



RSA Cryptography based Multi-Modal Biometric Identification System for High-Security Application

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Abstract: In recent days the requirements of Biometric Identification System (BIS) increased enormously. BIS Unimodal Biometric systems (UM-BS) have different kinds of problems like non-universality, noisy data, unacceptable error rate and spoof attacks. These limitations are solved by using multi-modal Biometric systems (MM-BS). MM-BS uses two or more individual modalities, like face, Palm, iris, retina, fingerprint, etc. This paper has introduced feature-level fusion and Rivest Shamir Adleman (RSA) encryption based FEP-RSA-MM biometrics system. This FEP-RSA-MM system has taken combination of Face, iris and Palm biological characters for individual Identification. FEP-RSA-MM was implemented by using MATLAB and the performance were calculated and assessed in terms of Recall, Sensitivity, Specificity, Accuracy, F-Score, Precision, Mean Square Error, Root Mean Square (RMS) Error, etc. The performance of this FEP-RSA-MM system mainly depends on the accuracy. The accuracy of FEP-RSA-MM system is 93.33 % and it improved compared to two existing methods GF-FLF-MM, SIFT-KNN-MM, FLF-GSO-MM and SLF-PSO-MM.

Keywords: Multi-modal biometric systems, Face-Iris-Palm, Feature level fusion, Bi dimensional empirical mode decomposition, False acceptance ratio, False rejection ratio.

1. Introduction

Normally Biometric systems working in the principle of measuring the biological characters and testing the biological characters (such as hands, fingers, feet, irises, faces, retinas, teeth, ears, veins, signatures, voices, typing styles, odors, gaits, DNA, etc.) of individuals. The biological characters (features) of each individual extracted and stored in the database which is named as a biometric database or biometric templates. For testing the biological features, this database is used to identify the individual feature to improve the security [1]. Biometric systems are of two different types: UM-BS and MM-BS. UM-BS contains only one biometric characteristic of the individual recognition. BIS that use a combination of two or more biometric modalities to determine an individual is called MM-BS. The main objective of MM-BS is to improve the

recognition rate [2]. UM-BS has some limitations like high spoofing rate, uniqueness, high error rate, non-universality, and noise. For example, face recognition is disturbed by position, sadness, happiness and the density of lighting [3]. To overcome the UM-BS limitations, now a day MM-BS is used, that improves the accuracy and population coverage [4]. This method combines multiple features from each modality to deliver the enhanced recognition results [5].

The key to successful MM-BS is in an effective fusion method, which is essential to fuse the information given by multiple domain experts. In a given problem domain, the enhanced set of experts is determined by the fusion and then an appropriate function is fused optimally which is shown by individual experts [6-7]. Pieces of evidence in a MM-BS is integrated in several different levels such as Prior Matching Fusion (PMF) and After Matching

A Research on Development of a Fixed Solar Dryer with a Practical Research

K.Nagendra Babu, P.Sudheer Kumar, D.Yamuna

Abstract— Solar energy heating apparatus to dry food and other crops that can enhance the quality of the product while reducing the wasted product. Drying is an eminent way to preserve the food and solar energy food drying is an approximate food preservation mechanism for a sustainable real world. This fixed solar dryer has the capacity of 15 kg which is used for the preservation, drying of grapes, potatoes, onions, mango pulp, chilies, green leafy vegetables, jack fruit pulp, green pepper, herbal medicines, ginger etc., more than 50 kinds have been dried using this solar dryer at various AKRUTPS. Drying will generally refers to the removal of moisture content by evaporation rather than by pressure or other physical parameters. Our country is blessed with ample of solar energy round the year. The principle of this dryer is that, hot air is lighter than the cool air and its raises up the altitude. While raising this warm air comes in contact with food slices and draws the moisture from it. The repeated cycle of this process makes it a low cost, very healthy, long term investment. Generally the sun's power of heat is used to dry up the moisture content of the fruits or vegetables.

