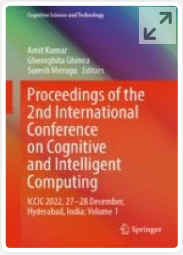
3.4.4 Details of books and chapters in edited volumes / books per teacher during the year

Sl. No.	Name of the Teacher	Title of the Book publi	Title of the Chapter pu	Title of the proceeding	Name of the conferen	National / Internation
1	Anuradha, P., Rajkuma	Proceedings of the 2nd	Implementation of Aut	Proceedings of the 2nd	ICCIC 2022	International
2	Navitha, C., Anuradha,	Proceedings of the 2nd	Implementation of Ma	Proceedings of the 2nd	ICCIC 2022	International
3	Siva Priyanka, S., Raju,	Proceedings of the Sec	IoT Based Crop Recom	ICETE 2023	ICETE 2023	International
4	Goud, J. R., Rao, N. V. K	Advances in Microwav	Harmonic Suppression	NA	NA	International

Year and month of pul	ISBN of the Book/Conf	Affiliating Institute of	Name of the Publisher
September 2023	978-981-99-2742-5	CBIT	Springer, Singapore
September 2023	978-981-99-2742-5	CBIT	Springer, Singapore
November 2023	978-94-6463-252-1	CBIT	Atlantis Press
November 2023	9.78103E+12	CBIT	CRC Press, Routledge Taylor & Francis Group



International Conference on Information and Management Engineering

ICCIC 2022: **Proceedings of the 2nd International Conference on Cognitive and Intelligent Computing**, pp 63–70

Implementation of Automatic Vending Machine Using FPGA

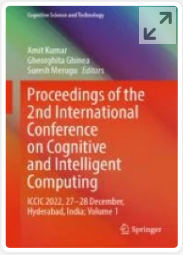
P. Anuradha, K. Rajkumar, Ch. Navitha & M. Jithender Reddy

Conference paper | First Online: 27 September 2023

Part of the Cognitive Science and Technology book series (CSAT)

Abstract

Vending machine is used to dispense the items from the machine for given amount. This machine is implemented using FPGA board. FPGA board-based machine gives us fast response and it is reprogrammable. This machine takes money such as coins as input and gives out the product for which the money is inserted. If the amount inserted is greater than cost of product, then the vending



International Conference on Information and Management Engineering

ICCIC 2022: **Proceedings of the 2nd International Conference on Cognitive and Intelligent Computing**, pp 289–299

Implementation of Massive MIMO Technology with Artificial Intelligence Assisted Deep Learning Convolutional Neural Network (DLCNN)-Based Channel Estimation

Ch. Navitha & P. Anuradha

Conference paper | First Online: 27 September 2023

Part of the Cognitive Science and Technology book series (CSAT)

Abstract

Fifth generation wireless communication requires the higher data rates to meet the requirements of real-world applications. However, the conventional multiple-input-multiple output (MIMO) technology unable to meet these requirements due to low performance channel estimation methods.

IoT Based Crop Recommendation System Using Machine Learning for Smart Agriculture

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Abstract. In India, agriculture is one of the most significant sources of income. For the survival of the human race, agriculture is essential. These days, the climatic conditions are unpredictable and irregular, which in turn impacts the agriculture industry a lot more than any other industry. A change in the climatic condition affects the nutrients in the soil, which, therefore, affects the type of crop to be sown for the best result. This paper help farmers for recommending suitable crops to yield based on the input parameters using Machine Learning algorithm. Temperature and humidity are collected through the DHT11 sensor using NodeMCU, and NPK, pH, (are directly fed from soil analysis report) and rainfall values. To make it a farmer-friendly application a mobile application is built using Kodular Creator and it communicates with the Firebase cloud platform. To measure the accuracy for crop recommendation, different performance metrics are evaluated: Precision Score, Recall Score, and F1 Score. The proposed method shows better performance compared to the various other existing methods.

Keywords: Crop Recommendation · Machine Learning · Firebase Cloud · Kodular Creator

1 Introduction

India is an agriculturally-based country where most people depend on this industry for survival. The economy of the country is greatly impacted by agriculture. Farming is a key development in the world to produce essential items for the whole world. The majority of farming worldwide is conventional or traditional. It involves methods recommended by seasoned farmers [1]. These methods require hard work and take a lot of time because they are not exact. In agriculture, IoT-based smart farming systems are frequently utilized to monitor fields using sensors like the DHT11 (temperature and humidity sensor). Farmers may check on the state of their fields from anywhere. Farmers are unaware of crop cultivation due to climate change. The recommendation of crops is main problem in the present agriculture sector. The farmers have to know the correct way to resolve the issues to meet their exceptions. Several Machine Learning [ML] techniques have been used to

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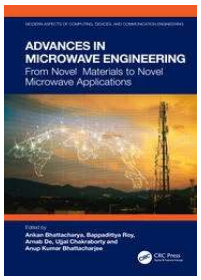
Chapter



Harmonic Suppression Triple-Band U-Slot Antenna for GPS/ WLAN/5G Applications

By J. Rajeshwar Goud (/search?contributorName=J. Rajeshwar Goud&contributorRole=author&redirectFromPDP=true&context=ubx), N. V. Koteswara Rao (/search?contributorName=N. V. Koteswara Rao&contributorRole=author&redirectFromPDP=true&context=ubx), A. Mallikarjuna Prasad (/search?contributorName=A. Mallikarjuna Prasad&contributorRole=author&redirectFromPDP=true&context=ubx)

Book Advances in Microwave Engineering (https://www.taylorfrancis.com/books/mono/10.1201/9781003459880/advances-microwave-engineering?refId=86db62d6-ec79-4456-8f14-7c1148d8509b&context=ubx)

Edition	1st Edition
First Published	2023
Imprint	CRC Press
Pages	16
eBook ISBN	9781003459880

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ABSTRACT

< Previous Chapter (chapters/edit/10.1201/9781003459880-11/development-multiport-mimo-antenna-band-frequency-application-wireless-communication-kranti-patil-yadav?context=ubx)
Next Chapter > (chapters/edit/10.1201/9781003459880-13/mutual-coupling-reduction-patch-antenna-array-using-microstrip-resonator-wireless-communication-system-applications-santimoy-mandal-chandan-kumar-ghosh?context=ubx)

RESEARCH ARTICLE | OCTOBER 04 2023

Combined optimization in radial distribution system using CPSO

P. Venkata Prasad

+ Author & Article Information

AIP Conf. Proc. 2794, 020034 (2023)

https://doi.org/10.1063/5.0165706

This paper provides a novel technique in order to allocate the shunt capacitor (SC) banks and distributed generators (DG) optimally in radial distribution system (RDS) to decrease power losses, improve voltage profile, increase the voltage stability index, and acquire great energy savings. To find the optimal size and site of DG and SC banks Particle Swarm optimization (PSO) technique is modified with constriction factor and is applied to IEEE 33-bus system. The result shows the efficiency of the proposed method.

Topics

Mathematical optimization

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Development of Intelligent Power Quality Management in Renewable Energy System in Smart Grid using Deep Learning

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***Abstract*— The present research addresses the crucial issues in intelligent power quality management inside smart grids by merging machine learning models with an Internet of Things (IoT) infrastructure. The research focuses on renewable energy sources, notably solar and wind, employing multiple sensors such as temperature, wind speed, and windmill rotation speed to obtain complete environmental data. A microcontroller records the sensor readings and related power production, generating a dataset of 20,223 entries over a month. Four machine learning models—the Recurrent Neural Network (RNN), Decision Tree (DT), Support Vector Machine (SVM), and Artificial Neural Network (ANN)—are evaluated on 20% of the dataset after being trained on 80% of it. Thesse trained ML model predicts the electricity that can be produced in future based on the information collected from the sensor. Also if the climatic condition is known then the electricity produced in future can be predicted in future. From the experimental result it is seen that the ANN emerges as the top-performing model with an accuracy of 93.5%, displaying its ability to predict electricity. SVM closely follows with 92.3%, while DT exhibits a balanced performance at 89.7%. The RNN, specialized in handling sequential data, achieves an accuracy of 86.22%. The findings underline the usefulness of the integrated system for forecasting electricity production based on real-time environmental conditions, supporting informed decision-making for smart grid stability. This work advances the field of intelligent power quality management and offers a roadmap for maximising the integration of renewable energy sources through the use of machine learning and Internet of Things technology. As the study seek for sustainable energy solutions, this research moves the sector ahead by giving practical insights for robust and efficient smart grid operations.**

Keywords*— *renewable energy, smart grid, deep learning, power quality management, sustainable infrastructure

I. Introduction

Smart grid technology has changed the way electricity is distributed and managed. This age brings heightened efficiency and safety[1,2]. An age of smart grids includes advanced sensor, communication and control technologies for monitoring and managing the grid. Renewable energy sources have received global attention, notably solar and wind power. Power quality management in smart systems is becoming increasingly complex. This research proposes to solve this problem [3]. By demonstrating how ML and IoT device combination can be used to forecast and improve the quality of electrical power in smart grids [4], [5].

Renewable energy systems are dynamic systems powered by a change in the environment. In the traditional grid management systems, when the output of solar and wind energy unexpectedly changes, this is not so smart [6]–[8]. Incorporating internet of things (IoT) technology allows real-time monitoring through the employment of many sensors. Temperature and wind sensors are used to measure environmental conditions and this information is invaluable in predicting the likely generation of electricity. According to reliable data projections, this kind of electricity production contributes to rational planning of smart grid stability. So far, the emphasis of our research has been on a worldwide trend toward sustainable energy alternatives. Renewable energy use is escalating--and therefore smart grid stability must employ advanced power quality control. To bridge the gap between variable renewable power and stable smart grids, our study aims to provide some helpful ideas and methods for managing energy in [9], [10] an ever-growing world of energy users.

Renewable energy integration in smart grids has attracted considerable attention in recent years. With environmental considerations, traditional energy sources are being accounted for, keeping clean and sustainable energy resources in the limelight [11],[12],[13]. Smart grids provide a foundation on which renewable forms of energy can be seamlessly integrated onto a grand scale as well as promoting monitoring and control, and optimization. IoT technology has been poised to change smart grids significantly. Requiring connectivity and data exchange across devices in real-time, IoT can monitor and control fully [14],[15]. Inside smart grids, renewable energy systems' use of sensors is key for gathering crucial data on environmental conditions, energy generation, and grid operating parameters. This information, in guidance of

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Maximizing Power Utilization through Machine Learning and IoT based Power Flow Strategies in DC Micro Grids with Renewable Energy Resources

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***Abstract*—The various challenges in the power grid with renewable energy systems are overcome using the implementation of DC microgrids. This helps in obtaining a reliable and efficient energy management system. The maximization of power utilization in microgrids with renewable energy resources is achieved using machine learning with simulated annealing optimization integrated with the Internet of Things through power flow strategies. The variable and intermittent generation patterns are exhibited through renewable energy sources such as wind and solar energy sources. The energy is monitored and obtained through control strategies. The proactive energy management with energy storage capacity and load demand through renewable energy is achieved through machine learning algorithms. The optimum allocation of energy resources is achieved through a simulated annealing optimization algorithm. Another parameter includes the energy distribution strategy that helps to maximize the power utilization in microgrids. This is initiated through factors such as energy storage capacity and various energy generation constraints. This helps to improve the grid stability by reducing the energy losses in the system during transmission and distribution. The power flow strategies with real-time monitoring and control parameters are achieved through the Internet of Things (IoT). The storage levels are monitored using sensors and smart devices. This helps to obtain sustainable power utilization with improved reliability**

Keywords*—Power grid, Renewable energy system, Energy management system, Machine learning, Simulated annealing, Internet of Things

I. Introduction

Microgrids are localized structures with self-reliant energy dissemination systems. They have the ability to function independently or combined with various larger grid systems. They obtain significant specialization due to the ability to integrate with renewable energy sources [1]. The important aspect of designing the microgrids is to generate and produce energy through the aid of renewable energy sources [2]. This includes solar energy, wind energy, tidal and hydroelectric power sources. The important potential of microgrids integrated with renewable energy storage systems is to reduce the emission of greenhouse gas emissions and the larger dependencies on the fossil fuels. Thus the microgrid provides a sustainable form of energy generation with a green environment [3]. The microgrid provides improved energy resilience and reliability in the grid system. They have the ability to provide a continuous power supply without any intervention. They can function autonomously during the grid outrages. This is due to the storage of excessive energy in batteries which helps the microgrid to balance between the supply and demand [4]. This helps in cost savings with reduced energy generation.

Microgrids are also enhancing energy democratization by empowering everyone to proceed with respective communities to generate their own green energy. This helps to have control over the individual energy consumption [5]. They also help in enhancing distributed energy resources which help everyone to become prosumers. This indicates that everyone can consume their energy and save the excess energy for future utility. They provide a promising solution for saving power with varied conditions. The advancement of innovative technology plays a vital role in providing improved stability in the grid system [6]. This is implemented through the aid of artificial intelligence. The control parameters are implemented through various optimization algorithms. These kinds of decentralized energy storage systems help in achieving sustainability in spite of the varying climatic conditions. The important stage involves energy forecasting [7]. This includes historical data and real time data analysis to monitor the renewable energy generation from various forms of renewable energy sources. This helps to attain the best grid management and load balancing neglecting fluctuations in the microgrid. The conservation of power

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3rd International Conference on Evolutionary Computing and Mobile Sustainable Networks (ICECMSN 2023)

Development of Renewable Energy System for Enhancing Reliability of Power

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Abstract

Meeting global energy demands has been a major challenge due to the shortage of primary energy resources. Adding renewable energy resources to the grid has become increasingly popular. During peak hours of energy demand, the sun's irradiance is strong enough to generate a significant amount of energy. This paper will design a photovoltaic energy generating system that harnesses solar energy using the latest technological advancements available. A system like this one is an ideal solution to addressing rising energy demands and reducing carbon footprint. Renewable energy sources can minimize carbon emissions, operating costs, etc., but their intermittency and uncertainty make their reliability a serious concern. The objective of this paper is to improve the reliability of the power grid through the use of solar photovoltaic (PV), battery energy storage systems (BESS), and distributed generation systems (DG).

Keywords: Renewable Energy system; Reliability; photovoltaic (PV); battery energy storage systems (BESS); and distributed generation systems (DG)

1. Introduction

Meeting global energy demands has been a major challenge due to the shortage of primary energy resources like natural gas, coal, and oil. In India, a small increase in energy costs can put a strain on common people's finances. To

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Short-term load forecasting using Artificial Bee Colony Optimization with Deep Learning Model on Power Systems

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***Abstract*—In power systems, Short-term load prediction is a serious element of effective energy management as well as grid operation. It contains forecast of power demand over a quite short time prospect that ranges from hours to few days in advance. Exact load forecasting is vital for guaranteeing a steady and trustworthy power supply, enhancing generation and distribution, as well as allowing utilities to create knowledgeable choices about resource allocation and demand response plans. Leveraging historical information, climate situations, time of day, and other pertinent factors, advanced machine learning (ML) techniques used in order to offer exact load forecasts, assist grid operators in justifying imbalances, decrease operational costs, as well as improving general grid reliability. Therefore, this study presents a Short-term load forecasting using Artificial Bee Colony Optimization with Deep Learning (STLF-ABCDL) model on Power Systems. The STLF-ABCDL technique incorporates a multiple-stage procedure, starting with min-max normalization-based pre-processing for assuring data consistency. Besides, the STLF-ABCDL technique applies Long Short-Term Memory (LSTM) for forecasting load. For boosting efficacy of LSTM model, the ABC algorithm can be utilized to tune the parameters and optimize network hyperparameters. The presented STLF-ABCDL technique exhibits considerable enhancements in the load prediction results, providing enhanced stability and optimal resource allocation.**

Keywords— Short-term Load Forecasting; Artificial Bee Colony; Deep Learning; Resource Allocation; Machine Learning

I. INTRODUCTION

Load forecasting is a vital part of distribution method development and process. With aid of predictive methods, a pattern of demand was explored and a few electrical originators were assigned in order to meet the request at sub-transmission and distribution systems [1]. Therefore, any huge deviation in predicting causes technical as well as economic issues. Besides, in relaxed power method promoting, every request plan from energy creator as well as a client can openly reliant on forecast request [2]. Normally, there is a delay in alertness of a growth in a request of load and existence of that growth. It permits electrical plans to execute an assignment of preparation and prediction to meet predictable request growth [3]. A forecast of load is needed to define when a growth in load arises so that appropriate movements can be taken. A requisite forecast prospect defines a sort of forecasting like long, medium, or short period [4]. Whereas, in short-term prediction, time planned to be one hour ahead up to one week with everyday estimating that is 24 hours. Numerous operation actions were done in this short term like voltage regulating, real-time assessing in energy market, generator dispatching, unit commitment and many others [5]. An exact short period load forecasting model needs information that is chiefly linked with time aspects like predicted weather conditions, historical load, past weather conditions, and nature of time and period are instances of necessary information for short period electric load prediction [6].

