



VIMAL JYOTHI ENGINEERING COLLEGE

JYOTHI NAGAR, CHEMPERI - 670632, KANNUR, KERALA

Affiliated to APJ Abdul Kalam Technological University, Approved by AICTE
ISO 9001 : 2015 Certified | Accredited by Institution of Engineers (India), NBA, NAAC
Ph: 0490 2212240, 2213399 Email: office@vjec.ac.in Website: www.vjec.ac.in

NAAC Cycle 2

Criterion: 3.3.2

Sl.No	Title of Books/Papers	Page No
1	Computer Aided Detection of Breast Cancer on Mammograms: Extreme Machine Neural Network Approach	2
2	Learning and Reflection of Technology based Collaborative MOOC design and its Evaluation, Validation and Results	3
3	Machine Learning Approach for 5G Hybrid Technologies	4
4	A New 2-Scroll Chaos Plant with Multistability and its Circuit Realization	5
5	KY Based DC-DC Converter for Standalone Photovoltaic Water Pumping System Employing Four Switch BLDC Drive	6
6	Digital Signal Processing	7
7	Environmental Science, GTU - 2019	8
8	Melanoma Classification and Birthmark Mole Detection on Clinical Images	9
9	Soft Computing Based MPPT Controller for Solar Powered Battery Charger Under Partial Shading Conditions	10





VIMAL JYOTHI ENGINEERING COLLEGE

JYOTHI NAGAR, CHEMPERI - 670632, KANNUR, KERALA

Affiliated to APJ Abdul Kalam Technological University, Approved by AICTE
ISO 9001 : 2015 Certified | Accredited by Institution of Engineers (India), NBA, NAAC
Ph: 0490 2212240, 2213399 Email: office@vjec.ac.in Website: www.vjec.ac.in

NAAC Cycle 2

Criterion: 3.3.2

Computer-Aided Detection of Breast Cancer on Mammograms

Extreme Learning Machine Neural Network Approach

Jayesh George M.

Vimal Jyothi Engineering College, Chempери, Kerala, India

Perumal Sankar S.

ToC H Institute of Science and Technology, Kochi, Kerala, India

14.1 Introduction

Breast cancer is considered as a major reason of mortality among adult female. According to the National Cancer Institute Annual Report to the Nation 2017, incidence summary shows that between 1999 and 2013 the overall cancer incidence rate remained stable for women while the incidence rate continued to decrease among men. This type of cancer occurs almost entirely in women but in some rare cases men suffers from it too. There are about 20 different types of breast cancer. Most cancer occurs in the milk ducts and some in the glands.

The two types of tumors seen in women are benign and malignant. A noncancerous tumor is called benign tumor and is considered to be completely curable. A malignant tumor may invade the surrounding tissues and spread all over the body. The exact reason for breast cancer is still unknown but some of these are due to genetic abnormality and about 5–10% of cancers are inherited from parents. An X-ray imaging technique to examine human breast is called mammography. This specialized imaging technique aids in the early identification and diagnosing of breast abnormality as a screening tool. A diagnostic mammography is done for the patient who has previous abnormality and require some follow-up. A typical mammogram involves two or four views taken from different angles. A top view of breast is called cranial caudal view while a side view is called mediolateral oblique view.

Dense tissue and overlap of cancer cells with normal tissues leads to missed rate at the range of 10% in mammography. Interpretation of mammogram images is difficult because normal breast looks different for each women. It is necessary to have an advanced system between mammogram image reader and an input image to correctly identify the lesions. A computer-aided detection (CAD) system highlights the abnormal areas (mass, density, and microcalcification) on the images. [1] It will lead to a higher "recall" rate with less or no effect on positive predictive value for clinical biopsy. By





VIMAL JYOTHI ENGINEERING COLLEGE

JYOTHI NAGAR, CHEMPERI - 670632, KANNUR, KERALA

Affiliated to APJ Abdul Kalam Technological University, Approved by AICTE ISO 9001 : 2015 Certified | Accredited by Institution of Engineers (India), NBA, NAAC Ph: 0490 2212240, 2213399 Email: office@vjec.ac.in Website: www.vjec.ac.in