1. INTRODUCTION

Drying is one of the particular procedures used to preserve food products for longer durations. The fierce heat of the sun's energy coupled with the wind energy has been utilized to dry food for preservation for couple of years. Drying is the oldest action of preserving manner of agricultural substances and it is an energy intensive series of action. A great extent prices and shortfalls of fossil fuels has been increased the special importance for using the different another possibility of renewable energy resources. Drying of agricultural substances using non conventional sources of energies such as solar energy is the eco friendly and gives low environmental influence. Non identical models of solar energy dryers have been elaborated to a specified degree and had a practical analysis in the non related regions of the tropics, subtropics. The utmost two categorised solar energy dryers are natural convection solar potency dryers, forced convection solar energy dryers. In the case of natural convection solar dryers the airflow is created by the buoyancy induces the airflow while in the forced convection solar potency dryers the airflow is provided by use of a medium called fan operated either by electricity solar section or by fossil fuel. Solar thermal energy technology is rapidly gaining the fact of being received as adequate power saving measure in agriculture real time

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2. MATERIALS CONSIDERED ESSENTIAL FOR MAKING THE SOLAR DRYER:

The essential materials that are used to make the solar thermal energy dryer are very much useful in our everyday life to which they are found easily near our localities also.

- 1) Aluminum Sheets
- 2) Hammer
- 3) M.S L angular
- 4) M. S Wired Mess
- 5) Fiber Glass
- 6) Thermometer
- 7) Black Paint



FIGURE-2.1: Front view of Solar dryer

3. MATHEMATICAL FORMULA.

$$\text{Efficiency} = (\text{output}/\text{input}) * 100$$

Here we calculate efficiency in terms of weight.

3.1 The fact of being active of the Dryer

This solar energy dryer is a passive inter connecting network means which has no moving section. It is energized by the solar energy radiation entering through the collector glossing of the dryer. The tricking of the sun's rays is further improve the quality by the inside surfaces of the solar energy collector that were painted in black in



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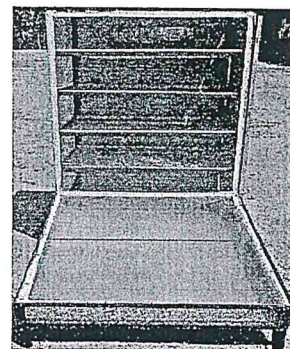


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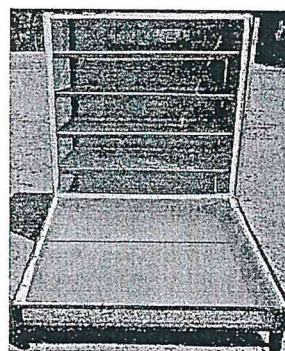


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A NOVEL DEVELOPMENT OF A MANUAL CAN CRUSHER

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ABSTRACT

Our piece of work to be done for this project is to design and create a can crusher that will reduce to the smallest possible amount of the volume of aluminum cans by 70%. The can crusher will be made up of various parts containing as part of the whole being considered a lever, base frame, can bin, piston cylinder arrangement, chain sprocket mechanism and bearing. The inspiration behind this design came from the wastage in malls, canteens of big company often the holidays involve large parties where people gather and consume a lot of canned beverages. Thus, it makes sense that there should be an easy way to dispose of cans properly during these large social gatherings. Thus this can crusher was created, with a portable and manually operated mechanism. Can crushers are primarily used to save space and recycling. Can crushers make it possible to make small stackable piles that save space. There are many designs that can crushers come in. Some of the designs are pneumatic, hydraulic and chain operated with sprockets. Recycling is wonderful way to help the environment. One device that will make our life easier, and our recycling haul much more compact, is the can crushing machine. Can crushing machine are available in a number of styles, sizes and speed, with models to suit everyone from the heavy soda drinker to the recycling center man.