The capability to estimate request from 1 hour to a day can aid energy producers in expecting how much influence to create for seeing real-time user request dependably and efficiently potential [7]. Underrating demand lead to control outages and untrustworthy grid process. However overestimating request outcome in energy wastage. So, exact estimates result in enhanced energy management as well as important provider cost investments [8]. But, it is challenging because load shows very complex and greatly non-linear patterns. Additionally, many features affect loads like climate, period, time of day, consumer behaviour, and other arbitrary factor [9]. In this study, the 3 primary techniques developed to solve this issue namely customary statistical-based methods, machine learning (ML) based approaches and deep learning (DL) based models. In addition to that, ML approaches contract with defects of

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An Effective BiLSTM-CRF based Approach to Predict Student Achievement: An Experimental Evaluation

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Abstract **–Currently, massive volumes of data are accumulated in databases when people configure new requirements and services. Data mining techniques and intelligent systems are emerging for managing large amounts of data and extracting actionable insights for policy development. As digital technology has grown, it has naturally become intertwined with e-learning practices. In order to facilitate communication between instructors and a diverse student body located all over the world, distance learning programs rely on Learning Management Systems (LMSs). Colleges can better accommodate their students' individual needs by using and analyzing interaction data that reveals variances in their learning progress. Predicting pupils' success or failure is a breeze with the help of learning analytics tools. Better learning outcomes might be achieved through early prediction leading to swift focused action. Preprocessing, feature selection, and model training are the three components of the proposed method. Data cleansing, data transformation, and data reduction are the preprocessing steps used here. It used a CFS to enable feature selection. This study has used a BiLSTM-CRF hybrid approach to train the model. When compared to tried-and-true techniques like CNN and CRF, the proposed method performs effectively.**

Keywords **— Gated Convolution (GC), Self – Attention (SA), Bidirectional Long Short -Term Memory (Bi-LSTM).**

I. INTRODUCTION

The academic world has come around to accepting the reality of teacher expectation effects. Achievement expectations in the classroom can have a long-lasting impact on a child's growth and development in the classroom and beyond. The root of expectation effects in the classroom, however, remains unknown. There are typically three phases to self-fulfilling prophecies in the classroom; teachers have erroneous expectations; these expectations lead teachers to treat higher- and lower-expectancy students differently; and the students' reactions to this differential teacher treatment confirm the initial teacher expectations, resulting in greater achievement gains for high-expectancy students. Teaching children about the scientific method and other scientific concepts is crucial in today's society. There is broad support for mandating science education for all students. Educators have made it a top priority to ensure that their students have a deep understanding of topics like technology, culture, and society scientific concerns with social and political repercussions. For an international Incorporating scientific inquiry into the classroom sets the stage for students to acquire and apply a breadth of cutting-edge scientific understanding act in accordance with one's own preconceived notions of the universe. The advancement of society is often credited to scientific and technological advances economic growth and cultural development. Therefore, there have been proposals to use social media materials to enhance science instruction issues and current events, with the intention of better equipping students to fights every day. This Global Education Program methods of instruction and educational possibilities. The prior is morphing into a research and policy focal point, as well as a place for artistic expression better strategies for obtaining and evaluating voluminous scientific data. Evaluating instruction is a rigorous and methodical method for gauging a teacher's efficacy. In the classroom, effective teachers employ a variety of strategies with the goal of raising their students' achievement have found that students learn more when their teachers are well-versed in the subject matter, have an innovative method of instruction, and are adept at assessing their development. The effectiveness of a teacher has been demonstrated to account for as much as a 49.99% variance in student achievement. Finding qualified teachers is essential if the proposed approach is to give every kid the quality of education to which the system is entitled. Policymakers have paid a lot of attention to teacher assessment during the past decade since it is the greatest way to quantify teachers' performance. Several authors have argued that evaluating teachers' performance is an effective way to improve education. Classroom observations, portfolios,

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Arithmetic Optimization Algorithm with Machine Learning based Smart Irrigation System in IoT Environment

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***Abstract*—An integration of new technologies like agro-hydroinformatics and computational intelligence, and information technology (IT) roles a vital play in developing a sustainable precision irrigation method with the effectual management of sensed data assuming plants, weather, and soil. Machine learning (ML) is a fast-developing technology for precision irrigation schemes, because of their capability to simulate human decision-making but also resolve the multi-variable, non-linear, and time-variant problems affecting irrigation management. An essential drive of ML is for providing data from preceding experiences and statistical data to machines towards it is carried out their allocated task of resolving a particular problem. Therefore, this study develops an Arithmetic Optimization Algorithm with Machine Learning based Smart irrigation system (AOAML-SIS) technique in IoT environment. Initially, the AOAML-SIS technique exploits the IoT sensors for data collection process. For determining the need for irrigation, the AOALM-SIS technique utilizes multilayer perceptron (MLP) classification model. Since the MLP parameters play a vital role, the parameter tuning process is carried out by the AOA algorithm. The experimental assessment of the AOAML-SIS technique takes place on agriculture data. The simulation values inferred the effectual irrigation classification efficacy of the AOAML-SIS technique over other models.**

Keywords— Smart irrigation; Agriculture 4.0, Machine learning; Arithmetic optimization algorithm

I. INTRODUCTION

Water is a scarce and valuable natural resource and especially an essential component, it needs to be developed, planned, managed, conserved, and in particular, effectively utilized [1]. Optimum management of presented water resources in the agriculture sector is obligatory because of limited resources and increasing demands. It is vital to rise agricultural yield under limited water resources for optimum agricultural crops to satisfy upcoming food production requirements [2]. The constraint water supply must be efficiently utilized for irrigating additional areas with a similar quantity of water [3]. Lately, various research workers have employed the Internet of things (IoT) and artificial intelligence (AI) to manage irrigational problems accurately via linear models. Precision irrigation scheduling is directed towards effectual water usage for all the plants, when and where it is essential, to reimburse for water loss over evapotranspiration, deep percolation, or erosion when preventing over- and under-irrigation [4]. With appropriate irrigation management through and optimum control efficient monitoring, water could be saved, along with providing a reduction in other indirect costs experienced from energy usage through fossil fuel or electricity for pumping, for optimum cost-efficiency [5]. Fig. 1 depicts the overview of IoT-based smart irrigation system.

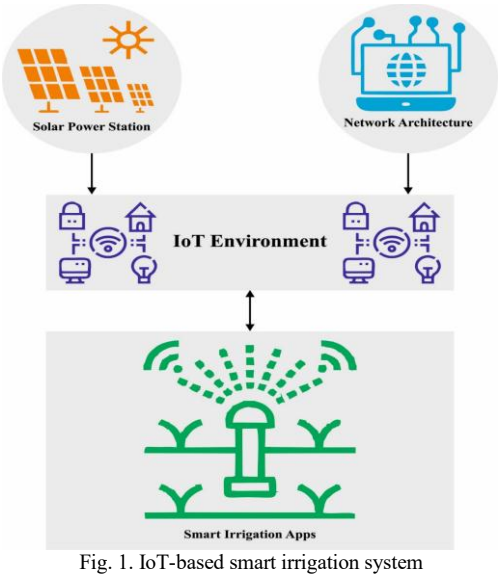

Fig. 1. IoT-based smart irrigation system

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A Study on Battery Storage Exploitation using Reinforcement Learning

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Abstract— An integral part of the new smart grid, battery storage is becoming an increasingly common requirement. Batteries are considered as an attractive alternative for other distributed intelligent energy resources because of their speed in responding to events like changes in renewable power or grid interruptions. Various research studied exist to explain about making money out of this talent. Any solution must take into account both the fast-paced nature of electrical phenomena and the more gradual changes in the relevant power markets. An area of AI called reinforcement learning has demonstrated promising results in optimizing difficult tasks with high degrees of uncertainty. As a result, the need for first-of-its-kind smart buildings is growing in tandem with the complexity of decentralized power systems and the widespread use of renewable energy sources. The initial portion of the algorithm is based on deep learning using recurrent neural networks to deal with the unknowns of power pricing and load needs in the future. The other method uses reinforcement learning to determine the best time to charge or discharge a battery bank based on profit, load, and grid peak conditions. This research study presents a reinforcement learning approach for battery scheduling, which is considered as a crucial component to meet the consumer objectives. The framework relies on a customer making a multi-criteria choice in order to maximize local energy production from batteries during peak demand. This will save costs by reducing the amount of power used by the grid. The reinforcement learning system used to choose the best battery scheduling actions uses predictions of available wind power. Consumers' understanding of what to do to maximize battery life in a variety of time-dependent settings is expanded thanks to the built-in learning mechanism. The established framework enables smart consumers to acquire knowledge of the stochastic environment and apply it to the process of making decisions about energy management strategies.

Keywords—Smart Grid, Reinforcement Learning (RL), Energy Storage, Battery Management, Uncertainty, Deep Learning.

I. INTRODUCTION

Load demands are anticipated to considerably grow on the consumer side of the grid as a result of the widespread deployment of charge stations for electric vehicles and other high-energy demand facilities such as data servers and cloud computing systems. To address the energy and environmental issues of the twenty-first century, renewable energies offer viable answers [1,2]. The effective and secure operation of these systems presents new technological and societal problems when they are integrated into current grids. Given that smart grids are expected to boost energy efficiency in distributed systems through the efficient control of both construction and utilization, they are the new paradigm necessary to overcome these challenges [3,4]. By reducing transmission losses and the time needed to manage fault repair and congestion, a more central position of generating and consumption sources can improve service quality from the standpoint of the end user. Contrarily, the growth of a significant number of microgrids raises energy management concerns, such as the possibility of incompatible necessities and restricted transportation between the many agents of the microgrids, demanding the application of distributed intelligent solutions [5]. This is why several works that attempt to ensure the most efficient functioning of microgrids have highlighted the importance of conducting in-depth research on smart energy management frameworks inside microgrids. Such frameworks can't be developed without energy system models that do justice to the system's complex and dynamic nature on several levels.

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Accurate Cardiac Arrest Risk Forecasting with Ensemble Learning

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***Abstract*— Accurate Cardiac Arrest Risk Forecasting (ACARF), with Ensemble studying, is a predictive analytics method that may assist clinical experts in predicting the dangers of cardiovascular illnesses for their patients. This approach combines multiple knowledge of algorithms into an ensemble that can, as it should be, assess a man or woman's danger of cardiac arrest, thereby supporting personalized care. ACARF uses an extended function set to become aware of predictive information to maximize its effectiveness. It includes clinical information, clinical history, medications, and lifestyle choices. The version is then educated and evaluated to ensure the excessive accuracy of its predictions. The effects of the ensemble can then be used to inform clinicians of their sufferers' hazard for cardiac arrest and to broaden customized scientific interventions. The use of ACARF with Ensemble learning has been determined to significantly enhance the accuracy of predictions of cardiac arrest relative to the conventional unmarried-set of rules technique.**

Keywords*— *Accurate, predictive, conventional, interventions, information, cardiovascular.

I. INTRODUCTION

Cardiac arrest (CA) is one of the most life-threatening cardiovascular diseases and has grown to be a chief public health situation with increasing prevalence and mortality. Accurate danger prediction of CA is essential for early prognosis and intervention, which allows you to reduce its devastating medical effects [1]. Traditional techniques of predicting CA chance depend especially on statistical fashions and affected person danger factors. However, such models have restrained predictive accuracy and need help remembering the increasingly complex elements contributing to CA risk. Ensemble gaining knowledge of techniques are emerging as potential alternatives to standard CA hazard forecasting [2-4]. Those methods combine multiple weak rookies (e.g., selection Tree) to generate a better, more accurate predictive version. That is fine over unmarried-model predictions, as errors from individual fashions may be averaged out, reducing the general error of the ensemble. Furthermore, an ensemble gaining knowledge can consider a much wider variety of things because it uses more than one fashion to predict the final results[5-7]. Ensemble studying techniques can provide extra accurate threat predictions when implemented in cardiac arrest threat forecasting. Ensemble models can consider more complex elements than traditional methods by counting on a couple of fashions and combining their outputs. Moreover, because of their innate adaptability to new statistics sources and trends, ensemble fashions can be tailored to more recent and extra-accurate hazard predictors[8]. Ensemble Getting to Know is an attractive option for medical researchers and healthcare companies because it can offer correct and well-timed predictions of CA hazards. Its capacity to account for multiple factors and adapt to new traits makes it a powerful tool for accurately forecasting cardiac arrest danger[9]. Although more outstanding studies are wanted to assess the practicality and accuracy of ensemble mastering methods on CA hazard predictions, the proof suggests that it is an invaluable tool for healthcare companies to use in the fight against cardiovascular diseases[10]. Correct cardiac arrest risk forecasting is essential for effectively controlling cardiac occasions. However, modern strategies must be revised in accuracy and their potential to apprehend complex styles in cardiac statistics. Ensemble getting to know has been proposed as a method to this difficulty, imparting extra correct predictions and better predictions for complicated styles [11]. Fig1 shows that the neural network in the current problem

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Adversarial Transfer Learning for Surgical Instrument Segmentation in Endoscopic Images

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***Abstract*— Hostile switch mastering is an effective tool to help enhance the robustness of surgical tool segmentation in endoscopic pix. Transfer getting to know intends to switch understanding from a source domain to enhance a version's overall performance in a goal area. In endoscopy, instrument segmentation distinguishes between surgical contraptions and anatomical structures in an endoscopic photo. Because of the broad type of units and conditions encountered in endoscopic picas, transfer mastering can bridge the space between the source and goal area, allowing you to improve overall performance. Opposed switch gaining knowledge of has been used efficaciously to exclude inappropriate capabilities from the supply area even as inclusive of relevant ones inside the target domain, yielding a correct segmentation version. Similarly, the use of adverse training has enabled area variation from the supply area to the goal area, generating segmentation results that are extra particular. This paper presents an outline of adverse switch gaining knowledge of for surgical instrument segmentation in endoscopic photos and discusses its advantages and limitations.**

Keywords*— *Adversarial, limitations, surgical, segmentation, anatomical

I. INTRODUCTION

Adversarial switch gaining knowledge of is a practical new approach for education device getting to know models, and it guarantees to revolutionize many areas of healthcare, including surgical instrument segmentation in endoscopic photos. Switch studying is a device getting-to-know technique that lets machines conform their mastering to new records using leveraging knowledge previously acquired from similar obligations [1]. Hostile transfer gaining knowledge of takes transfer studying one step further by allowing machines to learn from each data resource simultaneously. Hostile transfer gaining knowledge has been tested to be decisive in many healthcare packages, along with the segmentation of surgical contraptions in endoscopic images. Through this powerful technique, machines can learn from snapshots of diverse kinds and sizes and might adapt to one-of-a-kind varieties of surgical procedures [2]. It extensively increases the segmentation technique's accuracy, pace, and performance. In scientific programs which include endoscopic digital operations, accuracy and speed are of maximum significance. Adverse switch mastering can assist in attaining this intention by allowing machines to learn from multiple units of information and thereby gain knowledge of greater fast. This may be useful for each skilled surgeon and those performing minimally-invasive surgical strategies. The usage of antagonistic transfer studying can also allow surgeons to greater appropriately segment surgical units in endoscopic picas [3-4]. By using mastering the blended set of data; a gadget can better recognize the shapes of surgical devices, in addition to their exceptional textures and other information. This advanced segmentation ability can result in better medical results via assisting to locate and dispose of tissue appropriately. It could save you the destruction of healthful tissue at some point of surgical treatment. Universal, the usage of antagonistic transfer getting to know for surgical device segmentation in endoscopic pix is a crucial breakthrough for healthcare [5].