NAAC Cycle 2

Criterion: 3.3.2

2018 IEEE Ninth International Conference on Technology for Education (T4E)

Learning and Reflection of Technology based Collaborative MOOC design and its Evaluation, Validation and Results

Atul M Kulkarni

Electronics and Telecommunication
Engg. Dr. Babarabek Ambekar
Technological University Institute of
Petrochemical Engineering
Lonere, India
amkulkarni@dbata.ac.in

Gowrinankar P

Electronics and Communication
Systems.
Hindustan college of arts and science
Coimbatore, TamilNadu, India
hicaselectronicshod@hindustan.net

K. Madhavi

Humanities & Sciences dept
VNR Vignana Jyothi Institute of
Engineering and Technology
Hyderabad, India
madhavik@vnrvjiet.in

Joby P Joseph

Mechanical Engineering, Vimal Jyothi,
Engineering College,
Kannur, Kerala, India
jobypjoseph@vjec.ac.in

Abstract— Information and Communication Technology (ICT) making a radical change in teaching learning practices. Content knowledge assimilation using technological pedagogical knowledge (TPK) is proven effective for learner centric approach. The rise of massive open online courses (MOOCs) made possible diverse learners to upgrade their knowledge and skills hence became a solution for facilitating access to quality education. This paper presents Learning and Reflection of Technology based Collaborative designed MOOC, the work is a essence of faculty development program on "Mentoring Educators in Educational Technology" course offered by IIT Bombay (IITB). Work done is a collaborative efforts of team assigned by IITB course team, participant's Le. peer reviewers are also assigned by IITB course team for MOOC course designed by us. The MOOC designed team received guidelines from IITB course team, discussion forum, peers, social media group of peers and office hours conducted by IITB course team. The design team encouraged exploration of Technological pedagogical and Content Knowledge (TPACK) model to design learner centric MOOC. The team used the internet, social media to create connected learning experience and reflected throughout the process of development and conduction of MOOC.

Validation of the results, reflection and analysis in this paper zeniths because the MOOC course creators and reviewers have completed Foundation Program in ICT for Education and Pedagogy for Online and Blended Teaching-Learning Process FDP with a score of 80% and above conducted by IIT Bombay.

Keywords— MOOC, reflection, learner centric, Evaluation, Collaborative, social media.

I. INTRODUCTION

Massive open online courses (MOOCs) are proving to be best online learning resource for diverse learners in a wide variety of subjects [1]. However, there is scope to improve use and effectiveness of MOOCs by significant utilisation of TPACK. The Results of MOOC course design and evaluation included in this paper is actually a teamwork carried out during participation of the course "Mentoring educators in education technology" conducted by IIT Bombay. The work done is a part of course [2]. We all four team members never met till date and everyone is minimum 500 km away from other's, Hence without video conferencing and telephonic audio conversation we discussed and completed MOOC designed related tasks starting from deciding topic for MOOC, Moodle administrator (setup), Course Design Layout, Activity

Design, Moodle Gradebook setup and configurations, Survey report on Perception of Engagement, Learning and Usability, FDP design report, reviewing and compiling reflections by team members, FDP design analysis report, analysis and reflection of engagement, preparation of various components of Learner centric MOOC (LCM), MOODLE related queries, improvement/modification in content using social media and email. [3] Two members of group were engaged in various institute related activities like national board of accreditation (NBA) and national assessment and accreditation council (NAAC), still we able to complete the distributed task in time. We hosted our short duration i.e. 1 hr. course on moodlecloud.com [5]. We faced various challenges while completion of activity creation and evaluation. Our learning and reflection is consolidated in this paper.

The first part of this paper section II we analysed engagement of participants, in section III learning of participants is analysed using ISAT tool of IIT Bombay. ISAT is a tool to generate transition pattern. Users can interactively get the transition values and patterns using this tool [4][6]. In section IV perception of participants about the course is analysed. In section V our learning and reflection on collaboratively designed i.e. co-designed MOOC using social media and analysis of evaluation of MOOC explored.

