

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Key-Based Functional Obfuscation of Integrated Circuits for a Hardware Security

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Abstract— A novel technique proposed in this paper for securing integrated circuits, IP cores known as mixed functional Obfuscation. The functional obfuscation is a type of countermeasure used to encrypt and protect circuits from adversary attacks and from illegitimate use during the IC fabrication process. The main goal is to obscure the hardware circuit functionality at a design house by modifying its design using encryption keys. This technique is obtained from current obfuscation methods termed as fixed, dynamic obfuscation. This method increases the level of obfuscation in terms of brute force attack time and reverse engineering attack time.

Keywords—Functional Obfuscation, illegal attacks, adversaries, dynamic obfuscation, fixed obfuscation.

I. INTRODUCTION

Semiconductor industries are changing to be a fabless model which outsources its work to manufacturing plants or foundry of IC's. Rostami et al concentrated on hardware circuit vulnerabilities such as illegal reproduction, insertion of malicious components, reverse engineering attacks [5]. S. Bhunia et al explained the importance of safeguarding semiconductor circuits by adopting concepts of security mostly in cryptographic applications [6]. Hardware obfuscation of integrated circuits is one such method demonstrated by R. S. Chakraborty et al [3], it serves as a countermeasure against IC overproduction, illegal reuse of IP's by adversaries. The goal of obfuscation is similar to hiding the circuit functionality with corrupted outputs. It is related to the encryption process where the keys are embedded on the design. Unless the correct secret key is given, the attempts made by third parties to access illegally or illegal reproduction of ICs' is fruitless. The secret keys are embedded onto the chip once it is obtained from the design house and then moved to the market. Several advances in hardware obfuscation or Functional encryption had been proposed in the literature by J. Zhang et al [10].

Lao et al implemented new approach of sequential logic obfuscation [7] with a perception that, alike circuits may exhibit different functionality and circuits which look distinct will have same circuit behavior. Sekhar et al [11], G. N. Shanmugam et al [8] demonstrated this concept with Fast Fourier Transform circuits which were illustrated by Ayinala et

al using folding transformation [4] to derive a pipelined architecture. These techniques are mainly derived into a class of obfuscation termed as fixed obfuscation. Xie et al have exposed the short comes of fixed obfuscation method such as low security level and susceptibility to attacks based on circuit parameter analysis [9]. By utilizing dynamic nature and time variance behavior of hardware design can secure the circuit behavior by increasing its security level, this concept was proposed by S. Koteswara et al [11], [12] termed as dynamic obfuscation.

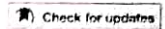
In this paper, these concepts have been used and represent a new idea of perplexity. The method implemented in this paper secures circuit at two-levels by merging concepts derived from existing obfuscation methods. Moreover, the dynamic and random behavior of the circuit increases the key deciphering time. It follows that: the proposed method can deliver as a method which provides security at a level in between fixed, dynamic obfuscation methods. The FFT circuit demonstration using this form of functional obfuscation technique, analogizes among the existing and implemented techniques and the best method can be opted based on the analysis.

II. PROPOSED METHOD

Obfuscation is achieved by mapping secret keys to the hardware circuit using combinational circuits. These circuits can be any universal gates or logic gates, multiplexers. Whenever the given input key is incorrect, the resulted outputs can be in incorrect or vice-versa. The output generated depends on input i.e., key-input hence, it is an input-dependent circuit and this process is termed as fixed obfuscation. The basic input-dependent circuit is used to obtain functionality of fixed obfuscation is as shown in Fig. 1, it illustrates multiplexer based concept. $k[0]$ and $k[1]$ represents key bits which are mapped to select lines of multiplexer, whereas $c1$, $c1'$ are correct and incorrect inputs of multiplexer. Depending on the key value given as select input, the circuit output can be either correct or incorrect value designated as $o1$ and $o2$.

Perplexity level is increased by accruing time-dependence; random nature to the design and this concept was introduced by S. Koteswara et al [8] is termed as dynamic obfuscation. The modified obfuscation circuit is shown in Fig. 2. Here, the circuit is designed to exhibit dynamic nature such that for an





Kinetic modelling of augmenting biomethane yield from poultry litter by mitigating ammonia

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ABSTRACT

In this study, the kinetics of biogas production was studied by performing a series of the laboratory experiment with air stripped poultry litter. Four kilograms of Raw Poultry Litter is mixed with water in the ratio 1:3, respectively, and loaded inside the digesters and the samples are compared with Air stripped Poultry Litter for a retention time of 21 days. The modified Gompertz equation suitably construes the cumulative biogas produced as a function of time. From the kinetics of the system, it is inferred that the biogas production potential (A), maximum biogas production rate (r_m), and lag phase period (λ) of Raw Poultry litter is 18.77 (l/kg of VS); 1.08 (l/kg of VS/day); 1.5 days, respectively, comparing with Air stripped Poultry Litter of 22.05 (l/kg of VS); 1.30 (l/kg of VS/day); 1 day, respectively. These results show that biogas production can be enhanced efficiently by means of ammonia removal pre-treatment process.