Using offering machines with the potential to learn from multiple assets, accuracy, pace, and efficiency can be significantly stepped forward, leading to better diagnosis and treatment of medical conditions. Antagonistic switch learning has evolved as an innovative approach for segmentation of surgical contraptions in endoscopic pix. The manner uses a deep mastering model, consisting of a convolution neural community, to acquire high-accuracy segmentation outcomes. The method employs an adversarial training framework. This is, the model is used to produce segmentation masks for tool annotations, then compared to the annotated mask to gain a loss characteristic that's then used for optimization. It lets the model steadily enhance its segmentation performance [6]. The development diagram has proven in the following fig.1

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Generative Adversarial Networks for Synthesizing Abnormal Medical Images

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***Abstract*— Generative hostile networks (GANs) have emerged as a practical approach for synthesizing unusual clinical pictures for analysis. GANs encompass two distinctive neural networks, generative and discriminative, educated simultaneously to generate sensible pics. Generative networks produce synthetic snapshots with chest X-rays and CT scans, even as discriminative networks apprehend real from synthetic images. This method has been used to generate sensible and accurate anomalies in medical photographs that can correctly help in analysis. GANs may reduce the need for massive datasets of real strange picas and can generate more excellent, effective analysis capabilities. Moreover, GANs can reinforce datasets of medical snapshots and permit more green clinical research...**

Keywords— generating, anomalies, abnormal, technique, diagnosis.

I. INTRODUCTION

Generative opposed Networks (GANs) have these days been deployed to supply realistic and accurate synthetically generated medical picas. This breakthrough has crucial implications for the field of medication, as GAN-generated photos can facilitate the diagnosis and remedy of sicknesses [1].First; GANs allow the technology of new clinical photographs from restrained datasets, making the dataset more correct and more entire. These extended facts may be used to become aware of and classify diseases appropriately, allowing faster and more particular prognoses. Artificial photograph information also can enhance the accuracy of present classifications by presenting scientific specialists with more fantastic elements and perceptions of disease abnormalities.

Furthermore, GANs may be used to create unseen photos from current pix [2]. This artificial fact can enhance the accuracy of deep convolution networks for image segmentation and abnormality detection. This capacity is of fantastic value in clinical imaging, as it may reduce the time required to diagnose and treat illnesses.

Furthermore, GANs can create disorder anomaly photos that do not exist, permitting scientific personnel to gain valuable insights into illnesses that have no longer been observed or as they should be categorized [3].in. In the long run, GANs provide a versatile and powerful device for clinical practitioners to synthesize correct and dependable unusual clinical pictures. These artificial statistics may be used to improve the accuracy of image evaluation and enlarge current datasets.

Moreover, GANs offer healthcare experts more accuracy, pace, and expertise in diagnosing and treating sicknesses. The recent advances in Generative antagonistic Networks (GANs) endorse a new and essential way to synthesize extraordinary scientific photographs. GANs have been efficaciously implemented in various computer vision packages over the last few years and are increasingly used in scientific imaging [4]. Generative opposed networks are a generative system getting to know fashions that learn to generate sensible synthetic picas from samples of actual picas. GANs include two neural networks, a generator community, and a discriminator community [5]. The generator is a deep gaining knowledge of the network that produces artificial picas, at the same time; the discriminator is a neural community that tries to distinguish authentic images from generated ones. The generator is educated to supply picas that the discriminator cannot differentiate as fake. The cause of GANs for clinical imaging is to generate realistic images from normal pictures, which might be classified with an unusual label. Using education GANs with a selection of statistics sets from each wholesome and sick patient, the networks can synthesize ordinary clinical imaging situations containing functions from healthful and ill scenarios [6]. In this manner, the network can learn to discover hard-to-diagnose lesions or diseases in medical

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Adaptive Medical Image Segmentation Using Deep Convolutional Neural Networks

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***Abstract*— Recent developments in deep learning have made it possible to apply it to medical image segmentation. Deep convolutional neural networks (DCNNs) are a type of deep learning model used for segmenting medical images. This approach has been found to be effective in accurately segmenting medical images, and better results in faster segmentation times than traditional methods. DCNNs use a combination of convolutional layers, pooling layers, and activation functions to detect patterns in the input images and learn a set of features from it. DCNNs have the advantage of having fewer parameters compared to other methods. This makes them easily adaptable and portable across different applications. By using the latest advances in CNNs, more accurate segmentation can be achieved in a shorter time. This makes DCNNs a powerful tool for medical image segmentation.**

Keywords*— segmentation, parameters, combination, convolutional, pooling.

I. INTRODUCTION

Medical image segmentation, the manner of extracting meaningful information from digital medical pictures, is becoming increasingly essential in health care. It's miles used to perceive and segment diverse organs and tissues, classify disorder states, inform laptop-aided prognosis, and localize interventions including radiation remedy and surgical operation. Conventional medical picture segmentation techniques and thresholding and vicinity growth had progressed with the accelerated use of convolutional neural networks (CNNs) [1]. CNNs have become the preferred approach for medical photo segmentation because of their capability to extract and become aware of capabilities from the raw records mechanically. Deep convolutional neural networks are currently the most famous and powerful technique to section clinical pictures accurately. A deep CNN consists of a chain of layers, and each layer plays a particular function. Those features consist of function extraction, type, and segmentation. the primary layer extracts function from the entered photograph, passing the extracted features to the next layer. The subsequent layer combines those features with those extracted from the preceding layer, and so forth. This system is repeated until the features are identified, and the desired segmentation is carried out.

Deep convolutional neural networks were used to accurately phase numerous scientific photos, including MRI scans, CT scans, X-rays, and ultrasound pics [2]. Those networks have been shown to provide the highest accuracy and consistency compared to other strategies. Deep CNNs' advantages include a discounted want for guide labeling, multiplied speed, low computational prices, and high accuracy. Adaptive medical image segmentation using deep convolutional neural networks can revolutionize the medical imaging sector [3]. It may offer distinct records approximately the structure and function of organs and tissues from scientific images, assisting clinicians in diagnosing and dealing with diseases more correctly and efficiently.

moreover, it can facilitate the improvement of personalized care plans for character patients, mainly to step forward affected person consequences. Adaptive medical picture segmentation, using deep convolutional neural networks, has lately emerged as a device to improve the accuracy and speed of medical image segmentation [4]. This technology has proved to be an effective and reliable answer for many medical imaging programs, together with most cancer diagnosis, tumor segmentation, and image registration. Deploying deep convolutional neural networks for medical image segmentation improves accuracy via utilizing earlier expertise in medical snapshots and knowledge of how neighboring areas in images are related [5]. This method enables to pick out the primary features of positive parts of a scientific image, allowing medical specialists to isolate areas inside an image appropriately.

Additionally, deep convolutional neural networks have proven progressed accuracy and pace compared to conventional procedures for scientific photo segmentation [6].Deep convolutional neural networks similarly improve

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An Improved Convolutional Neural Network for Medical Image Segmentation

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***Abstract*— This paper provides a progressed convolutional neural community (CNN) version for medical picture segmentation. It specializes in improving the accuracy and speed of today's segmenting of scientific photos and improving modern semantic segmentation of first-rate present-day clinical photos. Modern accuracy is improved by introducing pre-processing layer, residual connection, attention module, and up sampling layer to the CNN. The stepped-forward overall performance state-of-the-art pace is achieved through dual-project cutting-edge, wherein the segmentation task is divided into two sequential sub-obligations, modern-day semantic segmentation and shape regression. The improved version is examined on publicly available scientific datasets, achieving 49a2d564f1275e1c4e633abc331547db segmentation performance. The results show that the proposed method is robust, green, and generalizable..**

Keywords— generalizable, regression, improvement, segmentation, convolutional.

I. INTRODUCTION

Convolutional neural networks (CNNs) are effective for analyzing scientific photographs. They have been established to differentiate excellent info in diverse pictures and, as it should be, segment objects from the historical past. But modern-day CNNs can be confined to their potential to appropriately segment photographs due to inaccuracies and bad optimization[1]. This paper proposes a progressed CNN version for scientific photograph segmentation. This version includes each external and internal capabilities and is based on a multi-degree loss optimization approach. the first step of this method is to contain external capabilities to the network, such as form prior, object possibility, and area chance. The external capabilities assist to initialize model parameters which give greater correct segmentation.

the second step is to incorporate inner features to refine the parameters. these internal functions are cognizance of the relationships among the additives of the input photograph[2]. the multi-level loss optimization approach is implemented to enhance the network's performance. The multi-level loss optimization uses a combination of pass-entropy loss and cube loss to enhance the version's accuracy and ability to section gadgets accurately.The performance of the version is evaluated at the skin Lesion Segmentation dataset. The results show that the proposed model can produce greater correct segmentation than the baseline methods. The methods used in this examination may be prolonged to diverse scientific pix, together with cell segmentation, tissue segmentation, and gastrointestinal photo segmentation. this paper gives a progressed CNN model for medical picture segmentation[3]. This version offers higher accuracy compared to current models and can be used for various medical photo segmentation tasks. The results serve as a constructing block for advancements in the vicinity of scientific image segmentation on the way to having a first-rate impact on the sphere of medical imaging. The idea of advanced convolutional neural networks for medical photograph segmentation is a progressive leap forward in biomedical engineering[4]. It has revolutionized how medical pix are analyzed and interpreted, allowing for better accuracy and improved scientific outcomes. With this new generation, healthcare specialists can pick out and isolate specific organs, tissues, and systems within 3-D clinical snapshots. The convolutional neural network utilizes practical mathematical algorithms that recognize patterns in the studied pictures. By processing the pixels within a picture, the set of rules can create a model of the photograph that can then discover excellent functions and margins. Doing so enables clinicians to appropriately isolate organs and tissues from the rest of the photo[5].This progressed technique has helped healthcare specialists hit upon, classify, and target diverse illnesses and conditions more precisely. This accurate method has fewer dangers for sufferers and more time for medical doctors to be aware of potential treatments. It also enables lessening the charges related to diagnosis and picture acquisition, contributing to the overall efficiency of healthcare agencies.

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Single-Phase Grid-Connected 5-Level Switched Capacitor Inverter Using PLECS Tool

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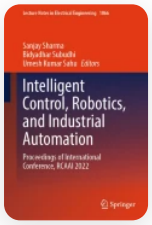

Intelligent Control, Robotics, and Industrial Automation

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Part of the book series: Lecture Notes in Electrical Engineering ((LNEE,volume 1066))

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Abstract

In this paper, a 5-level Switched Capacitor (SC)-based grid-connected inverter (GCI) using Piecewise Linear Electrical Circuit Simulation (PLECS) tool is presented. This topology consists of six switches, 1 diode, 1 switched capacitor, and one single DC source. The SC is self-balanced based on the charging and discharging principle. This technique

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A Ladder Architecture for Power Improvement and Multi-Peaks Elimination in PV Arrays during Non-Uniform Irradiance Scenarios

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***Abstract*— Solar Photovoltaic (PV) arrays are vulnerable to non-uniform irradiances that diminish their power generation and introduce complexities by creating multiple peaks in the power-voltage curves, ultimately leading to reduction in overall performance. Various mitigation techniques are proposed in the literature but, each exhibits limitations of cost, complexity, and application. Hence, to deal with such problems, in this paper, a ladder architecture for PV arrays is proposed to improve the power generation capability during non-uniform irradiance scenarios by using the charge redistribution approach. Also, the proposed ladder approach ensures the PV array to operates with convex characteristics and eliminates multiple peaks from the power curves. The proposed architecture is modeled and validated in the MATLAB/Simulink platform using a 9x3 array with system size of 8.8kW. The performance comparison under four partial shading cases is carried out with the conventional configurations using various comparison parameters. From the conducted analysis, the approach is found to significantly improve the array power generation and generate convex curves with higher than 99% conversion efficiency.**

Keywords—photovoltaic (PV), partial shading, bypass diode, multiple peaks, mismatch.

I. INTRODUCTION

The utilization of solar photovoltaic (PV) technology for harnessing solar energy has witnessed remarkable growth over the past few decades, driven by the increasing global demand for clean and sustainable energy sources [1]. The PV arrays have emerged as a key player in the transition towards renewable energy generation [2]. However, one significant challenge that continues to plague the PV systems is the issue of shading [3]. Partial shading occurs when some sections of an array receive non-uniform irradiance due to factors such as shading from nearby objects, cloud cover, or even soiling on the PV modules [4]. This seemingly innocuous phenomenon can have a profound impact on the overall performance and efficiency of the PV system. Partial shading in the arrays can lead to many problems including reduced energy output, mismatch losses, hot spots, and potential damage to the cells. As the deployment of PV systems is increasingly widespread in urban and suburban environments, shading is becoming a more prevalent concern. Therefore, it is crucial to develop effective strategies and mitigation techniques to address the challenges posed by partial shading [5].

The most widely used solution for partial shading is to connect modules with anti-parallel bypass diodes that serve a critical function by providing an alternative pathway for the flow of current when a portion of the array is shaded [6]. This helps to prevent reverse biasing and allows the unshaded cells to continue generating electricity without being significantly affected by the shaded cells. However, the major concerns in the activation of bypass diodes are mismatch loss, voltage drop, multiple peaks in power curves, heating, and fault probability. The multi-peaks in the characteristics curves create tracking issues in maximum power point tracking (MPPT) algorithms by converging towards the local peak resulting in lower power generation [7]. But, to deal with the tracking issues, numerous modified MPPT techniques on nature-inspired optimization algorithms are proposed [8]. Examples of such techniques include salp swarm [9], swarm intelligence [10], improved PSO [11], and many more. But, cost, complexity, algorithm tuning, and calibration, increased risk of failures, reliable tracking, and limited standardization are the major concerns of these algorithms when implemented in a PV system.

Differential Power Processing (DPP) is another innovative approach to mitigate the adverse effects of partial shading in PV arrays. It involves the use of specialized power electronics, specifically DPP converters, to manage the power output of individual PV modules or strings within an array, allowing for increased energy generation even when some portions of the array are shaded [12]. The most widely used DPP approach is switched-capacitor converters (SCC) which is derived from the battery equalization scheme [13]. The SCCs are controlled using the sub-module voltage equalization principle that relies on the concept that the highest voltage across each sub-module should be the same. The equalizing SC converters have a fixed conversion ratio with equal gains in both directions and they are mostly linked to nearby sub-modules to operate at their maximum power point voltage. In [14], a theoretical study is conducted on DC cells using ladder-connected DC converters that resulted in improved efficiency while minimizing system insertion loss. A technique for extracting energy from individual modules has been suggested in [15] which involves using integrated converters and incorporating switched-capacitor converters on the same chip. In [16], a solution that involves an embedded system using a resonant SCC and a high-voltage CMOS IC designed to balance power flow in the

A Reliable Technique for Power Generation Enhancement in Unsymmetrical PV Arrays during Partial Shading

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***Abstract*—Solar Photovoltaic (PV) arrays consist of modules that are connected to generate the power required by the loads. The arrays are expected to generate the maximum power based on the irradiance at the site but, in the field, this condition gets affected by the frequently occurring partial shading. The effect of partial shading is so large that it can reduce the power output of the arrays to zero and creates complications such as hotspots in modules, power losses, and distorted power curves. To overcome these complications, this paper proposed a reliable technique that uses a switching matrix circuit to effectively distribute the current in the array under partial shading. The proposed switching matrix determines the optimal electrical connection of the modules based on the minimum row current difference approach which is calculated using the particle swarm optimization algorithm to enhance the power output of the PV array during partial shading. The system has been tested for a 7x4 unsymmetrical array that uses 56 switches to reduce the losses in the array and enhance the power during partial shading. The investigation is conducted in MATLAB simulation and the proposed system is compared with conventional, hybrid, and existing static reconfiguration techniques under partial shading. The analysis conducted shows that the proposed system has 53.95%, 46.2%, 45.9%, 26.3%, and 20.94% of average power improvement than the SP, TCT, SP-TCT, SDS, and FER respectively.**

Keywords—photovoltaic, switching matrix, genetic algorithm, partial shading, power losses

I. INTRODUCTION

Partial shading occurs frequently in the operating site of the solar PV arrays that cannot be avoided in any way [1]. In the case of roof-top systems and large power plants, shadows of nearby buildings and trees, bird droppings, dust, clouds, snow, and self-shading are the major causes of partial shading among the modules as shown in Fig.1 [2]. Partial shading in the PV system leads to different irradiances in the modules and thus to unequal operating conditions, which result in power losses in the system and hotspots [3]. In practice, bypass diodes are installed anti-parallel with the modules to bypass the higher current through the shaded modules and hence, prevent the PV modules from hotspots and losses in the system [4]. But this solution creates additional complication by deteriorating the characteristics curves of the PV arrays with larger maximum power points (MPPs) [5]. Hence, with the distorted curves, the conventional maximum power point trackers (MPPT) get converged to the first peak as the maximum power even if the actual maximum power lies at the other peaks of the curve [6, 7]. However, to deal with this fault tracking issue, the researcher proposed various advanced MPPT algorithms in the wide range of literature that uses optimization algorithms such as PSO, FA, and MFA [8], and nature-inspired [9] techniques to locate the position of the actual peak with maximum power value. But, the practical implementation of these techniques still has various demerits such as expensive and complexities due to the microcontroller requirement and related algorithms.