II. ANALYSIS OF ENGAGEMENT

The MOODLE course on Flipping the classroom with technology was originally designed on moodlecloud platform by our team, which was reviewed by participants/peers allotted by IITB course team. The all 12 participants/peers took the course. The course involved the following activities that were to be completed by participants during the duration of the course: learning dialogues (LeDs) - 5 Nos, learning by doings (LbDs) - 4 Nos, Discussion Forum on FQ, Discussion Forum on Reflection on Learning, Reflection Quiz (RQ), Learning extension Trajectories (LxT) - 1 Video, Assimilation Quiz (AQ), Knowledge Quiz (KQ), Evaluation and Feedback/Course Exit Survey [3].

The activity completion report generated from the course reports section shows the engagement of participants in the





Machine Learning Approach for 5G Hybrid Technologies

Asish B Mathews
Research Scholar,
Department of ECE,
Noorul Islam Centre for Higher Education, India.
asishbmathews@gmail.com

G.Glan Devadhas
Professor,
Dept of EIE,
Vimal Jyothi Engineering College, India.
glandeva@gmail.com

Abstract- The rapid evolution of mobile communication networks is due to the large increase in the number of users. But higher throughput is not the only criterion to address the fifth generation of cellular networks. It mainly focuses on the redressal of the possible issues of the networks. The mostly found issues are lesser area of coverage, non-linear signal effects and the dispersion which is found to occur during the signal pathway. This work entails on increasing the maximum limit of coverage without signal loss. Through the usage of microcells in the proposed system, maximum limit of coverage is achieved in highly populated areas. The simulations are carried out using software MATLAB 2017a and Opti-System, in which enhanced symbol error rate plot and reduced out of band emissions power performance have been improved. Finally, the conclusion and the future scope of the work has been discussed.

Keywords: Generalized Frequency Division Multiplexing (GFDM), Fifth Generation (5G), Improved ANN (IANN) Equalizer.

I INTRODUCTION

In conventional cellular systems, microcells are used to provide increased system capacity, delivery of innovative value-added services, improved coverage and performance. When compared to picocell, the microcell is normally well-built; however the characteristics are partially mentioned. The power control is used in the microcell, which limit the coverage area radius of the cell. In general, the microcell coverage range is within two kilometres wide, while standard BS coverage ranges up to 35 kilometres.

Man-made noise is created by several sources must be represented by impulsive models because it cannot be assumed to be Gaussian directly, all these are observed by Blackard et al. Consequently impulsive noise model is described as a non-Gaussian random occurrence noise with short duration and causes significant harm in the data transmission. Generally, GFDM analyzed by Ghosh. Hence impulse noise impairments pose a significant restraint on GFDM systems and cause bit or burst errors in data transmission.

Another sensitive limitation of GFDM system is carrier frequency offset (CFO). CFO in the GFDM transceiver is introduced by frequency differences analyzed by Armstrong. Hence it should be suppressed to recover reliable data in GFDM system.

One more responsive drawback of GFDM system is nonlinear distortion caused by high power amplifiers (HPA) at the transmitter, investigated by Banelli et al. The disparaging effects of nonlinear distortions are spectral-spreading of the GFDM signal and inter-modulations between subcarriers, predicted by Zhou and Kenney.

II LITERATURE SURVEY

In order to acquire optimum filter weights, LMS algorithm is used. The allowed weights are initialized to zero, and at iterations the weights are done by estimating the mean square error gradient [1]. Normalized Least Mean Squares filter (NLMS) can be employed to normalize the input power [2]. RLS algorithm utilizes the input as deterministic, whereas similar algorithm deploys the stochastic input. This may lead to high circuit complexity [3].

The use of zero forcing equalizers make use of the inverse frequency response of the transmission channel [4,5]. Zero forcing using IEEE 802.11n (MIMO) can be used in modern 5G networks for maintaining noise free transmissions.

An interleaved effective architecture utilizing adaptive lattice algorithm is used to overcome convergence problem to a greater extent[7]. A variable-step blind decision equalization is better for high-order QAM based estimation [8]. Effective safe limit of SNR switches Decision Directed mode with much reduced divergence [9,10].

Unequal noises and dispersion can be reduced by using some equalizer like MMSE and improved MLE algorithm [11]. The usage of adaptive filters with high convergence speed reduces mean square to a large extent[12,13].