1. INTRODUCTION:

The inspiration behind this design came from the festivals, wastage in malls, canteens of big company often the winter holidays involve large parties where people gather and consume a lot of canned beverages. Thus, it only makes sense that there should be an easy way to dispose of cans properly during these large social gatherings. Thus this can crusher was created, with a portable and manually operated mechanism. Can crushers are primarily used to save space

and recycling. Can crushers make it possible to make small stackable piles

that save space. There are many designs that can crushers come in. Some of the designs are pneumatic, hydraulic, aluminum, and wood. Jesse M. Wright was the man who invented the aluminum can crusher in 1937, but he did not get it patented until August 30, 1938. Recycling is wonderful way to help the environment, even if you think otherwise when you're hauling big,



OPTIMIZED SPWM CONTROL METHOD AND ENHANCED POWER-DECOUPLING ABILITY FOR SWITCHED-CAPACITOR-BASED MULTILEVEL INVERTER

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Abstract: -Small scale inverters strolling into the unmarried-installation form from new imperativeness supply with low-voltage yield face the issues of functionality bottleneck and times-line-repeat series. This paper proposed a taken aback inverter reliant on framework remoted traded capacitor (BMSC) circuits with its predominance in exchange adequacy and strength thickness. The topology is made out of DC-DC and DC-AC degrees with self-enough manipulate for every level, looking to improve device adequacy and alter the manipulate method. The BMSC DC-DC mastermind, which may be stretched out to fuse extra degrees, competencies taken aback voltage benefit just as not completely replaces the principle mass facts capacitor and boundaries as a working essentialness pad to beautify energy decoupling restrict among DC and AC aspects. In DC-AC kind out, the manipulate technique of reducing aspect unipolar repeat multi managing sine-wave beat width exchange (UFD-SPWM) is proposed to enhance the concept of yield waveform. in the period in-between, the surprised voltage diploma has been progressed to decrease the impact incident further. subsequently, a version has been advanced and attempted. associated with the reenactment, the exploratory consequences suggest the practicability of these examinations.

Index Terms: Switched-capacitor circuit, staggered inverter, manipulate decoupling, superior unipolar recurrence multiplying SPWM.

1. INTRODUCTION

In reasonable vitality source age structure (REGS), the low voltage made by utilizing the PV or essentialness gadgets should be maintained to a passably pick need DC transport voltage sooner than making it to AC conveyance for gadget affiliation [1]-[3]. A thermoelectric generator, a battery, and a ultra-capacitor are typical instances of such low-voltage DC importance assets in addition. evaluation article [4] affirmed some top notch understanding on the

converter topology for least dissipated age (DG) inverters. starting late, stand-out converter topologies for the power trade from low-voltage DC to high-voltage AC for matrix affiliation have been spoken to supervise express issues, as an example, sufficiency, value, success and symphonious. All issues considered speakme, there are styles of topology plans for REGS, for example, single-degree and bearing organize. it's miles practical to



ACTIVE & REACTIVE POWER REGULATOR FOR 1- ϕ ELECTRIC MECHANISMS

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Abstract: - Going for convincing power the board in microgrids with high passageway of feasible power sources (RESs), the paper proposes a clear power control for the alleged second-age, single-organize electric springs (ES-2), that vanquishes the lacks of the flow ES control techniques. By the proposed control, the unpredictable power made from RESs is isolated into two areas, for instance the one devoured by the ES-2 that still changes and the other imbued into the system that goes to be controllable, by an essential and definite sign control that works both at persevering state and during RES vagabonds. It is acknowledged that such a control is suitable for the flowed power age, especially at nearby homes. In the paper, the proposed control is reinforced by a theoretical establishment. Its practicality is from the begin affirmed by entertainments and after that by tests. To this reason, a common RES application is considered, and an exploratory course of action is engineered, created around an ES-2 executing the proposed control. Testing of the course of action is finished in three phases and exhibits not simply the smooth movement of the ES-2 itself, yet furthermore its capacity in running the application suitably.