In recent years, array reconfiguration is playing a vital role in partial shading mitigation due to merits such as higher reliability, inexpensive, and reduced complexities [10]. The reconfiguration is classified into two categories i.e., static and dynamic whose implementation differs from each other but the concept remains the same. In static approach, the modules of the array are repositioned to different locations than the actual position based on shade dispersion algorithms. Some examples of static techniques include SDS [11], FER [12], henon map [13], ancient Chinese magic square [14], SDP [15], SD-PAR [16], Triple X sudoku [17], ER [18], hyper sudoku [19], ZSSR [20], two-Step module placement [21], modified Sudoku [22], and electrical reconfiguration [23].

Fig. 1. Potential causes of partial shading in PV arrays [Source: Google]

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Development Of PV Emulator For Partial Shading Condition With Processor-In-The-Loop Simulation Utilizing Real-Time Microcontoller

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***Abstract*— This paper presents a new approach and development of a PV emulator capable of accurately emulating the output characteristics of a PV module under partial shading conditions. The use of the MATLAB Simulink platform, coupled with the integration of a DC-DC buck converter and PI controller, enables reliable and accurate emulation of the behaviour of PV module under partial shading condition. The resulting power-voltage curve exhibits three distinct peaks, closely matching the characteristics of a real PV module, with mean absolute (MAPE) error percentage of only 0.167%. The inclusion of Processor-in-the-Loop (PIL) simulation further enhances the accuracy of the PV emulator, resulting in an even lower MAPE of 0.142%. Overall, the proposed PV emulator demonstrates robustness with settling time as low as 3ms at the peak power operating point and effectiveness in dynamic load conditions, highlighting its potential for practical applications.**

Keywords—PV emulator, partial shading, PI controller, DC-DC buck converter, processor-in-the-loop

I. INTRODUCTION

In the field of energy generation, solar energy has emerged as a prominent low-carbon solution, experiencing rapid growth in recent years. Its primary objective is to diminish and ultimately replace conventional non-sustainable energy sources. While solar generation optimization technology such as maximum power point tracking (MPPT), have made significant progress in recent years, there is still potential for further enhancements to optimize solar energy yield. To conduct research in this area, it is necessary to employ a photovoltaic (PV) emulator capable of replicating the electrical output characteristics of a PV module [1]–[3]. This emulator serves to efficiently evaluate the feasibility of MPPT technology without the need for constructing an expensive and large-scale solar PV system.

Several studies have proposed the development of PV emulators for testing MPPT algorithms [4]–[6]. These emulators consist of key components, including the PV model [7], [8] and its implement method, power converter, and controller. Various methods have been proposed for developing the PV model, such as the electrical circuit models employing single diode models [1], [3], [4], [6]–[14] and double diode models [2], [15], as well as interpolation methods [16]–[19]. The single diode model is commonly used due to its simplicity. The double diode model is known to provide higher accuracy in emulating the output characteristics of a PV module. However, its accuracy comes at the cost of increased complexity and the requirement of more unknown parameters, potentially affecting the response time of the emulator. Interpolation method offers a computationally efficient approach but is less accurate compared to electrical circuit models. The interpolation method is a mathematical function based on specific points of the PV module output characteristics curve, whereas electrical circuit models directly represent the characteristics of the PV module.

The common methods used in studies of PV emulators are numerical method [4], [5], [8], [10], [14], [15] and look-up table (LUT) [11], [12], [16], [18], [20]. Electrical circuit model is commonly employed using numerical method. This method offers advantages such as lower memory requirements with higher accuracy compared to the LUT method, but suffer from a higher computational burden. The LUT method relies on precomputed data stored in a table where higher number of sampling points increases the memory requirements. While the LUT method reduces the computational burden, it has adaptability issue since different data sets are required to emulate each type of PV module.

The role of the power converter is to transform the output characteristics signal produced by the PV model into practical power-transmitting output characteristics. Different types of power converters have been proposed, including buck converters [2], [3], [8]–[10], [15], [16], [21], linear voltage regulators [17], single-ended primary-inductor converter (SEPIC) converters [11] and modified current/voltage (C/V) stabilizer [1]. Some studies have proposed PV emulators without power converters by utilizing diode strings [6], but the model is affected by the thermal behaviour of the diodes.

The controller of the power converter plays a crucial role in ensuring the robustness and accuracy of the PV emulator. Various types of controllers have been proposed, including proportional-integral (PI) controllers [2], [4], [9], [10], [12], [13], sliding mode algorithms [1], [15], shift controllers [8], backstepping controllers [11], fuzzy logic controllers [16], and fractional-order PI controllers [3]. Additionally, programmable DC supplies have been utilized as PV emulators [14]. However, most of the aforementioned studies

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Turbulence Modeling through Deep Learning: An In-Depth Study of Wasserstein GANs

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***Abstract* – This research study compares the accuracy of different techniques based on deep learning (DL) for predicting turbulent flows. Different types of Generative Adversarial Networks (GANs) are examined in terms of their applicability to the study and simulation of turbulence. Next, we select Wasserstein Gans (WGANs) to produce localized disturbances. Network features including the learning rate and loss function are examined as they pertain to the performance of the WGANs during training on turbulent data gleaned from high-resolution Direct Numerical Simulations (DNS). DNS input data and the generated turbulent structures are proven to agree qualitatively well. The projected turbulent fields are evaluated quantitatively and statistically.**

Keywords: Turbulence, DL, WGANs, DNS, High Reynolds number.

I. INTRODUCTION

Some of the most basic issues in classical physics include turbulent fluid flows, which are multi-scale, complicated, and highly non-linear [1]. Turbulent flows feature fluctuation that is both random and scale-free. Researching turbulence typically involves attempting to foretell the statistical distribution of these wildly varying velocity and scalar fields. It would be useful in many fields, from geophysics to combustion science, if these statistical features of turbulence could be accurately predicted [2].

Statistics have been the main focus of turbulence studies within the framework of Kolmogorov's scaling theory. For sufficiently high Reynolds numbers, Kolmogorov's theory (commonly referred to in research as K41) predicts that small-scale moments will be statistically independent from large-scale moments [3]. The statistical universality and reproducibility of some symmetries at small sizes should set them apart from the large-scale phenomena that are more sensitive to boundary or initial conditions[4], [5]. Kolmogorov's theory predicts that the minimum observable length scales are determined by the average dissipation rate and the kinematic viscosity v of a fluid (angle brackets represent ensemble averaging) [6]. A statistical theory for turbulent flows might be feasible if the concept of small-scale universality were formally valid. Internal intermittency is largely to blame for the large difference between Kolmogorov's usual K41 prediction and the results of many experimental and numerical research [7]. Small-scale universality breaks down as a result of internal intermittency, which is a major obstacle for first-principles theoretical approaches[8]–[10].

In this study, we take on the difficult task of turbulence modelling from a new angle, employing deep learning (DL) as our primary research methodology. Significant advancements have been made in DL in recent years, and it has found widespread use from CS to biomedicine. Forecasting the statistical behavior of small-scale turbulence using DL is a relatively new topic with many unanswered concerns, as far as the authors are concerned [11], [12]. Despite the chaotic character of turbulence, it has already been proven that deep learning can disclose obvious coherent structures and statistical symmetry. Though there are analytical approaches for lower-order correlation functions, there is currently none for higher-order correlation functions. A preliminary attempt at predicting turbulence structures is provided, suggesting that DL approaches offer a potential way to predicting the statistics of small-scale turbulence. By using high-fidelity data from DNS of turbulence, we put a number of DL networks from the literature through their paces. To evaluate the reliability of the predicted turbulence data, we compare it both qualitatively and quantitatively to the original data, as well as to the statistics of the original data. Finding the right combination of network design and hyperparameters is a significant difficulty in DL applications; this work tested a number of different setups.

The remains of this project are structured as follows. In Sec. 2, we analyze the challenges and opportunities for deep learning in highly dynamic environments. Then, in Section 3, the DNS database is discussed in detail. Predicted turbulent structures are illustrated, and their sensitivity to alterations in network variables including learning rate and loss function is examined in Sec. 4. The paper concludes at Sec. 5.

Decomposition of electrical and electronic waste management by using artificial intelligence

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***Abstract*— The electrical and electronic waste or e-waste is the collection of used electrical and electronic components that are assigned for reuse or disposal through proper way without any hazardous consequences. The improper decomposition of the electrical and electronic waste leads to various constraints that leads to disturbances in the ecosystem. The highly toxic substances such as mercury and lead that are released from the electronic components may tend to penetrate in the ground which leads to degrade the soil fertility. This electrical and electronic components contain numerous nonrenewable resources such as silver, cobalt, copper and aluminum alloys and tend to destroy if they are not properly maintained and decomposed. This decomposition of electrical and electronic components are done with artificial intelligence technique to obtain with higher precision. This is accompanied through image processing with optimization techniques.**

Keywords—E-Waste management, decomposition, alloys, artificial intelligence, image processing, optimization techniques.

I. INTRODUCTION

The electrical and electronic waste also referred as e-waste are formed from the used electrical and electronic components that are in unusable condition or unable to process further [1]. Thus they must be decomposed in a proper way to get rid of many consequences in future. The improper decomposition of the solid waste tends to degrade the overall quality of the atmosphere that have an adverse effect on the human health conditions. This causes various environmental pollution [2]. They are caused by the release of various chemicals in the environment that leads to air and water pollution. This contain several toxic substances.

Due to the completion of equipment's life span, they are need to be decomposed with proper care [3]. The increased electrical and electronic waste are caused due to the increase in technology and advanced equipments in day to day life. These residues are tend to decompose with several measures with preventive control [4]. These include larger industrial equipment's with several household equipment's. There are several Government policies and terms to decompose the equipment's with proper measures [5]. These hazardous waste release several poisonous and toxic gases to the atmosphere that cause various problems to living organisms [6]. There are tons and tons of electrical and electronic waste are collected every year to decompose. The waste generated from the batteries are controlled with directive policies referred as battery directive [7]. This is done to enhance the decomposition of the battery waste with proper measures to save several living organisms in the environment [8]. The common equipment's in the electrical and electronic waste are computers, fax machines, televisions and equipment used in industrial sectors. They are dangerous due to dumping the equipment's in the landfill. They are done with proper measures [9].

These equipment's are decomposed with several techniques that cannot harm the environment [10]. These recycling processes cause several profit through e-waste management. This creates several profit in huge markets to enhance the long term survival of the advanced technologies. Thus the e-waste management is accompanied through artificial intelligence that makes decomposition of the electrical and electronic equipment's in a smarter way [11].

AI plays a vital part in increasing the efficiency and effectiveness of electrical and electronic waste (e-waste) management procedures. With the speedy pace of technological progression, the generation of e-waste has surged, posing significant environmental and health challenges. AI technologies contribute to addressing these issues in numerous customs. One key aspect is the automation of e-waste sorting and recycling processes. AI-powered robotic systems can accurately identify and sort various electronic components, simplifying the efficient extraction of valuable materials for recycling. Machine learning algorithms enable these systems to uninterruptedly improve their recognition capabilities, adapting to evolving e-waste compositions and ensuring a high level of accuracy in sorting. AI supports predictive maintenance in electronic waste treatment facilities. By analyzing data from sensors and

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Residential Energy Management System using Machine Learning Algorithms

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***Abstract*— Residential Energy Management Systems (REMS) are emerging as a key solution to address energy efficiency and sustainability challenges in residential settings. Homeowners gain awareness of their energy consumption patterns, enabling them to make informed decisions and adopt energy-saving behaviors. REMS facilitate real-time feedback, helping individuals understand the impact of their actions on energy usage and promoting sustainable habits. Through intelligent control and coordination, homeowners can maximize the utilization of on-site solar panels or battery storage systems, reducing reliance on the grid and promoting clean energy generation. Based on the charging and discharging cycles, the REMS ensures the switching of loads to the storage systems energized by REGs, effectively. This paper uses Support Vector Machines (SVMs), and Machine Learning Algorithms (MLAs) to perform switching automation. This ensures a significant reduction in the grid-supplied power.**

Keywords—REMS, EMS, SVMs, MLAs, SOC

I. INTRODUCTION

The Residential Energy Management System (REMS) is an advanced system that has been designed to manage and control the energy consumption of residential buildings. The purpose of the REMS is to optimize energy usage by switching between grid and renewable energy sources based on demand and availability. The REMS will be effective if it employs Machine Learning Algorithms (MLAs). Learning from past usage patterns, the MLAs to predict future energy requirements. This allows the system to make informed decisions about when to switch between grid and renewable energy sources. The primary objective of the REMS is to reduce energy costs for homeowners while minimizing their carbon footprint. Renewable Energy Generation helps the REMS in managing energy independent of fossil fuels and lowering carbon emissions. The REMS is an essential tool for energy management in residential buildings, as it helps to reduce energy consumption, lower costs, and promote sustainability [1-4].

Machine learning techniques have emerged as a powerful tool for optimizing energy usage in buildings. Machine learning algorithms can be trained to learn from past usage patterns and to predict future energy demand. This allows the system to make informed decisions about when to switch between grid and renewable energy sources. The design guidelines for the communication infrastructure of home energy management systems (HEMS) are presented in [5]. This paper highlights the importance of a reliable and secure communication infrastructure for HEMS, which enables the integration of energy monitoring and control systems with user preferences, renewable energy sources, and demand response programs. Later, a survey of smart home energy management systems is presented in [6]. This paper discusses the challenges and opportunities of smart energy management in residential buildings, including the integration of renewable energy sources, energy storage, and load management.

Paper [7] proposes a home energy management system (HEMS) for electricity cost savings and comfort preservation. The paper presents a HEMS architecture that integrates energy monitoring and control systems with user preferences and comfort requirements. A low-cost implementation of home area networks (HANs) for home energy management systems is described in [8]. The paper presents a HAN architecture that uses ZigBee wireless communication technology to connect smart appliances and energy meters. The authors propose a centralized HAN coordinator that collects and analyzes energy data to optimize energy consumption and reduce costs. An EMS-based residential demand response management modelled as a multi-objective problem in [9]. The paper proposes an EMS architecture that integrates energy monitoring and control systems with demand response programs and user preferences. The proposed system uses a multi-objective genetic algorithm to optimize energy consumption, reduce costs, and maintain user comfort. In [10], a smart energy management system (SEMS) for residential use is proposed. The paper presents a SEMS architecture that integrates energy monitoring and control systems with renewable energy sources and energy storage devices. This paper proposes an ML-based Energy Residential Management System to help households to switch between grid and renewable energy sources based on the load demand and availability of energy sources. To achieve this, this paper develops artificial neural networks, multiple linear regression, and support vector machine algorithms.