A New 2-Scroll Chaos Plant with Multistability and its Circuit Realization

Sundarapandian Vaidyanathan

School of Electrical and Communication Engineering
Vel Tech University
Vel Nagar, Avadi, Chennai-600 062, T.N., India
sundar@veltech.edu.in

G. Glan Devadhas

Department of Electronics and Instrumentation Engineering
Vimal Jyothi Engineering College
Chempere, Kannur-670632, Kerala, India
glandevn@vjec.ac.in

Aceng Sambas

Department of Mechanical Engineering
Universitas Muhammadiyah Tasikmalaya
Tasikmalaya, West Java 46196, Indonesia
acengs@umtas.ac.id

P.S. Godwin Anand

Head, Department of Interdisciplinary Engineering
SaintGits College of Engineering
Pathamuttam-Post, Kottayam-686 532, Kerala, India
godwin.anand@ieee.org

Abstract— A new 2-scroll chaos plant with multistability is reported in this work. Qualitative dynamical properties of the new nonlinear plant are displayed with signal phase plots and bifurcation analysis. The new chaos dynamical plant has multistability and four saddle-type rest points, viz. a saddle rest point at the origin and three saddle-foci rest points. Also, a MultiSIM realization of the nonlinear plant with chaos oscillator with multistability is built for checking the real-world implementation of the chaos nonlinear plant with multistability.

Keywords—chaos; chaotic system; multistability; bifurcation; circuit realization.

I. INTRODUCTION

Chaotic dynamical systems are studied in several branches like population biology [1], circuits [2-4], medicine [5-6], finance [7], robotics [8], memristors [9], encryption [10], etc.

In [1], Gatabazi et al. presented an application of grey Lotka-Volterra models for the adoption of cryptocurrencies. In [2], Dong et al. discussed Hamiltonian chaotic systems with multistability and applied them for pseudo-random number generators (PRNG). In [3], Mobayen et al. presented a novel chaos system with boomerang curve of rest points and applied it for sound encryption. In [4], Vaidyanathan et al. explored the electronic circuit design for a chaos plant with axe-shaped curve of rest points. In [5], Zhao et al. presented a chaos enhanced grey wolf optimization for effective diagnosis framework for identifying paraquat-poisoned patients. In [6], Baskerville discussed the role of chaos in mitochondria and type-2 diabetic disorder. In [7], Vaidyanathan et al. dealt with a new nonlinear finance model with passivity applications. In [8], Gohari et al. explored chaotic maps for boundary surveillance with the help of quadrotor robots. In [9], Wang et al. analyzed the application of memristor systems and image encryption systems. In [10], Liu et al. applied a chaotic circuit for designing robust image encryption and compressive sensing.

A new 2-scroll chaos plant with multistability is reported in this work. Qualitative dynamical properties of the new nonlinear plant with three quadratic nonlinear terms are displayed with signal phase plots and bifurcation analysis. The new chaos dynamical plant has multistability and four saddle-type rest points, viz. a saddle rest point at the origin and three saddle-foci rest points. Also, a MultiSIM realization of the nonlinear plant with chaos oscillator with multi-stability is built for checking the real-world implementation of the chaos nonlinear plant with multi-stability.

II. A NEW CHAOS NONLINEAR PLANT WITH TWO SADDLE REST POINTS

A new three-dimensional nonlinear plant is proposed as

$$\begin{cases} \dot{z}_1 = \alpha(z_2 - z_1) + \gamma z_1 z_2 \\ \dot{z}_2 = \beta z_1 - z_2 - z_1 z_2 \\ \dot{z}_3 = 5z_1 z_2 - z_2 - z_3 \end{cases} \quad (1)$$

In Eq (1), $Z = (z_1, z_2, z_3)$ is the state and (α, β, γ) is a set of positive parameters. It is significant that the dynamical system (1) has 3 quadratic nonlinear terms in its dynamics.