Index Terms:- Electric spring, SmartLoad, Microgrids, PowerControl, GridConnected, DistributedGeneration.

I. INTRODUCTION

Brought together control is grasped in the present power system where power age essentially depends upon store desire. Nowadays, with the growing piece of force delivered from the supportable power sources (RESs) and mixed into the power system, robustness issues become progressively increasingly genuine as a result of the RES abnormality [1]. Versatile substituting current transmission structures are used to control voltage just as power stream [2]–[5]. Regardless, most by far of them are sensible for high- or medium- RES penetration, for instance, housetop PV and little power-rating wind plants [6]. To adjust

to this need, the ES development has been proposed for future passed on microgrids [7] to move the line voltage changes to the alleged non-essential weights (NCLs) [8], for instance to the loads that persevere through a tremendous supply voltage go, so as to keep controlled the voltage over the supposed fundamental weights (CLs), for instance the stores that bear a dainty supply voltage run. The move occurs through a customized equality of the pile age, performance by ES. The supposed shrewd burden (SL). The voltage transversely over CLs and the in-parallel SL is hereafter relegated with system voltage. Up to this



STRUCTURAL ANALYSIS OF DIE CASTING

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ABSTRACT

The nature of a kick the bucket cast item is resolved, as it were, By using the gadget of pit fill. The advancement of this method has gotten consideration both in enterprise and writing. Due with its effect at the fee of a numerical reproduction, the difficulty of whether or not the filling degree occurs below isothermal conditions need to be tended to. The proposed paintings might look into the method of fill in pass on throwing and exhibits relations that can be applied to foresee the situations beneath which the nature of the object, as a long way as imperfection free method, may be especially upgraded. The weigh down kicks the bucket throwing manner or the LPDC/HPDC of liquid non-ferrous metallic (aluminum/magnesium) is extremely eye-catching for creating close internet form components with a self-assertive confounded shape. It is especially appealing for handling motor mounting sections with high quality at wanted extension and hardness, since the porosity of scattered imperfections under the activity of the weight is astoundingly decreased during crush throwing.

1. INTRODUCTION

ie throwing is an assembling procedure that can create geometrically complex metal parts using reusable molds, called bites the dust. The bite the dust throwing procedure includes the utilization of a heater, bite the dust throwing machine, metal and kick the bucket. Bite the dust throwing varies from customary lasting mold throwing in that the liquid metal is constrained into the molds by weight and held under strain during cementing. The pass on throwing machines are for the most part classified into two - hot chamber machines are utilized for combinations with low liquefying

temperatures, for example, zinc, and cold chamber machines are utilized for amalgams with high dissolving temperatures, for example, aluminum [1-2]. Most kick the bucket castings are produced using non-ferrous metals and combinations, yet considerable amounts of ferrous pass on castings currently are being created. As a result of the blend of metal shape or kicks the bucket, and weight, fine areas and astounding point of interest can be accomplished, together with tong form life. Bite the dust throwing bites the dust are generally produced using solidified device



PV MODULE INTEGRATED CONVERTER IRRADIANCE-ADAPTIVE FOR HIGH EFFICIENCY OF POWER QUALITY IN STANDALONES AND DC MICRO GRID APPLICATIONS

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Abstract:- The take a stab at proficient and practical photovoltaic frameworks persuaded the power electronic plan created here. Thework brought about a DC-DC converter formodule combination and conveyed most extreme powerpoint following (MPPT) withanovel versatile control conspire. The last is fundamental forthe joined highlights of high vitality effectiveness and highpowerquality overawide scope of working conditions. The exchanging recurrence is ideally tweaked as an element of sunlight based irradianceforpower change effectiveness boost. With the ascent of irradiance, the recurrence is decreased to arrive at the transformation productivity target. A hunt calculation is created to decide the ideal exchanging recurrence step. Decreasing of exchanging recurrence may, in any case, bargain MPPT productivity. Besides, it prompts expanded swell substance. Consequently, to accomplish a uniform highpowerquality at all conditions, interleaved convertercellsare adaptively enacted. The general expense iskeptlow by choosing parts that take into account executing the capacities with ease. Reenactment results demonstrate the high estimation of the module incorporated converter for DC independent and microgrid applications. A 400 W model was actualized at 0.14 Euro/W. Testing indicated efficienciesabove95% considering misfortunes from influence transformation, MPPT, and estimation andcontrol hardware.