This paper will, after presenting the introduction in section-I, discusses the modeling of REMS in section-II. The results and the discussions are given in section-III. In section-IV, the results and discussions are given. Finally, section-V gives the conclusions.

II. RESIDENTIAL ENERGY MANAGEMENT SYSTEM

A. Modelling the REMS Parameters

The residential energy management system (REMS) uses machine learning algorithms to optimize energy usage by switching between grid and renewable energy sources. The system is designed to learn from past usage patterns and to predict future energy demand, allowing it to make informed decisions about when to switch between energy sources. The REMS uses several machine learning algorithms, including Multiple Linear Regression (MLP), and Support Vector Machine (SVM). These algorithms are trained using

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Solar Energy Monitoring and Management System Using IoT

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***Abstract*—Solar Energy has the potential to significantly reduce our dependence on fossil fuels and mitigate the environmental impacts associated with conventional non-renewable energy resources. Building a solar power system for individual houses can be a great way to promote the use of renewable energy at the household level. However, managing the energy generated by solar panels may not always be sufficient to meet all the energy needs of a household. Integrating solar energy with conventional power supply and managing the electrical load effectively is a key challenge in maximizing the utilization of solar energy. This paper proposes an Internet of Things (IoT) based method for managing solar energy while supplying loads alongside conventional grid.This paper proposes a solar energy monitoring and management system that presents an innovative approach to optimize solar energy utilization, improve system performance, and contribute to sustainable energy management practices. The successful implementation of this work has the potential to bring significant environmental, social, and economic benefits, paving the way for a more sustainable and renewable energy landscape.**

Keywords—component, formatting, style, styling, insert *(key words)*

I. INTRODUCTION

The most fundamental necessity that every person has in the current society is electricity. Various power system difficulties should be researched in order to keep the operation uninterrupted, secure, and dependable [1]. The graph of energy consumption is increasing day by day while the graph of energy resources is declining concurrently. Shortage of electricity and disruption in electricity supply may cause serious problem to human and utilities [2-5]. To make up for the electrical shortage, a variety of sources are utilized to generate electricity. There are two main types of energy that can be used to generate electricity: conventional sources and unconventional sources. Numerous energy sources are used, including nuclear and fossil fuels, however since these are not renewable resources, they are referred to as non-conventional resources. In its broadest sense, solar energy is essential for developing a sustainable energy source. By converting solar energy into electrical energy, the sun's rays serve as a key source to produce electricity. This traditional method is known as solar thermal energy. Solar power provides several advantages despite the availability of other sustainable sources such as wind, tides, geothermal, rain, etc. Solar photovoltaic energy is the most advantageous of all renewable energy sources since it is available nationwide and has the least negative environmental impact compared to resources with geographic restrictions. The amount of solar energy that the earth receives each hour is 430 quintillion joules, which is more than enough to power the entire world for a year. The problem is that using this much energy efficiently is tough [6]. Today, solar panels are installed everywhere, but they are not monitored. As a result, we don't know how much energy they produce, and they only operate at their peak efficiency for an hour or two at a time. However, by utilizing the Internet of Things, these issues can be resolved by monitoring and controlling solar panels. Solar power plants should be watched over for the best power output. This aids in obtaining the power plant's actual production while keeping an eye out for damaged panels, loose connections, dust accumulation on the panels that reduces output, and other problems like those impacting solar performance. With the help of the Cloud Server Network and the IoT, an object can be remotely detected, observed, and controlled. Machines can communicate without the need for people thanks to IoT technology. An IoT-based solar power monitoring framework uses the internet to track the properties of the panel, including voltage, current, and power.

The increasing demand for electricity and the adverse effects causing due to generating electricity using fossil fuels are leading to the generation of electricity from solar energy. This is achieved using solar panels but then these solar power plants require a vast amount of area to install the plant and the efficiency is very less compared to other power generation techniques. To tackle this problem and sustain in the increasing demand, implementing an individual solar power plant for individual residential houses would be a better solution where in the consumers can install solar panels on their house roof tops and generate electricity which is needed for their household purpose. This solar energy must be stored using a battery and the performance of the system must be monitored to obtain timely updates of the parameters such as voltage, current and power. This monitoring can be achieved using embedded systems and IOT devices. As the efficiency of the solar panels is quite less it might not be possible to provide the energy supplied by the solar panels to all the loads. In most of the cases, solar energy is used as a backup supply or the minor supply system which is given to the low power domestic loads. If at all the consumer wants to rely completely on solar energy still, they must use conventional power from grid as a backup for high power loads. Instead of manually operating the loads it would be effective if we can achieve the automatic control between the solar energy and the conventional energy depending on the amount of energy generated by the solar power system and the power consumed by the various loads.

According to CISCO, IoT has the potential to transform the solar energy industry for companies. Solar systems are widely used in industries for their energy requirements, as they provide a sustainable and renewable source of electricity. People also widely use solar systems for various

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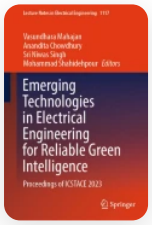
Stochastic Optimal Allocation of Photovoltaic-Based DG and DSTATCOM in Distribution System Considering Uncertainties of Loads and Solar Irradiance

| Conference paper | First Online: 24 January 2024

| pp 287–297 | Cite this conference paper



Emerging Technologies in Electrical Engineering for Reliable Green Intelligence

(ICSTACE 2023)

P. Siva Prasad, M. Sushama & P. Vijay Babu

Part of the book series: Lecture Notes in Electrical Engineering ((LNEE,volume 1117))

Included in the following conference series:
International Conference on Sustainable Technology and Advanced Computing in Electrical Engineering

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19 A novel blockchain-based artificial intelligence application for healthcare automation

From the book Toward Artificial General Intelligence

Pramendra Kumar, Gunawan Widjaja, Nikhil S. Patankar and B. Suresh Kumar

https://doi.org/10.1515/9783111323749-019

Abstract

The integration of blockchain and artificial intelligence (AI) technology can facilitate a comprehensive healthcare automation platform that can leverage the power of both AI and blockchain. This platform not only creates trust, enabling transparency of patient data sharing and record keeping, but also allows AI and machine learning algorithms to improve the efficiency and accuracy of healthcare technologies. It can provide healthcare data privacy, ease the access and sharing of medical records and other confidential health information, and enable fast and secure medical imaging transfers.

An investigation of a photovoltaic system under distinguished thermal environment conditions

1

Anurag Koushal[1], *Yogesh K. Chauhan*[2], *Rupendra Kumar Pachauri*[3], *Thanikanti Sudhakar Babu*[4] *and Ali Q. Al-Shetwi*[5]

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1. Introduction

Nowadays, humans are highly dependent on technologies which enhance the power demand from commercial and domestic applications. Due to limited storage capacity of fossil fuels, renewable energy (RE) sources such as solar energy, wind energy, biofuel, etc., have been explored and made significant contributions to meeting the world's growing energy demands. Furthermore, solar energy has no environmental impact and produces clean energy, which is the main reason for its popularity compared to other RE sources [1]. A normal photovoltaic (PV) module can utilize 6%−20% of solar radiation incident on it, dependent upon the type of solar cells used, and also turn depends upon the prevalent climatic conditions [2].

In Ref. [3], the authors discussed the working performance of hybrid photovoltaic/thermal (PV/T) systems in both energetic and exegetics modes. It is taken into consideration that the energy is always destroyed whenever there is a fluctuation in temperature. Thus, the increase in entropy is proportional to the destruction of energy that has occurred. With the observations made the authors were able to show an increase in electric power and solar cell conversion efficiency. They also listed various factors which could limit the efficient performance of the solar PV module, such as (a) reflection of light from the surface of the module, (b) fluctuation in solar irradiation, (c) series resistance in current flow, (d) shading effect due to surface top electric contacts, and (e) a lack of the optimal operating temperature. In Ref. [4], the authors enhanced the efficiency of the solar PV system experimentally by inculcating a water flow effect over the glass and water mass basins heat capacity. Numerical calculations revealed the enhanced efficiency of a solar still. In Ref. [5], the authors carried out numerical investigations for a heat transfer and energy conversion process. They were

Green Energy Systems. https://doi.org/10.1016/B978-0-323-95108-1.00001-X

ScienceDirect

Green Energy Systems

Design, Modelling, Synthesis and Applications

2023, Pages 207-221

10 - A jigsaw puzzle-based reconfiguration technique for enhancing maximum power in partially shaded hybrid photovoltaic array—methodology

Palpandian Murugesan [1], Prince Winston David [2], Rajvikram Madurai Elavarasan [3], G.M. Shafiullah [4], Praveen Kumar Balachandran [5], Thanikanti Sudhakar Babu [6]

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https://doi.org/10.1016/B978-0-323-95108-1.00009-4 ↗

Abstract

ScienceDirect

Performance Enhancement and Control of Photovoltaic Systems

2024, Pages 161-180

8 - Modeling and comparative study of half-cut cell and standard cell photovoltaic modules under partial shading conditions

C.H. Siow [1], Rodney H.G. Tan [1], T. Sudhakar Babu [2]

[1] Department of Electrical & Electronic Engineering, UCSI University, Kuala Lumpur, Malaysia

[2] Department of Electrical and Electronics Engineering, Chaitanya Bharati Institute of Technology, Hyderabad, Telangana, India

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https://doi.org/10.1016/B978-0-443-13392-3.00008-6 ↗

Abstract

This chapter presents the performance comparison between the standard-cell solar photovoltaic (PV) module and the half-cut cell solar PV module, which was introduced in 2015. The comparative study looks into the PV panel I-V characteristic and P-V characteristic under various partial shading conditions. Both the standard-cell and the half-cut cell PV module are models based on the commercial datasheet in the MATLAB®/Simulink environment. The PV module was modeled using three bypass diodes for both standard and half-cut cell modules but in a different configuration. Shading patterns, including horizontal, vertical, and diagonal, were simulated on the

Smart Grids as Cyber Physical Systems: Smart Grids Paving the Way to Smart Cities

Chapter 4

Parameters Sensitivity of Solar Photovoltaic Array Architectures under Incremental Row and Column Shading

Priya Ranjan Satpathy, Sudhakar Babu Thanikanti, Belqasem Aljafari, Pritam Bhowmik

Book Editor(s):O.V. Gnana Swathika, K. Karthikeyan, Sanjeevikumar Padmanaban

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Summary

The susceptibility of the solar photovoltaic (PV) array towards the unavoidable partial shading has raised serious concerns as power generation gets affected the most along with physical damage to the system. This issue can be solved through numerous mitigation methodologies, among which, array architectures gained a wide audience due to ease of implementation. The performance of these architectures largely depends on the patterns and nature of shading whose electrical parameters can be utilized to design effective partial shading algorithms. In this study, the sensitivity of the electrical parameters of the array architectures was studied under field-occurring incremental row and column-shading environment to determine the effective parameters for shading prediction. The PV array architectures are differentiated based on the junction wires and the ability of shading losses minimization. The entire investigation is conducted in the MATLAB/ Simulink environment for a PV array of 7x7 size operating under incremental column and row shading. The performance and parameter sensitivity of the array architectures were studied and found that the current and voltage parameters show inconsistent behavior under shading. Also, the array encountered higher losses of 86.72% during row-level shading as compared to column-level shading at 74.05%.

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Abdulmawjood , K. , Alsadi , S. , Refaat , S. S. , & Morsi , W. G. (2022). Characteristic study of solar photovoltaic array under different partial shading conditions . *IEEE Access* , **10** , 6856 – 6866 .

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Artificial Intelligence-Empowered Modern Electric Vehicles in Smart Grid Systems

Fundamentals, Technologies, and Solutions

2024, Pages 417-439

Chapter 15 - Front-in parking method for intelligent electric vehicles using proportional–integral–derivative control

Mukesh Soni [1 2], Renato R. Maaliw III [3], Haewon Byeon Inje [4], Venkata Krishna Reddy [5]

[1] Dr. D. Y. Patil School of Science & Technology, Dr. D. Y. Patil Vidyapeeth, Tathawade, Pune, Maharashtra, India

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https://doi.org/10.1016/B978-0-443-23814-7.00015-8

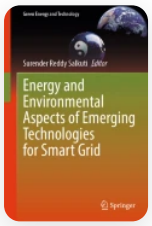
Abstract

Automatic parking is a crucial component of intelligent autonomous vehicle technology, capturing the attention of researchers and the business sector. As the preponderance of modern electric vehicles (EVs) are equipped with front-facing charging ports, a new parking paradigm emerges: front-in parking. In contrast to the prevalent emphasis on reverse parking, this inventive method takes precedence. Utilizing the vehicle's inherent

Coordinated Control Strategy for LFC in an Islanded Microgrid: A JAYA Algorithm Based Cascade PD-PI Approach

| Chapter | First Online: 24 May 2024

| pp 125–143 | Cite this chapter



Energy and Environmental Aspects of Emerging Technologies for Smart Grid

Anil Annamraju, P. Vijay Babu, Sheba Rani Repalle, C. Srinivasarathnam, P. Laxman Naik & Surender Reddy Salkuti

Part of the book series: Green Energy and Technology ((GREEN))

The original version of the chapter has been revised: The chapter author Prof. Dr. Anil Annamraju reads as a first author have been updated. A correction to this chapter can be found at https://doi.org/10.1007/978-3-031-18389-8_32

Abstract

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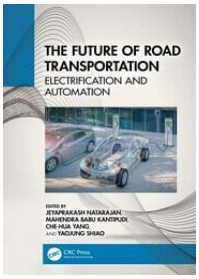

Evaluation of Single-Phase Rectifier Bridge Clamping Circuit Solar Power Transformerless Inverter Topologies for Electric Vehicle Applications

By Ahmad Syed (/search?contributorName=Ahmad Syed&contributorRole=author&redirectFromPDP=true&context=ubx), Tara Kalyani Sandipamu (/search?contributorName=Tara Kalyani Sandipamu&contributorRole=author&redirectFromPDP=true&context=ubx), Freddy Tan Kheng Suan (/search?contributorName=Freddy Tan Kheng Suan&contributorRole=author&redirectFromPDP=true&context=ubx), Xiaoqiang Guo (/search?contributorName=Xiaoqiang Guo&contributorRole=author&redirectFromPDP=true&context=ubx), Huai Wang (/search?contributorName=Huai Wang&contributorRole=author&redirectFromPDP=true&context=ubx), B. Mouli Chandra (/search?contributorName=B. Mouli Chandra&contributorRole=author&redirectFromPDP=true&context=ubx)

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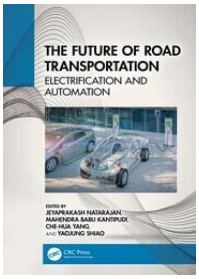

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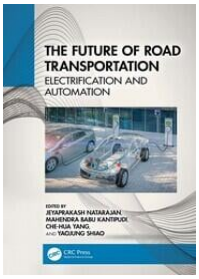

Analysis of Recent Developments in Three-Phase Transformerless Inverter Topologies for Photovoltaic and Electric Vehicle Applications

By Ahmad Syed (/search?contributorName=Ahmad Syed&contributorRole=author&redirectFromPDP=true&context=ubx), Tara Kalyani Sandipamu (/search?contributorName=Tara Kalyani Sandipamu&contributorRole=author&redirectFromPDP=true&context=ubx), Freddy Tan Kheng Suan (/search?contributorName=Freddy Tan Kheng Suan&contributorRole=author&redirectFromPDP=true&context=ubx), Xiaoqiang Guo (/search?contributorName=Xiaoqiang Guo&contributorRole=author&redirectFromPDP=true&context=ubx), Huai Wang (/search?contributorName=Huai Wang&contributorRole=author&redirectFromPDP=true&context=ubx), B. Mouli Chandra (/search?contributorName=B. Mouli Chandra&contributorRole=author&redirectFromPDP=true&context=ubx)