The complex properties of the new three-dimensional plant (1) will be explored in this section. For MATLAB simulations, we take the parameter values as

$$\alpha = 12, \beta = 17, \gamma = 12 \quad (2)$$

The initial state of the dynamical system (1) is picked as

$$z_1(0) = 0.2, z_2(0) = 0.1, z_3(0) = 0.2 \quad (3)$$

We calculated the characteristic Lyapunov exponents for the new plant (1) for (2) and (3) and found the following:

$$\phi_1 = 2.7081, \phi_2 = 0, \phi_3 = -16.7081 \quad (4)$$





KY Based DC-DC Converter for Standalone Photovoltaic Water Pumping System Employing Four Switch BLDC Drive

Trishna Jayaraj
PG Scholar, Department of Electrical and Electronics
Vimal Jyothi Engineering College
Kannur, Kerala, India
trishnajayaraj@gmail.com

Dr.G.Justin Sunil Dhas
Professor, Department of Electrical and Electronics
Vimal Jyothi Engineering College
Kannur, Kerala, India
agjustin@vjec.ac.in

Abstract—Solar based water pumping system is getting a broad consideration, since solar energy is found to be the best solution for the existing conventional energy resources. Moreover solar PV (Photovoltaic) fed water pumping is favored technique within the remote regions for different applications. In this paper KY based DC-DC converter fed water pumping system with BLDC (Brushless DC motor) is proposed. Voltage ripple reduction is one of the main advantages of KY converter with a high transient response. For tracking the maximum power under various irradiation conditions P & O Perturb and Observe) based MPPT (Maximum Power Point Technique) is employed by varying the duty ratio of KY converter. Instead of six switch VSI (Voltage Source Inverter), four switch VSI is employed, where cost saving is accomplished by decreasing the number of inverter power switches. A BLDC motor is connected to drive the centrifugal pump, since it has advantageous feature while connecting to that of PV generator.

Keywords—KY Converter, Four switch VSI, BLDC motor, MPPT

I. INTRODUCTION

SPV (Solar Photovoltaic) based projects are considered now, due to the reduction of cost of solar panels as well as the electronic devices. Water pumping using SPV received wide demand because of its vital and affordable nature of power generation. MPPT technique is employed in most of the PV based applications [1]. From the different traditional methods of MPPT, P&O MPPT is considered better, where it captures the maximum power under various conditions. Most common type of DC-DC converter used for SPV and MPPT application is the BOOST converter [2]. Conventional inductor-based boost converter produces high - voltage ripple pulsating current in output. As a result, large power losses will also have occurred. A recent study focuses on the design of a KY converter, possessing fast transient response, less voltage reduction etc [3].

The efficiency of the energy conversion in the solar energy system will be high only at certain voltage and current conditions at which the power will be a maximum. This operating point is called Maximum Power Point (MPP). In this project, the KY converter is controlled by Perturb and Observe

(P & O) algorithm to track MPP at any irradiance condition [4]. The purpose of this paper work is to develop PV array fed BLDC drive employing KY converter to boost the PV array voltage and four switches inverter for conversion of DC supply to AC supply required for BLDC motor. In the proposed BLDC drive, the number of switches in the 3-phase inverter is reduced from six to four which results in great saving in hardware cost and reducing the size of hardware. The performances of the proposed system is analyzed through the simulated results using MATLAB/Simulink environment.

II PROPOSED SYSTEM

A new PV array fed BLDC drive has been developed in order to harness renewable energy source and to reduce the load demand of EB supply. The system consists of KY Converter fed by PV array to make the DC voltage of PV panel to the desired value for inverter and four switch inverter to generate variable frequency and variable voltage AC supply.

III OPERATION OF PROPOSED SYSTEM

The block diagram of the PV fed BLDC motor drive employing KY converter for PV array MPPT and four switches inverter for BLDC motor is shown in Figure 1[5]. The KY converter will buck or boost the DC voltage output of solar panel in order to provide the required DC voltage for BLDC motor [6]. The duty cycle for PWM pulses of KY converter will be determined by P&O MPPT algorithm. P&O algorithm is also termed as hill climbing, where both the name indicates that the, providing certain perturbations, it captures the maximum power by increasing or decreasing the voltage. The four switch three phase inverter will generate the required variable voltage and variable frequency supply for BLDC motor [7][8]. The ON or OFF pulses for the power switches of inverter are determined from the signals obtained from Hall sensors. The speed feedback helps to achieve closed loop operation.