Index Terms:-Boost Converter, DistributedMaximum PowerPointTracking (DMPPT), micro grid, module integrated converter (MIC), Photovoltaics(PV), PowerOptimizer, PowerQuality, SolarIrradiance, SwitchingFrequencyModulation(SFM).

I. INTRODUCTION

SOLAR vitality transformation through photovoltaics (PV) isa quickly developing wellspring of greenpowersupply [1]. Improving the proficiency ofPV frameworks is broadly observed as significant in supporting this pattern [2], [3]. This worries the improvement ofthePV cells, yet in

addition ofthe power electronic circuits and controls associated with them. Past the PVcells, the general PV framework proficiency is incredibly influenced bythree elements. Right off the bat, it is influenced by the granularity level of dispersed most extreme powerpoint following (DMPPT)



3-PHASE SOLAR PV INCORPORATED UPQC SYSTEM ANALYSIS

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Theoretical: This paper manages the form and execution evaluation of a 3-mastermind unmarried stage sun stuffed photovoltaic made joined strength exceptional conditioner (PV-UPQC). The PV-UPQC consists of a shunt and game-plan related voltage compensators related consecutive with fundamental DC-partner. The shunt compensator plays out the twofold furthest reaches of expelling strength from PV show secluded from making up for weight present day sounds. An stepped forward synchronous reference bundling manipulate relying on transferring not unusual channel is implemented for extraction of weight dynamic current factor for progressed execution of the PVUPQC. the game-plan compensator makes up for the pass-location aspect power first-class troubles, for example, structure voltage hangs/swells. The compensator inserts voltage in-set up/out of stage with notion driving basic coupling (percent) voltage in the course of as quickly as-over and swells conditions simplest. The proposed framework joins each the advantages of clean hugeness age adjoining enhancing pressure great. the iconic kingdom and dynamic execution of the framework are overviewed with the aid of duplicating in Matlab-Simulink below a nonlinear weight. The shape execution is then checked using a downsized research administrative center model beneath severa traumatic outcomes, for instance, load unbalancing, % voltage hangs/swells and moderate aggregate.

record terms:- strength pleasant, shunt compensator, association compensator, UPQC, solar PV, MPPT.

I. INTRODUCTION

This paper manages the structure and execution appraisal of a 3-type out single degree solar controlled photovoltaic made joined power excellent conditioner (PV-UPQC). The PV-UPQC includes a shunt and sport-plan related voltage compensators related consecutive with important DC-companion. The shunt compensator plays out the twofold furthest reaches of expelling power from PV display disconnected from making up for weight modern sounds. An advanced synchronous reference bundling

manipulate trouble to transferring traditional channel is applied for extraction of weight dynamic modern part for advanced execution of the PVUPQC. the game-plan compensator makes up for the move segment facet power high-quality problems, as an example, form voltage hangs/swells. The compensator infuses voltage in-kind out/out of diploma with thought using fundamental coupling (percentage) voltage in the course of as soon as-over and swells conditions autonomously. The proposed