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Air stripped Poultry litter; ammonia mitigation; biogas production rate; kinetics of biogas production; modified gompertz equation

Introduction

Energy is required for human beings to sustain at every stage of life for their shelter, food, transportation, and industrial activities (Herbert and Krishnan 2016). In the recent past, the global energy consumption has been increased progressively in too many folds. The rural energy demand is growing rapidly which is supplied by the fossil fuels predominantly such as coal, oil, gas. The use of fossil fuel accompanies the emission of carbon compounds and other inorganic substances into the atmosphere which results in climate change, global warming and various health hazards (Panwar, Kaushik, and Kothari 2011). For independent and stable future in energy production, exploration of new renewable energy resources are the way to meet the energy demand (Demirbas and Balat 2009). The biomass plays an important role among all other renewable energy resources because it is the primary source for rural households. Biomass is used to produce heat by means of combustion directly or it can be converted into several forms of bio-fuel indirectly (Munda et al. 2012). Usage of biomass for energy production aids to uphold ecological balance by reducing harmful emissions and purifying the environment, apart from the economic and social aspects (Saha, Biswas, and Pal 2014).

While considering biomass sources, the wastes resulting from livestock breeding has a significant role to play in energy production (Okuo, Waheed, and Bolaji 2016). Poultry breeding plays a vital role in the rural economy, poultry farms are better organized, and it is progressing towards modernization than the rest of the livestock sector. The poultry breeding not

only provides valuable business, in turn at tail end it accumulates a huge volume of wastes which is a serious matter of discussion in recent times (Kirubakaran et al. 2007). Improper managed poultry wastes can cause severe harm to the environment by polluting water and air, which eventually reduce the quality of life (Abouelenien *et al.*, 2010). Considering all advantages in converting poultry waste into energy, anaerobic digestion (AD) is found to be an economically viable, fruitful technique which manages the wastes effectively resulting in the production of gaseous fuel and nutrient-rich manure compared to any other technique used for waste treatment (Panwar, Kaushik, and Kothari 2011). The working and monitoring the anaerobic systems are typical whose stability is always uncertain. The instability is observed as a reduction in methane production rate, increase in Volatile Fatty Acid (VFA) content causing failure of the digester. The high level of ammonia is identified as a major cause of digester failure since it inhibits the microbial activity directly by exterminating the microbial ambience (Rajagopal, Massé, and Singh 2013).

Poultry litter comprises a huge amount of organic nitrogen which mainly constitutes proteins and amino acids (60–80%) (Krylova et al. 1997 Kelleher et al. 2002). For the growth of anaerobic organisms, the presence of nitrogen is inevitable when the concentrations are within the limits (Strik, Domnanovich, and Holubar 2006). While biological anaerobic degradation of nitrogen, ammonia is evolved. As discussed,

Segmentation of colon and removal of opacified fluid for virtual colonoscopy

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Abstract Colorectal cancer (CRC) is the third most common type of cancer. The use of techniques such as flexible sigmoidoscopy and capsule endoscopy for the screening of colorectal cancer causes physical pain and hardship to the patients. Hence, to overcome the above disadvantages, computed tomography (CT) can be employed for the identification of polyps or growth, while screening for CRC. This proposed approach was implemented to improve the accuracy and to reduce the computation time of the accurate segmentation of the colon segments from the abdominal CT images which contain anatomical organs such as lungs, small bowels, large bowels (Colon), ribs, opacified fluid and bones. The segmentation is performed in two major steps. The first step segments the air-filled colon portions by placing suitable seed points using modified 3D seeded region growing which identify and match the similar voxels by 6-neighborhood connectivity technique. The segmentation of the opacified fluid portions is done using fuzzy connectedness approach enhanced with interval thresholding. The membership classes are defined and the voxels are categorized based on the class value. Interval thresholding is performed so that the bones and opacified fluid parts may be extracted. The bones are

removed by the placement of seed points as the existence of the continuity of the bone region is more in the axial slices. The resultant image containing bones is subtracted from the threshold output to segment the opacified fluid segments in all the axial slices of a dataset. Finally, concatenation of the opacified fluid with the segmented colon is performed for the 3D rendering of the segmented colon. This method was implemented in 15 datasets downloaded from TCIA and in real-time dataset in both supine and prone position and the accuracy achieved was 98.73%.

Keywords Computed tomography (CT) · 3D seeded region growing · 3D-6 neighborhood connectivity · Fuzzy connectedness · Opacified fluid · Small bowels

1 Introduction

Colorectal cancer (CRC) is cancer that occurs either in the colon or rectum. It is the second leading cause of death and the third most common form of cancer in the USA [26]. CRC will develop initially as colorectal polyps, which are growths inside the colon or rectum that may later become cancerous. Early detection and removal of colorectal polyps via screening are the most effective way to reduce colorectal cancer mortality. Virtual colonoscopy (VC) or CT colonography (CTC) is a rapidly evolving technology for the detection of colorectal polyps and permits interactive viewing with two-dimensional (2D) and three-dimensional (3D) image display techniques. This medical imaging method is being widely investigated as a non-invasive examination procedure for the detection of colorectal polyps. In this proposed work, a method for automatic segmentation of colon from abdominal CT images is

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