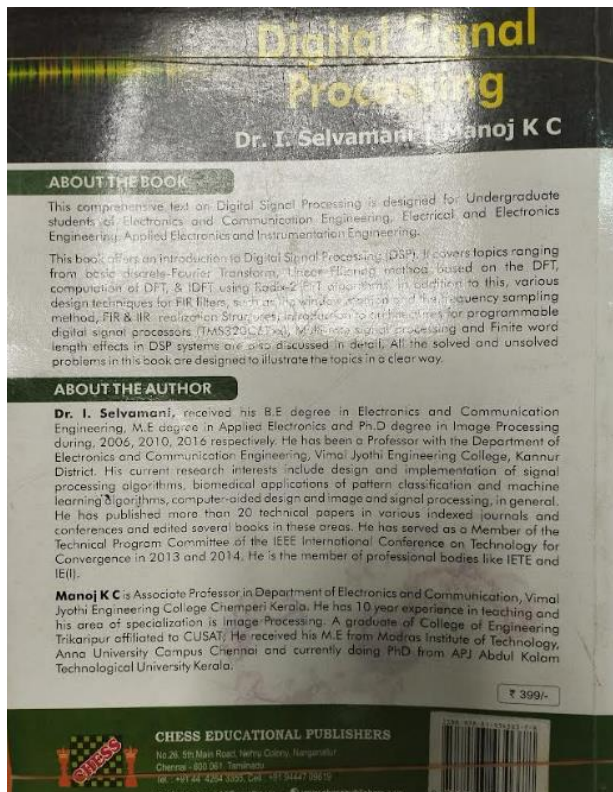
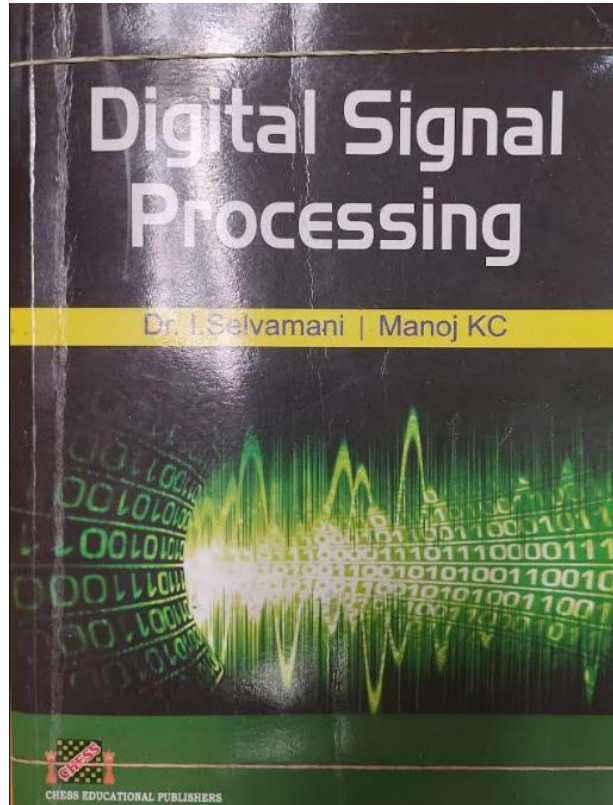
VIMAL JYOTHI ENGINEERING COLLEGE

JYOTHI NAGAR, CHEMPERI - 670632, KANNUR, KERALA

Affiliated to APJ Abdul Kalam Technological University, Approved by AICTE
ISO 9001 : 2015 Certified | Accredited by Institution of Engineers (India), NBA, NAAC
Ph: 0490 2212240, 2213399 Email: office@vjec.ac.in Website: www.vjec.ac.in