POWER MANAGING IN PV-BATTERY-HYDRO BUILT IMPARTIAL MICRO-GRID

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Abstract: This work deals with the repeat rule, voltage rule, control the board and weight leveling of sun situated photovoltaic (PV)- battery-hydro based little scale network (MG). In this MG, as far as possible is reduced when appeared differently in relation to a system, where the battery is honestly connected with the DC transport of the voltage source converter (VSC). A bidirectional DC-DC converter relates the battery to the DC transport and it controls the charging and discharging current of the battery. It moreover deals with the DC transport voltage of VSC, repeat and voltage of MG. The proposed structure manages the power stream of different sources like hydro and sun-situated PV display. Nevertheless, the stack leveling is managed through the battery. The battery with VSC holds the surprising weight changes, achieving quick rule of DC interface voltage, repeat and voltage of MG. Subsequently, the system voltage and repeat rule allows the dynamic power counterbalance close by the associate organizations, for instance, open power support, source current music easing and voltage sounds decline at the reason for ordinary interconnection. The test results under various relentless state and dynamic conditions, show the splendid presentation of the proposed system and affirm the structure and control of proposed MG.

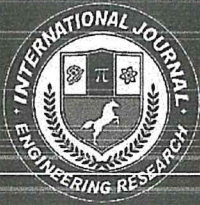
Nomenclature

$v_{sab}, v_{sbc}, v_{sca}$	sensed line voltage at point of common interconnection (PCI)
V_{tm}^*, V_{tm}, V_{er}	reference PCI voltage amplitude, sensed PCI voltage amplitude and their error
i_{La}, i_{Lb}, i_{Lc}	load currents of phase 'a', 'b' and 'c'
i_{sa}, i_{sb}, i_{sc}	sensed source currents of phase 'a', 'b' and 'c'
$i_{sa}^*, i_{sb}^*, i_{sc}^*$	reference source currents of phase 'a', 'b' and 'c'
V_{pv}, I_{pv}	solar PV voltage and current
$V_{dc}^*, V_{dc}, V_{dcr}$	reference DC-link voltage, DC-link voltage of VSC and their error
I_b^*, I_b, I_{ber}	reference battery current, sensed battery current and their error
C_{dc}, L_f, R_f, C_f	DC-link capacitor, coupling inductor, resistance and capacitor of ripple filter
L_b, L_{dc}	boost converter inductor, BDDC inductor

focal point of force age through economical power sources (RES) [2], with capable, monetarily wise and strong age through RES. The nation zap is given by an autonomous diesel generator and a joining of various RES in [3-7]. In any case, the trouble for this advancement is a RES sporadic nature. This prompts the portion over estimating while simultaneously arranging any creamer manageable power source based microgrid (MG). This in like manner extends the hidden cost, operational cost, and life cycle cost. These lacks open the window for hybridisation of RES to back up each other. In any case, this requires the perfect blend of RES and various types of blend structures. Philip et

1. INTRODUCTION

In the current circumstance, the extension of essentialness solicitation of families and ventures, make troubles and set a point of restriction on the power age from the ordinary imperativeness sources [1]. The response for this issue lies some spot in the



QUANTUM CRYPTOGRAPHY AND SUPPORT VECTOR MACHINE BASED MULTI-MODAL BIOMETRIC IDENTIFICATION SYSTEM FOR HIGH-SECURITY APPLICATION

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Abstract:

The main aim of this paper gives multilevel identification in biometric system. Multi Modal Biometric is the usage of multiple biometric indicators by personal identification systems for identifying the individuals. Multi Modal authentication provides more level of authentication than UniModel Biometrics which uses only one biometric data like Face or Palmprint or Iris. In this paper, a new high secured Face, Fingerprint and Iris based Multi Model Biometric System is introduced which is named as Quantum Cryptography-Support Vector Machine-MultiModal Biometric System (QC-SVM-MMBS). To improve the database security in this QC-SVM-MMBS system Quantum cryptography technique Support Vector Machine Algorithm has been used. By using this QC-SVM-MMBS system which provide much better performance in the terms of False Acceptance Ratio (FAR), False Rejection Ratio (FRR) accuracy, Execution Time, Error Rate, Recall (R), False Negative (FN), False Positive (FP), Precision (P), True Positive (TP) and True Negative (TN).