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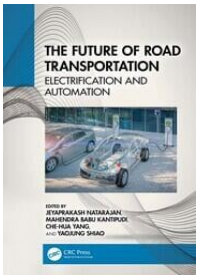

Recent Advancements and Challenges of Powertrain Technologies in Electric Vehicles Applications

By Ahmad Syed (/search?contributorName=Ahmad Syed&contributorRole=author&redirectFromPDP=true&context=ubx), Tara Kalyani Sandipamu (/search?contributorName=Tara Kalyani Sandipamu&contributorRole=author&redirectFromPDP=true&context=ubx), G. Suresh Babu (/search?contributorName=G. Suresh Babu&contributorRole=author&redirectFromPDP=true&context=ubx), Freddy Tan Kheng Suan (/search?contributorName=Freddy Tan Kheng Suan&contributorRole=author&redirectFromPDP=true&context=ubx), Xiaoqiang Guo (/search?contributorName=Xiaoqiang Guo&contributorRole=author&redirectFromPDP=true&context=ubx), Huai Wang (/search?contributorName=Huai Wang&contributorRole=author&redirectFromPDP=true&context=ubx)

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Chapter 2

Fuzzy-Based IoMT System Design Challenges

Ramakrishna Kolikipogu, Shivaputra, Makarand Upadhyaya

Book Editor(s):Satya Prakash Yadav, Sudesh Yadav, Pethuru Raj Chelliah, Victor Hugo C. de Albuquerque

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Advances in Fuzzy-Based Internet of Medical Things (IoMT)

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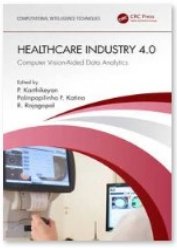
Summary

The desire for 24/7 Internet access to information is increased due to the rapid advancement of technology. With the help of the Internet of Things (IoT), intelligent items can be a key component of the omnipresent architecture. The organization experiences a decrease in expenses and workload as a result of inter-object communication. The industry is currently facing trouble integrating the Internet of Medical Things (IoMT) into its facilities. It is important to evaluate and solve these problems that are not only a time-consuming process but also need financial resources. It has applications in all industries, including medicine and healthcare. The writers of this study looked into several aspects



Chapter

Introduction to Computer Vision Aided Data Analytics in Healthcare Industry 4.0

By Ramakrishna Kolikipogu, D Ramya, Mujahid Siddiqui, Aaliyah Siddiqui, C Om Prakash

Book Healthcare Industry 4.0

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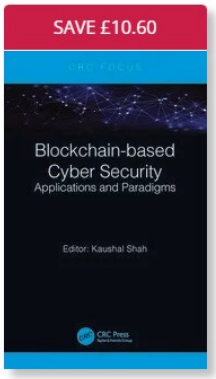

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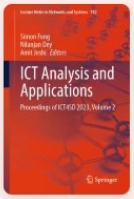

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(ICT4SD 2023)

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Modified Long Short Term Memory Technique for Human Action Recognition from Videos

Janaiah, Boddupally[a, b] ;

Pabboju, Suresh[c]

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Function as a service (FaaS) for fast, efficient, scalable systems

Mallellu, Sai Prashanth[a]; Maheswari V.[b]; Aluvalu, Rajanikanth[b]; Kantipudi, M. V. V. Prasad[c]
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Rule Based Classifier for the Detection of Autism in Children

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Abstract. Autism is a developmental disorder that hinders the life of an autistic child with poor communication and a lack of social skills to carry out their day-to-day work. Detecting autism is very important at an early stage to help the child overcome their learning disabilities. Generally, Autism is diagnosed by specialists in hospitals or therapy centers using procedures that are expensive and time-consuming. Research has been carried out to use various machine learning algorithms to develop intelligent classifiers for autism which can improve accuracy and reduce time. In this paper, we propose a Rule based classifier that generates rules that are combined with machine learning algorithms to detect autism in children by using the QCHAT screening tool. It is the first time Rule based machine learning has been used on a QCHAT screening tool that detects autism during 18–30 months of age. The dataset of QCHAT with rule based classifier has been used for detecting autism and achieved an accuracy of 97.37%. This would be helpful for the doctors and parents to diagnose the child with autism and initiate necessary therapies which can help the child to develop to the fullest.

Keywords: Autism Diagnosis · classification · machine learning · Rule based model

1 Introduction

Autism is a mental disability that hinders the development of a child in various aspects such as communication, gross motor skills, and personal skills. The exact cause of it is not known but it is assumed to be caused due to chemical disturbances in the brain [1]. There is no proper medicine available for it and only intervention helps to develop the necessary skills. As per the Centers for disease control and Prevention (CDC) report on autism, 2020,1 in 54 children has autism [2]. The rest of the paper is organized as follows: Literature Survey, Proposed Rule based classifier model, Results, and Conclusion.

2 Literature Survey

There are various ways of detecting autism and the most common method is to use autism screening and diagnostic tools. The other methods used are functional magnetic resonance imaging (f-MRI) scanning, electroencephalogram (EEG) signals, and Eye

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gaze. A lot of research has been done to detect autism using f-MRI scanning, EEG signals, and Eye gaze and the accuracy achieved is also good but they cannot be used to identify all the aspects of autism. In this paper, we concentrate on various autism screening tools on which various machine learning algorithms have been used to improve accuracy and reduce the time for identifying children with autism.

Various Screening tools available are:

- Ages and Stages Questionnaires (ASQ) (1 month-5.6 years): It is a questionnaire to be filled out by the parents and has 19 questions related to gross and fine motor skills, communication, and personal adaptive skills [3].
- Communication and Symbolic Behavior Scales (CSBS) (up to 24 months): It is a questionnaire to be filled out by the parent related to communication and other abilities [4].
- Parents' Evaluation of Developmental Status (PEDS) (birth-8 years): It is used for identifying the milestones of the children. It is to be filled by the parents [5]
- Modified Checklist for Autism in Toddlers (MCHAT) (16–30 months): It is a questionnaire to be filled out by the parents and is used to identify children with autism [6].
- Quantitative Checklist for Autism in Toddlers (QCHAT) (18–24 months): It is a questionnaire to be filled out by the parents to identify children with autism [20]
- Screening Tool for Autism in Toddlers and Young Children (STAT) (24–36 months): It is an activity-based assessment to test for various milestones of the children like communication, playing and imitating others [7].

Once the screening is done, if there is any problem in the child's development, they will be directed to diagnostic tools to identify the autism and its severity. Various diagnostic tools available are Autism Diagnosis Interview [8], Autism Diagnostic Observation Schedule [9], Childhood Autism Rating Scale (CARS) [10] and Gilliam Autism Rating Scale [11].

The Literature survey of machine learning algorithms applied to various screening tools is as follows:

1. Kazi Shahrukh Omar and others have developed a mobile application using 2 different datasets. One is an AQ-10 dataset and the other is a real dataset collected from persons. It was able to predict autism with an accuracy of 92.26%, 93.78%, and 97.10% for child, adolescent, and adult respectively for the AQ-10 dataset and 77% to 85% for the real dataset. A combination of random forest CART and random forest ID3 has been used [12].
2. Suman Raj and others have used various machine learning algorithms such as Naïve Bayes, KNN, support vector machine, neural network, logistic regression, and convolutional neural networks on 3 different datasets of ASD screening data for adults, children and adolescents. CNN has the best accuracy on all the datasets compared to other algorithms with an accuracy of 99.53% for adults, 98.30% for children and 96.88% for adolescents [13].
3. Fadi Thabtah and others used logistic regression on QCHAT-10 and AQ-10 datasets of adolescents and adults collected from the ASD test app. Information gain and the Chi-square test for feature analysis have been applied and were able to detect autism and the necessary features to detect autism [14]

4. Fadi Thabtah and others have used the Rules Machine learning algorithm on the AQ-10 dataset which helped to detect autism and also provide various rules which ensure whether the individual is autistic or not [15]
5. Tania and others have applied Adaboost, FDA, C5.0, GLMBOOST, LDA, MDA, PDA, SVM, and CART on QCHAT-10 for toddlers and AQ-10 datasets for adolescents and adults and SVM performed better for the toddler dataset. Before using classifiers various feature transformation techniques such as sine, log, and Z-score have been applied. After classification, feature selection techniques were used which helped to find the important features to detect autism [16]
6. Gennaro and others used various classification algorithms such as random forest (RF), naïve Bayes (NB), support vector machine (SVM), logistic regression (LR), and K-nearest neighbors (KNN) on QCHAT and QCHAT-10 and achieved an accuracy of 95% for SVM [17].
7. Mujeeb Rahman KK and others have used deep neural networks on QCHAT and QCHAT-10 datasets and achieved an accuracy of 97.50% and 100% respectively [18]

The above papers have used various machine learning algorithms to classify the child or adolescent as autistic or not. Fadi Thabtah [15] has used rules-based machine learning to generate an intelligent classifier for autism which is applicable only to adults. In this paper, we propose a rule based classifier model which generates rules used by the screening tool that are combined with machine learning algorithms to detect autism in children of the age group 18–30 months.

3 Proposed Rule Based Classifier Model

The diagram in Fig. 1 shows the architecture of the proposed Rule based Classifier model for detection.

The QCHAT dataset has been collected from the Mendeley data website [19] which is publicly available. The QCHAT dataset is based on the QCHAT screening tool and consists of 25 questions that corresponds to the child's various developmental areas such as speech and language, sensory issues, Eye contact, social communication, lack of

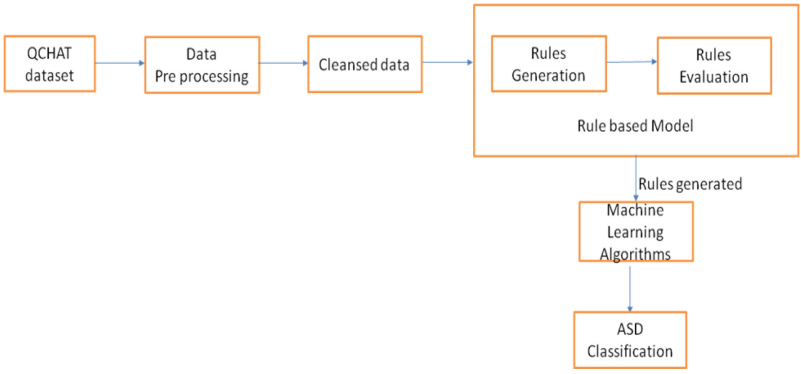

Fig. 1. Rule Based Classifier for the Detection of Autism in Children

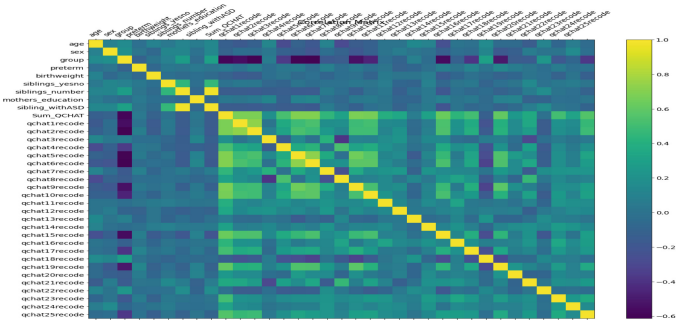

Fig. 2: Correlation matrix of the QCHAT dataset used for feature selection

attention, and concentration. The dataset has 252 records of the children who participated in the screening test with 36 attributes which include personal information of the child such as child_id, age, number of siblings, birth weight, and so on. Once the data is collected, Data Pre Processing is done on the dataset to check for empty values, duplicates or invalid data.

Feature selection is used to find the highly correlated features. The correlation matrix of the dataset is shown in Fig. 2. Based on the correlation matrix we have selected all 25 attributes which represent the questionnaire of QCHAT and other attributes which are highly correlated.

The correlation coefficient of the two variables is obtained by

$$\rho xy = \text{Cov}(x, y)/\sigma x \sigma y \tag{1}$$

where Cov(x,y) is the covariance of the variables x,y

And $\sigma x \sigma y$ are the products of the standard deviation of the variables.

The cleansed data obtained after data preprocessing is sent to rule based model to generate the rules which are then combined with machine learning models for the detection of autism in children. The outcome of the Rule based model is the set of rules generated which when combined with machine learning algorithms classify the new instance as autistic or not autistic.

The algorithm to generate rules is as follows:

Algorithm: Rule Based Classifier for the Detection of Autism in children

Input: QCHAT dataset with n users, min_val,min_strength // Rule_strength=min_strength and minimum frequency=min_value

Output: Set of Rules

1. S_f_R← { }
2. r_i ←{ }
3. Temp ← n
4. DO {
5. If $p(A_i,V_i)$ $\forall A_i / V_i \geq$ min_val

{6.if $p(A_i,V_i)$ $\forall$ i / $\sum V_i \geq$ min_strength

{7.ri={Ai,Vi}

}
8. Repeat steps 5-7 till no instances of A_i,V_i are found
}
}
9.S_f_R=ri
10. Exit when n has no more instances OR all p(A_i,V_i) instances, have been covered
11. Generate S_f_R
12. Classify Test(Test,S_f_R)

The above algorithm takes QCHAT dataset as an input and the output is the set of rules(S_f_R) generated which when combined with machine learning algorithms can be used to classify ASD or NO ASD. It has n number of users and each user has m number of attributes A_1, A_2, A_3,__,A_m. Each attribute has a value V_i associated with it. The algorithm uses two threshold values min_value and min_strength. The Rule is written as (A_1,V_1)and (A_2,V_2) and (A_3,V_3)and …(A_k,V_k)->C_n where the antecedent is the conjunction of an attribute and its value and the consequent is a class label. Here class labels are ASD or NO ASD. For every user, only if each attribute value is > = min_value, then it can be part of the rule. When the total of all the values is > = min_strength, then it can be added to the set of rules(S_f_R). Initially, S_f_R is empty. As the instances satisfy the conditions, the rules will be generated as shown in steps 5–8.The generated rules will be added to S_f_R in step 9 and this will be repeated for all the instances as shown in step 10. Final S_f_R will be generated in step 11 which are combined with machine learning algorithms to classify the children as ASD or NO ASD.

4 Results

Autism is a Neurodevelopment disorder that affects the child's growth in various aspects such as communication, social skills, eye contact, interpersonal skills, language, and sensory issues. In the proposed system autism is detected using Rule based classifier. QCHAT dataset which is publicly available is used for this purpose. It consists of 252 records with 36 columns. The metrics used for detection are accuracy, precision, and recall.

Accuracy is a measure of how well a machine learning algorithm can make correct predictions.

$$Accuracy = Number\ of\ correct\ predictions / Total\ number\ of\ predictions \quad (2)$$

Precision is a measure of the number of true positives to the total number of predictions.

$$Precision = True\ Positives / (True\ positives + False\ Positives) \quad (3)$$

Recall is a measure of number of the true positives to the total number of positive predictions.

$$Recall = True\ Positives / (True\ positives\ False\ Negatives) \quad (4)$$

Table 1. Confusion matrix and ROC curve for Random forest classifier

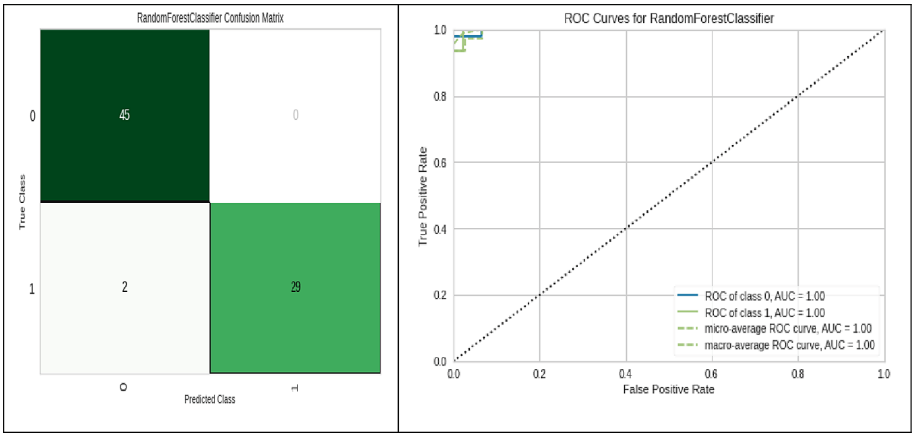

Table 2. Metrics of Random forest on train and test dataset

Data	Accuracy	Precision	Recall
Training Data	96.6%	98.5%	93.2%
Testing Data	97.37%	100%	93.5%

The model was developed by using Google Colaboratory provided by Google which facilitates research using machine learning. It has a Jupiter notebook which is cloud-based and can be accessed without any setup needed. Upon generation of rules, a Random forest algorithm has been applied to it. The dataset is divided into training and testing with a 70:30 ratio respectively and 10-fold cross-validation is used. The confusion matrix and the ROC curve are shown in Table 1.