NAAC Cycle 2

Criterion: 3.3.2





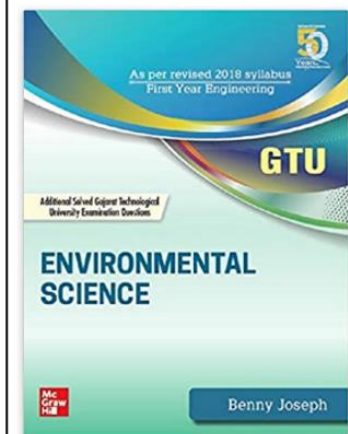
VIMAL JYOTHI ENGINEERING COLLEGE

JYOTHI NAGAR, CHEMPERI - 670632, KANNUR, KERALA

Affiliated to APJ Abdul Kalam Technological University, Approved by AICTE
ISO 9001 : 2015 Certified | Accredited by Institution of Engineers (India), NBA, NAAC
Ph: 0490 2212240, 2213399 Email: office@vjec.ac.in Website: www.vjec.ac.in

NAAC Cycle 2

Criterion: 3.3.2



Environmental Science: Additional Solved Gujarat Technical University Examination Questions Papers

by Benny Joseph (Author)

★★★★★ 5 ratings

See all formats and editions

Paperback
\$20.70

1 Used from \$19.34
5 New from \$19.36

Language



English

Dimensions



7.99 x 10 x 1.85
inches

ISBN-10



9353168090

ISBN-13



978-9353168094





2019 International Conference on Vision Towards Emerging Trends in Communication and Networking (ViTECoN)

Melanoma Classification and Birthmark Mole Detection on Clinical Images

Jaishmi Balakrishnan
Student

Department of Computer Science and Engineering
Vimal Jyothi Engineering College
Chempери, India
jaishmikr884@gmail.com

Derroll David
Assistant Professor

Department of Computer Science and Engineering
Vimal Jyothi Engineering College
Chempери, India
derrolldavid@vjec.ac.in

Abstract—According to the current data, there is a rapid growth of skin cancer. Early detection of skin cancer are almost curable. Method is described to classify objects with skin lesions as malignant or benign with a smaller number of features. The system considers the probability of occurrence of birthmark. There are chances of having doubt whether the birthmark is a cancer. Proposed system uses colour, texture, border features to detect skin cancer, birthmark mole and Classify melanoma as benign or malignant.

Keywords—skin cancer, melanoma, birthmark mole, clinical images, malignant

I. INTRODUCTION

The third most common skin cancer and one of the most malignant cancers is the malignant melanoma (MM). Melanoma often has a slow rate of early growth during which curable lesions can be detected and removed at relatively low cost, leading to a high survival rate of 95 % for five years [4].

Melanoma diffuses from one organ to another, not directly but indirectly, and has therefore been shown to be very deadly. Evidence has accurately predicted that melanoma causes the death rate of most of the individuals from skin cancer. Earlier detection and intervention of melanoma is more likely to cure [5]. Methods [4] [6] [11] [12] use dermoscope images and methods [1] [3] use non-dermoscopic images.

In recent times, there has been a rising trend for automatic detection, utilizing customary advanced cameras. This can be relevant in online and portable application as a telemedicine apparatus and furthermore as a framework that helps doctors. We proposed an automated diagnosis system for and birthmark detection and melanoma classification on dermoscopy images for efficient classification.

A. Observations

Skin cancer can arise in any parts of the body. Risk of cancer is increasing every day. People are always conscious about skin. Birthmark moles are very common in human, and most of them have one or two. Moles have the risk of becoming cancerous. Birthmark mole can

change in size, colour, and sensation having pain. There are chances of having confusion whether the birthmark is cancerous.

Our aim is to provide highly accurate classification results while keeping in mind about the various constraints. Although several works have been proposed for melanoma classification such as [1] [2] [3] [4], most of these methods does not consider the case of birthmark mole, does not concentrate on border features and took very little consideration about the incomplete borders. Our proposed scheme is a automated diagnosis system for melanoma classification and birthmark detection on dermoscopy images for efficient classification.

B. Contributions

1) To design an enhanced and proficient computerized framework that gives exceptionally accurate discovery and classification results.

2) To develop a system that incorporates incomplete lesions.

II. RELATED WORK

Here explains some of those related works for the detection that are recently proposed.

Fengying Xie et al [4] created a model for analyzing dermoscopy images to classify melanoma as either benign or malignant. Method mainly consists of 3 steps. A self-generating neural network has been used to extract lesions. Features of colour, texture and border are retrieved from lesions. Then using neural network ensemble model, lesion objects are finally classified. The system implemented new border features that can efficiently classify border abnormalities. Total of 57 features were used to classify melanoma as benign or malignant. Principal components analysis has been used to decrease the dimensions of the features.