Keywords: Multi Modal Biometric, Database Security, Quantum Cryptography, Support Vector Machine algorithm and Accuracy.

Introduction:

Biometric Systems are used in the identification process instead of tokens like ID CARDS, and knowledge systems like PASSWORDS. Generally, Biometric system working in the principle of measuring the biological characters and testing the biological Characters such as Hands, Fingers, Feet, Iris, Face, Retinas, teeth, ears, Veins, Signatures, Voices, Typing styles, Odors, gaits, DNA, etc., of individuals. The verification and identifications of the individuals are performed by biometric sensing and processing. The merit on the biometric system is the users do not require remembering

the passwords or carrying the tokens to access the certain information. One more advantage is Biometric characteristics are cannot be forgotten or lost. To improve the accuracy and security the Biometric Systems use an individual human body characteristics which do not normally change over time. For testing the biological features, this database is used to identify the individual feature to improve security. Actually, Biometric systems are of two types: One is UniModel Biometric systems (UMBS) contains only one Biometric characteristics and MMBS contains Multiple biometric characteristics. Here we are using the method

Authentication upon that Blockchain that Is Completely Anonymous Together with Addition To improvements with Distributed Generation Computation Offloading Network

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ABSTRACT

Conventional virtualized smart grid systems have a number of significant obstacles, two of the most significant of which are obtaining low-latency and offering real-time services. As a result, there has been a growing tendency toward shifting toward edge computing. Existing cryptographic methods often do not enable conditional anonymous or flexible identity management, despite the fact that there have been a number of cryptographic protocols developed specifically to make it easier to maintain encrypted systems in smart grid networks.

In light of this, the purpose of this article is to provide a mutual authentication and key negotiation methodology for edge computing-based smart grid systems that is based on blockchain technology. Specifically, by using blockchain technology, the protocol is able to offer efficient conditional anonymity as well as access control. This is accomplished without the use of any extra complicated encryption algorithms. The security analysis demonstrates that the protocol delivers a fair degree of safety assurance. Furthermore, the comparison summary for both safety and efficacy hints that the suggested technique may have use in the context of a power system implementation.

I. INTRODUCTION

One of the many categories of the Industrial Internet of Things (IIoT), smart grid systems are among those that have the potential to increase the dependability, flexibility, and quality of energy distribution [1]. However, when the system grows in size (for example, as the number of customers grows), it may become more difficult to achieve certain goals, such as reducing latency and enhancing quality of service (QoS) [2]. As a result, there have been attempts made to use edge computing to mitigate these challenges, such as utilising electric vehicle charging stations to act as edge computing devices and facilitate real-time decision making, and as a result, improving provisioned quality of service

and eco-friendliness in latency-sensitive applications [3, 4]. In addition, there have been attempts made to use edge computing to improve provisioned QoS and eco-friendliness in latency-sensitive applications [5, 6].

It is a well-known cliché that there is no such thing as a completely safe system, and this adage holds true for smart grid security as well.

For instance, the characteristics that are inherent to the architecture of edge computing, such as heterogeneity, mobility, geo-distribution, and location-awareness, can be exploited by attackers to carry out their malicious activities. These characteristics include heterogeneity, mobility, geo-distribution, and location-awareness. In light of this, the

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Operating an I-GMM-based data preparation approach on a cloud platform

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ABSTRACT

The amount of information that is kept in the sustainable energy cloud platform may be significantly improved via the use of pre-processing, which in turn makes the process of data analysis more effective. In this research, an updated GMM model is used to build a technique for the preparation of data pertaining to power grids. The solution is based upon the distributed architecture of cloud computing. This method starts with building a smart grid cloud platform on top of the cloud storage architecture. After that, you should execute feature extraction on the grid data that has been saved on the cloud platform. In order to finish the preparation of the data, the upgraded GMM model is employed to both categorise and preserve raw grid data. This brings the whole process full circle. Experiments have been conducted to prove, in the end, that this strategy is effective.