The output of random forest classifier is a dataset that consists of only autistic children which are around 76 rows and 37 columns where rows indicates the number of children who are autistic and columns indicate the attributes of the QCHAT dataset with an additional attribute of autistic. The autistic attribute has a value of 1 if the child is autistic and a 0 if not autistic.

The Accuracy, Precision, and Recall for the training data and testing data are as shown in Table 2.

5 Conclusion

Autism is a developmental disorder that affects the child's growth in various aspects and early detection helps to develop the necessary skills. Early detection can help the child to develop to their fullest. Evaluation of screening tools is carried out manually by the doctors. Using machine learning approaches in the detection helps doctors to

detect autism in less time and with better accuracy avoiding human errors. Our proposed system of Rule based classifier is the first of its kind to combine rules which are used by the screening tool and machine learning algorithms to detect autism effectively with an accuracy of 97.37%.

One of the limitations is the size of the dataset. The proposed method can achieve higher accuracy if more data can be collected. Our future scope is to combine machine learning algorithms for diagnostic tools of autism to increase their performance and reduce evaluation time.

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Classification Models in Education Domain Using PSO, ABC, and A2BC Metaheuristic Algorithm-Based Feature Selection and Optimization

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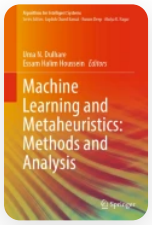

Machine Learning and Metaheuristics: Methods and Analysis

Uma N. Dulhare, D. Naga Jyothi, Bhavana Balimidi & Rama Rithika Kesaraju

Part of the book series: Algorithms for Intelligent Systems ((AIS))

Abstract

During the process of creating a machine learning model for real-life data, we often encounter numerous features in the dataset, but not all of them are essential. Incorporating irrelevant features during model training can lead to a decrease in overall accuracy, an increase in complexity, a decrease in generalization capability, and bias in the model. Therefore, selection of features is a crucial initialization step when building a

machine learning model. The primary objective of feature selection is to identify the optimal set of features by reducing the dimensionality of the data to improve the model's accuracy. Recently, swarm intelligence-based optimization techniques have gained popularity due to their effectiveness in solving dimensionality optimization problems. Techniques like PSO, ABC, and A2BC (automated ABC) have been explored, and feature selection methods based on these algorithms have been implemented and evaluated using various classifiers like SVM, Random Forest, XGBoost, and Voting (SVM + RF + DT) classifiers. The education science domain is used to evaluate these algorithms, which tackled a classification problem which is binary in nature related to freshman student's success. The aim is to compare the accuracies and the performances of the three machine learning algorithms, namely, PSO, ABC, and automated ABC (A2BC), and conclude the best algorithm.

Abbreviations

PSO: Particle Swarm Optimization

ABC: Artificial Bee Colony

A2BC: Automated Artificial Bee Colony

SVM: Support Vector Machine

FS: Feature Selection

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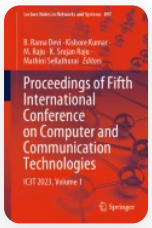

Proceedings of Fifth International Conference on Computer and Communication Technologies

(IC3T 2023)

Samuel Chepuri & Y. Ramadevi

Part of the book series: Lecture Notes in Networks and Systems ((LNNS,volume 897))

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Abstract

If not detected and managed correctly, Cotton diseases can lead to substantial economic losses for farmers. By implementing an automated disease detection system, farmers can save costs by reducing the reliance on manual scouting and labor-intensive inspections. It enables more efficient use of resources by focusing treatments only on affected plants instead of the entire field. Image segmentation methods may need help to generalize well across different datasets or disease types. The performance of segmentation algorithms can be affected by variations in leaf shape, disease symptoms, or even different camera setups. Training and validating the segmentation models on diverse datasets representing various disease severities and environmental conditions can help mitigate this limitation. When trained on large and diverse datasets, deep learning models can generalize well to unseen data. Once trained on a representative dataset, the models can generalize to new cotton leaf images and detect diseases even in different environments or with variations in lighting conditions, leaf shapes, or disease severities. Deep learning approaches promise precision farming. Cotton leaf disease detection in precision farming enables optimized resource management. This paper studies the different approaches for disease detection in cotton plants. Out of the many approaches, most optimization results are obtained by the deep learning approaches.

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ABOUT THE AUTHORS

Dr. Radhika Kavuri is currently working as Professor & Head of the Department of Artificial Intelligence & Data Science, CBIT, Hyderabad. Prof. Radhika Kavuri did her B.Tech.(EEE) from VRSEC, Vijayawada. She completed her postgraduate degree in computer science and engineering (CSE) at JNTU, Hyderabad. She received her Doctorate from Osmania University for her Research work titled "Efficient Mobile-Centric Vertical Handoff Decision Models for Heterogeneous Wireless Networks". She has a total of about 27 years of experience in both Industry and Academia. She was also the former Head of the Department of Information Technology, CBIT for 2 terms. She was instrumental in establishing a lab for Big Data Analytics with the sponsorship of AICTE and another lab for Internet of Things apart from modernizing the existing laboratories and creating other infrastructural facilities in the Department. The department got accredited by NBA 2 times during her tenure as the Head of the department. Prof. Radhika's research interests include Mobile Computing, Cloud Computing, Machine Learning and Decision Support Systems. She has published around 40 research papers in National / International Journals and Conferences. She is a recognized research supervisor to guide scholars from Faculty of Engineering, University College of Engineering, Osmania University. 3 scholars were awarded Ph.D. and 5 scholars are pursuing Ph.D. under her guidance. She is a member of various Professional bodies and was also a Panel Member and Session Chair for various National and International conferences.

Dr. Kadiyala Ramana currently holds the position of Associate Professor in Department of Artificial Intelligence and Data Science at Chaitanya Bharathi Institute of Technology (Autonomous) in Hyderabad, India. Previously, from 2007 to 2021, he served as an Assistant Professor in the Department of Information Technology at Annamacharya Institute of Technology and Sciences (Autonomous) in India. He earned his Bachelor's degree in Information Technology from Jawaharlal Nehru Technological University, Hyderabad, in 2007, followed by a Master's degree (M.Tech.) in Information Technology from Sathyabhama University, Chennai, in 2011. In November 2019, he received his Ph.D. from SRM University, Chennai, specializing in distributed systems, parallel and distributed systems, software-defined networking, cluster computing, and web technologies.

Dr. Ramana has made significant contributions to academia with over 50 publications in reputable international journals and active participation in various international conferences. He serves as a reviewer for several international journals and is a program committee member for various international conferences. Additionally, he holds a lifetime membership in prestigious professional organizations, including IEEE, CSI, ISTE, IAENG, IE(I), IACSIT. Further more, Dr. Ramana is currently contributing as the Treasurer for the IEEE Computer Society, Hyderabad Chapter, showcasing his commitment to advancing the field of computer science and technology.

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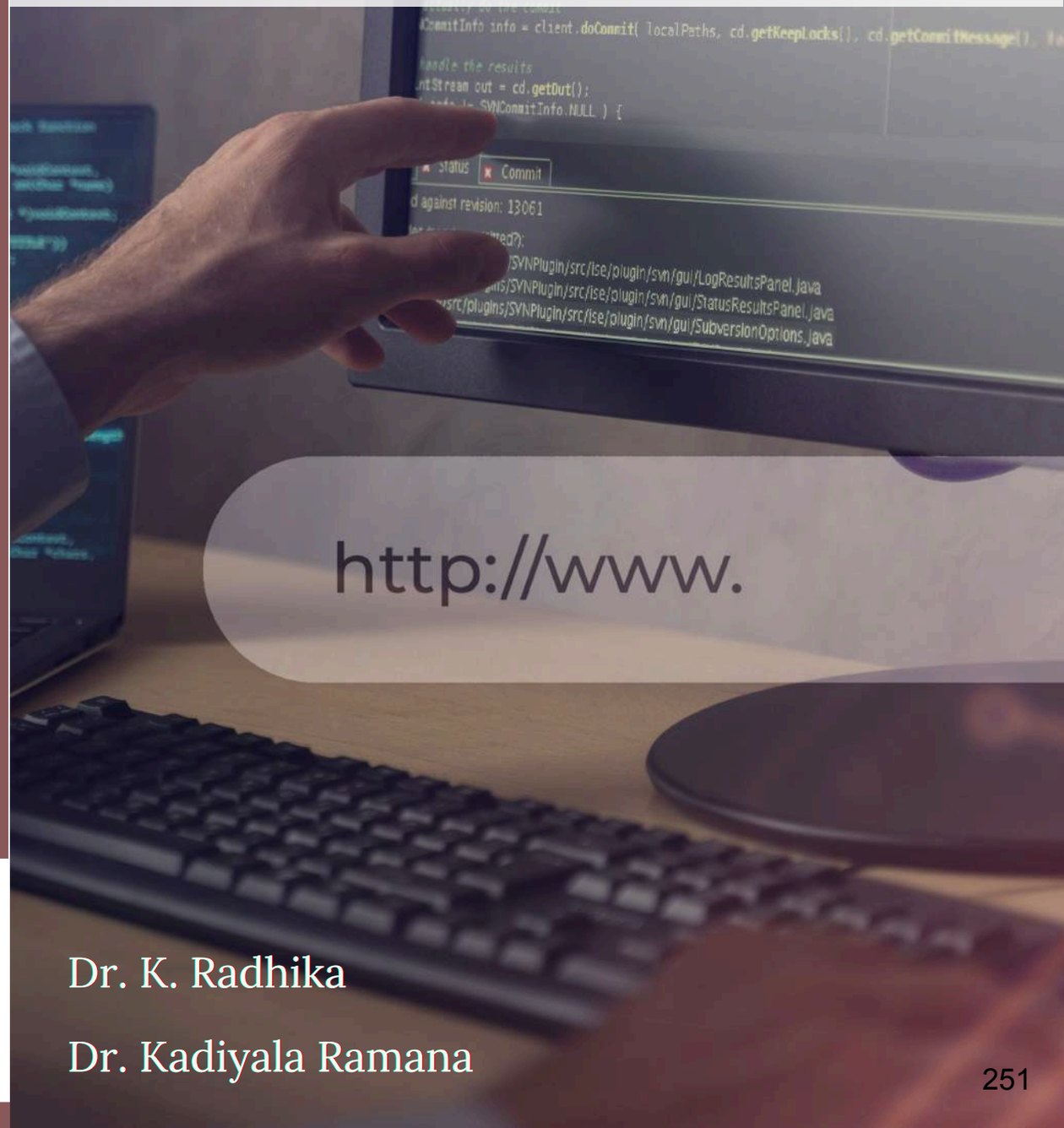

Dr. K. Radhika

Dr. Kadiyala Ramana

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Chapter 16

Quantum Cryptography with an Emphasis on the Security Analysis of QKD Protocols

Radhika Kavuri, Santhosh Voruganti, Sheena Mohammed, Sucharitha Inapanuri, B. Harish Goud

Book Editor(s):Sachi Nandan Mohanty, Rajanikanth Aluvalu, Sarita Mohanty

First published: 29 May 2023
https://doi.org/10.1002/9781119905172.ch16

Summary

Quantum computing is a fast-developing technology that uses the principles of quantum physics to solve issues that are too complicated for conventional computers. Even the most complex mathematical computations performed in conventional cryptographic algorithms can easily be hacked using quantum computers. Hence, cryptologists are recently looking into developing new quantum hard cryptographic algorithms that are secure against quantum computers. Quantum cryptography employs the inherent features of quantum physics in order to secure and transmit data in a way that cannot be intercepted. Quantum cryptography is emerging as a game changing technology in various domains including privacy preserving, secure online voting, banking, and manufacturing industries. This chapter covers basic terminology and concepts of quantum cryptography, trends in quantum cryptography, an in-depth overview of Quantum Key distribution protocols along with their vulnerabilities and future research foresights.

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Chapter 17

Deep Learning-Based Quantum System for Human Activity Recognition

Shoba Rani Salvadi, Narsimhulu Pallati, T. Madhuri

Book Editor(s):Sachi Nandan Mohanty, Rajanikanth Aluvalu, Sarita Mohanty

First published: 29 May 2023
https://doi.org/10.1002/9781119905172.ch17

Summary

People's daily activities and communications with their living settings are becoming increasingly important to better comprehend through human activity recognition (HAR), a fiercely debated topic in ubiquitous computing environments. Social communication has always relied heavily on human behavior. In order to better understand human behavior, it is important to look at how people interact with each other. In a variety of applications, such as human-intelligent video surveillance, the identification of human behavior is a significant difficulty. Extraction and learning data are critical to the evaluation algorithm. Numerous imposing outcomes, including neural networks, came from the triumph of deep learning. In order to get superior outcomes, quantum computing is used in the deep learning model. ORQC-CNN (Optimized Random Quantum Circuits with Convolutional Neural Networks) model is used to identify the HAR. The architecture that consists of a series of quantum classified layer is shown as an analogy to the classical CNN. Artificial gorilla troops optimizer (AGTO) for ORQC-CNN parameter update is presented using variational quantum methods. According to a network complexity analysis, the proposed model outperforms its predecessor exponentially.

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Smart Healthcare: Enhancing Patient Well-Being with IoT

| Conference paper | First Online: 06 October 2024

| pp 212–219 | Cite this conference paper

Proceedings of the 5th International Conference on Data Science, Machine Learning and...

(ICDSMLA 2023)

Swathi Tejah Yalla, Sanjana Mamidala, Deviprasanna Ganji & G. A. Keerthi

Part of the book series: Lecture Notes in Electrical Engineering ((LNEE,volume 1273))

Included in the following conference series:
International Conference on Data Science, Machine Learning and Applications

Abstract

In recent years, due to the increasing incidence of diseases, the importance of health care has been increasingly recognized. Health issues have become important concerns,

directly influencing individual quality of life. Neglect of health care management creates problems for the survival of an individual. Among the many applications supported by the Internet of Things (IoT), digital healthcare stands out as important. The Internet is a powerful way to integrate health care resources and improve overall quality of life. IoT has revolutionized the healthcare industry, providing doctors with an easier and faster way to access patient data to make informed decisions. These improvements significantly improve health care and patient outcomes. The development and deployment of IoT-based health monitoring systems depend on the integration of sensors and actuators. The system continuously monitors the patient's essential signs using temperature and heart rate sensors, allowing doctors to remotely access this information from their computers and predict the future condition of the patient's health. Machine learning algorithms help us calculate the accuracy of future prediction. If there is anything abnormal about the patient's condition, the system automatically sends an alert to the doctor via email. This instant feedback allows the physician to quickly diagnose and address any problems, and help save patient's lives. The main goal of this paper is to provide the physician with timely updates on the patient's health status, ensuring immediate intervention if any abnormal situations happen.