Ioannis Giotis et al. [1] proposed a computer - aided clinical system for skin cancer, called MED - NODE. System aimed at distinguishing melanoma from cellular naevi using simple digital images of lesions and using colour scheme, texture and visual attributes. The



Soft Computing Based MPPT Controller for Solar Powered Battery Charger Under Partial Shading Conditions

Neethu M

PG Scholar, Department of Electrical and Electronics
Vimal Jyothi Engineering College
Kannur, Kerala, India
neethum201@gmail.com

Dr.R.Senthilkumar

Professor, Department of Electrical and Electronics
Vimal Jyothi Engineering College
Kannur, Kerala, India
rsenthilkumar@vjec.ac.in

Abstract : Solar irradiations received by the PV panel is blocked by a moving or non-moving object is known as partial shading condition. The solar panel power output under partial shaded will be a maximum only if the panel voltage is maintained at the Global Maximum Power Point. The GMPP can be determined from the Power-Voltage characteristics of the partially shaded solar panel and this voltage is called optimum voltage. The battery charging may require a voltage different from the optimum voltage. Therefore, a GMPPT Global Maximum Power Point Tracking CUK converter is employed that maintains partially shaded solar panel voltage at optimum value and buck or boost the solar panel voltage to a value required for battery charging. The objective of this work is to develop solar based battery charger using CUK converter with Maximum Power Point Tracking under partial shaded condition by Grey Wolf Optimization algorithm. The simulation of the partially shaded solar panel fed CUK converter for battery charging applications is performed in MATLAB - SIMULINK. The CUK converter in the battery charging system is basically a buck-boost converter that employs a single power switch. Duty cycle of gate pulse to power switch decides the power drawn from partially shaded solar panel. Therefore, the duty cycle is determined for GMPPT using Grey Wolf Optimization algorithm which can track the GMPP very fast for fast changing irradiances. The simulation is performed for charging 5.8 AH, 48 V Lithium-Ion batteries.

Keywords — Maximum Power Point Tracking (MPPT); Partial Shading Condition (PSC); Global Maximum Power Point(GMPPT); Grey Wolf Optimization(GWO); Photovoltaic (PV)

I. INTRODUCTION

The need for non conventional and clean sources of energy is increasing throughout the world. With increasing popularity of solar systems, there is always an eminent need in making efficient the PV system. The efficiency of the energy conversion in the solar energy system will be high only at certain voltage and current conditions at which the power will be a maximum. Hence the operating point is called maximum power point. It is found non-linear for power-voltage curve of a PV panel and thereby it also

depends sunlight irradiance and temperature of the atmosphere. The variation in voltage and power due to temperature is less significant when compared to sunlight irradiance[1]. Since the sunlight irradiance is not constant throughout the day, the power output of a PV panel will also not constant. Besides, the MPP will also shift with change in sunlight irradiance and atmospheric temperature[2]. MPPT technique is to be used for achieve maximum power under different temperature and irradiance. Another major problem associated with solar power generation is handling Partial Shading Condition (PSC) due to passing clouds[3]. Under partial shading condition, the P-V characteristics has multiple power peaks (global and local maxima). The ordinary MPPT techniques are fail to search the Global Maximum Power Point under partial shading condition [4].Therefore the soft computing methods are used to determine the global power peak by deciding the best duty value for the CUK converter to remove greatest power from PV array under shading condition[5].

In this paper, the partially shaded PV panel is implemented by connecting the solar panel in series configuration and setting irradiance level of each panel at different values and connected via CUK converter for Lithium-Ion battery charging with GMPPT by using Grey Wolf Optimization (GWO) algorithm.

II. PROPOSED SYSTEM

The block diagram of PSC PV fed CUK converter based battery charging system with Grey Wolf optimization technique is presented in Figure 1. The proposed PV system consists of four PV panels in series with various irradiances to realize PSC, CUK converter and Lithium-Ion battery. In this project GWO technique is used to determine the best PWM duty for the CUK converter to track GMPP under Partial shading condition.