A Blockchain-Based Data-Sharing Framework for Cloud Based Internet of Things Systems with Efficient Smart Contracts

Publisher: IEEE Cite This PDF

Kadiyala Ramana ; R.Madana Mohana ; C. Kishor Kumar Reddy ; Gautam Srivastava ; Thippa Reddy Gadekallu **All Authors**

Abstract:
As the Internet of Things (IoT) has advanced, data sharing has become a crucial function of cloud computing. However, data security remains a significant challenge in this field. This research proposes a blockchain-based data-sharing system that prioritizes data security and efficiency. The system includes efficient smart contracts and security gateways that record data in the cloud using blockchain. If suspicious behaviour is detected, the blockchain is checked by the centralized cloud, and the responsible party for any malicious gateway behaviour is held accountable. Authentication and data exchange algorithms are used to ensure data security. Additionally, to reduce the burden on end-users, smart contracts in blockchain use highly complex partial decryption algorithms. To satisfy data restriction safety criteria, blockchain achieves traceability of historical actions through open and transparent supervision. Experimental findings demonstrate that the proposed technique is effective in ensuring the safety and efficiency of information exchange between various clients.

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Behavioral Cloning-Enabled Autonomous Vehicle Lane Line Detection Using Nvidia Convolution Neural Network Model

| Conference paper | First Online: 02 October 2023
| pp 761–769 | Cite this conference paper

Proceedings of the 2nd International Conference on Cognitive and Intelligent...

(ICCIC 2022)

Satya Kiranmai Tadepalli, Kratika Sharma, U. Sairam & V. Santosh

Part of the book series: Cognitive Science and Technology ((CSAT))

Included in the following conference series:
International Conference on Information and Management Engineering

Abstract

The fast improvement in artificial intelligence has revolutionized the location of self-sustaining motors by using incorporating complicated models and algorithms. Self-

driving motors are constantly certainly the biggest inventions in computer technology to know-how and robot intelligence and quite sturdy algorithms that facilitate the functioning of those automobiles probably decreases many existence-threatening accidents which arise due to human negligence and facilitate the benefit of visiting over long distances. In this paper, our aim is to create a deep mastering model with a view to force the car autonomously and can adapt nicely to the actual time tracks and doesn't require any manual function extraction. This research provides the laptop vision techniques using OpenCV for lane lines detection, development of convolutional neural networks to perceive between diverse traffic symptoms and Keras library implementation and behavioral cloning.

An Entropy enabled Random Forest Neural Network Algorithm to Grade the Reproductive System for Efficient Early Detection of Infertility

Publisher: IEEE Cite This PDF

Satya Kiranmai Tadepalli ; Prof. P.V. Lakshmi **All Authors**

Abstract:
The membrane that borders the uterus is called endometrium. When the liner leaves the uterus, a problem is evident. The main risks of infertility and other health issues can be substantially reduced if the primary cause of endometriosis is understood. As a result, the affected people can receive the right medical care and therapy. The suggested ensemble model performs better than traditional machine learning techniques. For effective implantation, there must be a dependency between the endometrium and the embryo at the blastocyst stage. Data mining method where information gathered from the endometrium/sub endometrium and their ability is assessed uses the endometrium as a site for embryo implantation. Using a typical rating system has certain drawbacks because there are so many irrelevant and unclear criteria. The usability and precision of scoring systems can also be increased using a number of artificial intelligence methods, including random forests and neural networks. This study coupled an advanced reproductive grading system with an entropy and random forest approach to define individuals with infertility according to their health conditions and choose more effective therapies.

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Melanoma Cancer Detection Using Quaternion Valued Neural Network

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| pp 879–886 | Cite this conference paper

Proceedings of the 14th International Conference on Soft Computing and Pattern...

(SoCPaR 2022)

Shoba Rani Salvadi, D. Nagendra Rao & S. Vatshal

Part of the book series: Lecture Notes in Networks and Systems ((LNNS,volume 648))

Included in the following conference series:
International Conference on Soft Computing and Pattern Recognition

Abstract

The most occurring skin cancer in the world is Melanoma is one the most dangerous form of skin cancer, but it has a higher survival rate if it is detected early. Presently Neural

networks field has seen significant development in the research with the growth of deep and conventional neural networks usage in most applications. For multi-dimensional data, neural network models with hyper complex parameters archive better results when compared to real-valued models. This paper investigates the quaternion-valued neural network for melanoma cancer detection of pattern recognition tasks. Moreover, it achieved improved results than the real-valued network models. In the proposed model, for experiments, we are taken publicly available challenge dataset ISIC 2020 to train and test the clinical images with convolution neural network along with four-dimensional quaternion values. Experimental findings show that the proposed method outperforms the state-of-the-art approach regarding diagnostic accuracy compared with prior real-valued neural networks on the same dataset.

A Review on Federated Learning-Based Network Intrusion Detection System

| Conference paper | First Online: 27 September 2023
| pp 707–713 | Cite this conference paper

Proceedings of the 2nd International Conference on Cognitive and Intelligent...

(ICCIC 2022)

K. Radhika, Bindhu Sree Reddy Alla, Sai Bhargavi Mamidi & Nishanth Puppala

Part of the book series: Cognitive Science and Technology ((CSAT))

Included in the following conference series:
International Conference on Information and Management Engineering

Abstract

The security of network-connected devices is a subject of increasing concern due to the widespread use of the Internet in recent years and the possibility of numerous flaws that

may be exploited by an attacker. Mobile phones, wearable technology, and self-driving cars are just a few examples of distributed networks that produce and transmit enormous amounts of data daily. The security and privacy of such devices are significantly enhanced by intrusion detection systems. For well-known intrusion detection systems (IDS) to detect increasingly sophisticated cybersecurity assaults effectively and efficiently, machine learning (ML) techniques must be applied. Due to their success in achieving high classification accuracy, these techniques have shown themselves to be quite useful. Thus, many solutions were developed to provide protection against cyberattacks and intruders. Many papers from many reputed authors were studied to understand the working of these solutions. However, the requirement to store and transmit data to a centralized server may put privacy and security concerns in jeopardy. Federated learning (FL), a privacy-preserving decentralized learning strategy that trains models locally and sends the parameters to a centralized server, fits in well to reduce privacy concerns associated with centralized systems. A computational methodology for networked machine learning called federated learning enables numerous cooperating organizations to train a single large-scale model. The rest of this review paper goes in-depth about the various solutions proposed by multiple authors. Their methodology, results, advantages, and disadvantages are analyzed, compared, and contrasted.

A Blockchain Based Decentralized Certificate Management System Using Hyperledger Fabric

| Conference paper | First Online: 28 March 2023

| pp 474–484 | Cite this conference paper

Proceedings of the 14th International Conference on Soft Computing and Pattern...

(SoCPaR 2022)

Naveen Kumar Dumpeti & Radhika Kavuri

Part of the book series: Lecture Notes in Networks and Systems ((LNNS,volume 648))

Included in the following conference series:
International Conference on Soft Computing and Pattern Recognition

Abstract

The development of blockchain has influenced various fields, including Banking, healthcare, fiśnancial and supply chain systems. At present, this technology is applied in the education sector and its unique features like decentralization, trustworthiness and

security have added revolutionary characteristics to existing systems. An individual deals with a variety of certificates in daily routine life which includes voter ID, land documents, marriage documents, vehicle documents and health documents. These documents showcase an individual's capabilities, achievements, strengths in terms of educational, extracurricular and professional certificates. Management of digital copy of these certificates became the main motive and the hardcopy perseverance became obsolete. The digital certificates help us to preserve and showcase an individual's capabilities for career growth. These certificates can be forged and misused for self motives. Need to secure these certificates against frauds. A variety of systems exist to manage these certificates and to thwart forgery. Traditional method of certificate storage involves usage of a centralized database or a web server for certificate storage which is vulnerable to theft and forgery. Best alternative is a Blockchain based system. Different Blockchain based certificate management systems and their drawbacks are discussed and will propose a hybrid model of educational certificate management model using Hyperledger Fabric, IoT and 2D Barcode.

A Comprehensive Analysis for Advancements and Challenges in Deep Learning Models for Image Processing

| Conference paper | First Online: 06 October 2024

| pp 229–234 | Cite this conference paper

Proceedings of the 5th International Conference on Data Science, Machine Learning and...

(ICDSMLA 2023)

Ravikumar Ch, Kalvog Prakasha Chary, S. Srinivas, Tedla Bhavani & Veeranna

Part of the book series: Lecture Notes in Electrical Engineering ((LNEE,volume 1273))

Included in the following conference series:
International Conference on Data Science, Machine Learning and Applications

Abstract

Deep learning, a profound advancement in artificial intelligence, has demonstrated remarkable achievements, particularly in image processing. The rapid evolution of deep learning in architecture, training methods, and specifications has driven the expansion of image processing techniques. However, the increasing complexity of model structures challenges the effectiveness of the back propagation algorithm, and issues like the accumulation of unlabeled training data and class imbalances hinder deep learning performance. To address these challenges, there's a growing need for innovative deep models and cutting-edge computing paradigms to enable more sophisticated image content analysis. In this study, we conduct a comprehensive examination of four deep learning models utilizing Convolutional Neural Networks (CNNs), clarifying their theoretical foundations within the image processing context, opening the door for further research. CNNs are notably essential for image processing due to their ability to handle complex images effectively.

A Comprehensive Analysis of Machine Learning Methods for Bug Prediction in Software Development

| Conference paper | First Online: 06 October 2024

| pp 929–935 | Cite this conference paper

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Part of the book series: Lecture Notes in Electrical Engineering ((LNEE,volume 1273))

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Abstract

In order to create software that is reliable, efficient, and of the highest quality, it is imperative to predict and address bugs during the development stage. Early detection of faults is crucial; yet developing a cost-effective and successful advanced bug prediction model presents challenges. This research endeavor aims to achieve precise bug identification by exploring the utilization of various machine learning techniques on training and testing datasets. Multiple machine learning methods have been devised to identify and learn from software defects. This study employs machine learning techniques to conduct a comprehensive examination of software bug detection, offering valuable insights to the software industry. It synthesizes existing research on bug prediction, detailing different methods and highlighting their effectiveness, advantages, and limitations. This comprehensive analysis offers valuable guidance to researchers and software developers seeking to enhance bug detection methods for the creation of higher-quality software.

An SDN-Based DDoS Traffic Generation, Collection and Classification Using Machine Learning Techniques

| Conference paper | First Online: 08 April 2023

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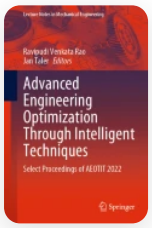

Advanced Engineering Optimization Through Intelligent Techniques

T. Arvind & K. Radhika

Part of the book series: Lecture Notes in Mechanical Engineering ((LNME))

Abstract

Distributed denial-of-service attack is among the most dangerous attacks that may occur on Software Defined Network (SDN) environment. It is a type of attack where sizable numbers of fake packets are fed into the network from multiple sources in order to consume network resources. In this paper, we have utilized SDN environment to generate and collect DDoS and normal traffic. The DDoS attacks considered for the present work

are namely SYN flooding, UDP flooding and ICMP flooding attacks, which were generated using hping3 tool and normal traffic using ping and iperf tool. The generated traffic was collected into a dataset and classified utilizing machine learning models, namely Gaussian Naive Bayes, Logistic Regression and Decision Tree models. The evaluation results show that Decision tree classifier provides better performance in terms of accuracy, error rate, training time, testing time, precision, recall, F1-score and ROC.

RESEARCH ARTICLE | FEBRUARY 20 2024

A deep learning framework for leakage diagnosis and time series water consumption prediction

Vasanth Sena Pesari ; Sammula Porika

+ Author & Article Information

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A smart city water distribution system offers a dependable and trustworthy water supply through smart water meters. To monitor, manage, automate, and control water distribution in a smart city, a smart water grid uses IoT devices like sensors, smart water meters, and controllers together with data analytics. A wealth of information on water pressure, availability, contamination, and water distribution system flaws may be gathered thanks to the smart sensors. Real-time data collection and analysis ensure that losses are kept to a minimum, improving system effectiveness. By imitating the self-learning functions layer and building a data-driven model with the available dataset, deep learning (DL), the most advanced paradigm of artificial neural network (ANN) computing, distinguishes itself from conventional or shallow learning methods. The suggested framework focuses on the creation of an effective deep learning framework with possible applications in data fusion, predictive analysis, the identification of anomalous events from recorded time series data, and the long short-term memory model for water usage prediction.

Topics

Mass measurement, **Data science**, **Deep learning**, **Artificial neural networks**, **Learning and learning models**, **News and events**

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About the Authors

Dr.Atchuta Rao Sadu has 20 years of experience in teaching, research administration. He received his Ph.D degree (Statistics) in 2013 from Andhra Univ Visakhapatnam. Currently, he is serving as an Associate Professor and coordinat Data Science, Dept. of Data Engineering in MVGR College of Engineerin Vizianagaram, AP, and a Life Member of ISPS and ISTE. He received gold med academic performance in graduation. He has published many research pap refereed journals. He chaired in International conferences and conducted work He is engaged with designing of curriculum modules for B.Tech programme. His a interests Probability& Statistics, Queueing theory and Data Science.

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Mr.Kalyan Balasubramanian is a graduate in Information Technology an acquired extensive knowledge in the field of IoT, Machine Learning, and soft development by handling various projects. The author has won certificates for the projects and holds a published patent in the field of AI. One of his notable projects Soldier Health Monitoring and Location Tracking System, which was selected as th project in the IT department of SRM Valliammai Engineering College, Chenna author has been involved in developing various other IoT and Cloud-related pr One of his significant accomplishments is the development of a Face Mask Detection system usin Machine, and Deep Learning, which achieved an accuracy rate of over 96% by applying MA performance metric. He has published one book on Deep Learning Essential. He is an active me of the Indian Society for Technical Education (ISTE) and the Computer Society of India (CSI).

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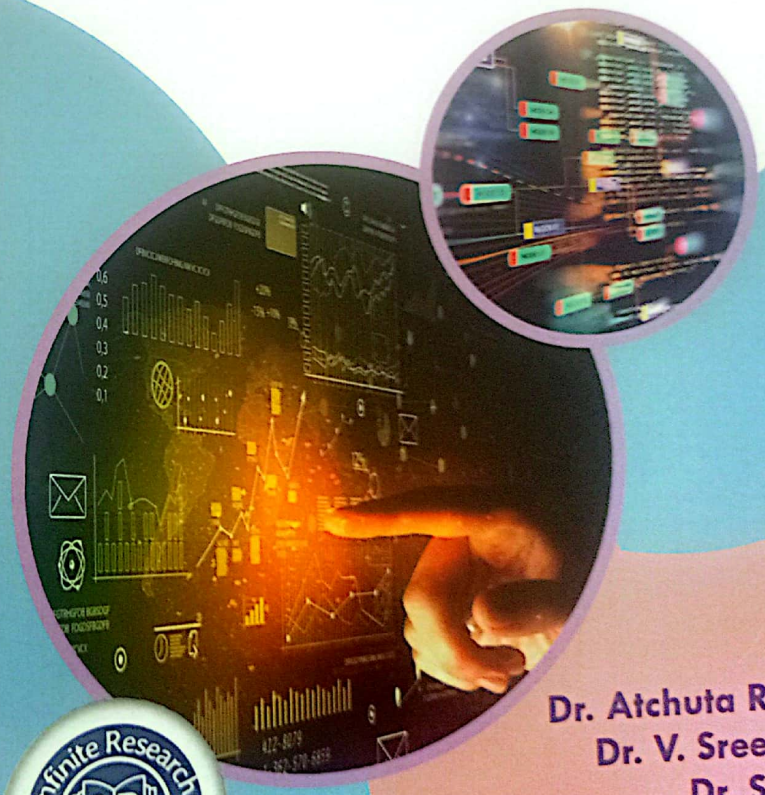

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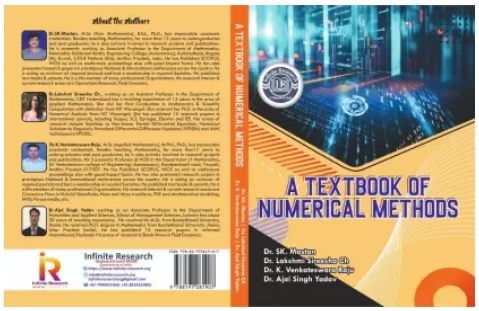

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