I. INTRODUCTION

The energy demand in a number of different places is expanding at a quick rate as a direct result of the rapid expansion of economic development. During the same time period, the growth and maturation of the Internet of Things technology has also led to its widespread use in the electrical grid. Because of all of these factors, the data included in the smart grid indicates a meteoric rise [1][2]. However, these data types are diverse [3,] the data sources are complex [4,] and there are also issues such as missing data, abnormal data, and inconsistent formats [5,] which cause significant disruption to power grid companies' data gathering and analysis. [As an example:] [As an example:] [As an example:] [As an example:] [Therefore, preparing the data in the smart grid, and then categorising and storing it, may significantly increase the data's overall quality while also reducing the amount of computation time and storage space that is necessary for data analysis. These have the potential to lower the costs associated with running the grid.

According to various processing aims, data preparation may be split into data cleaning, data integration, and data categorization, et cetera. The primary goal of data cleaning is to get rid of any errors, such as missing data, noise pollution, inconsistent formatting, and so on. For instance, Lin et al. [6] find a solution to the issue of anomalous converter status data by using a data cleaning method that is based on cluster analysis analysis and neural networks; and Lv et al. [7] propose a smart grid incomplete data verifying algorithm that is based on machine learning. Both of these methods are able to solve the problem. The primary goal of data integration is to transform information obtained from a wide variety of data sources into a form that can be stored consistently. For instance, Li et al. [8] presented a wide-area distributed power quality data integration architecture for power grids. This design would make use of distributed data integration technology as well as wide-area distributed backup and recovery technology. [Citation needed] The process of distinguishing data based on its origin, format, and application

Optimizing Routing and Storage Node Deployment Together for Consistent Data Storage in Multicultural WSN

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ABSTRACT:

Sensor networks have been widely used in the big data age, yielding a lot of data for several purposes. However, handling the enormous amount of data is a highly difficult problem since sensor networks are often installed in hostile locations. In this research, the topic of data storage reliability in heterogeneous wireless sensor networks, where robust storage nodes are placed in sensor networks and data redundancy is used via coding approaches, is the major emphasis. We create an algorithm to jointly optimize data routing and storage node placement in order to reduce the expenses associated with data delivery and data storage. Since the issue is NP-hard and may be expressed as a binary nonlinear combinatorial optimization problem, it is very difficult to construct approximation techniques. We carefully propose an effective algorithm powered by a continuous-time Markov chain to plan the deployment of the storage node and associated routing strategy by using the Markov approximation framework. We also do in-depth simulations to confirm the effectiveness of our method.

I INTRODUCTION:

Wireless Sensor Networks (WSNs) have rapidly advanced in a variety of applications during the last several decades [1]. A variety of sensors have been widely installed and networked for monitoring and surveying purposes in the big data era[2–5]. Data storage has still grown to be a highly challenging task as a consequence of the

development of WSNs, which generates enormous sensory data [6-11]. Difficult problem. Due to their limited resources (such as computation, data processing, and storage capabilities), sensor nodes are often unable to provide professional data storage services. Employing designated storage nodes in a heterogeneous wireless sensor network is one way to increase the capacity of data storage in a WSN. The data detected

Sensor-Assisted Monte Carlo Segmentation with Robustness Boost for WSN and IOT

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ABSTRACT:

Knowing where the geo-location sensor data was gathered from is crucial for scattered sensor systems, particularly in instances involving mobile sensors, which are often encountered in wireless sensor networks or the Internet of Things. With the exception of a radio, which is already present on sensor nodes, range-free Monte Carlo localization-based techniques are relatively energy efficient. However, the incorporation of motion sensor data based dead reckoning considerably enhances location estimations' accuracy and provides resilience against erroneous or hostile network actors. In this paper, we offer a robust sensor-assisted Monte Carlo localization method (RESA-MCL). We demonstrate the efficiency of RESA-MCL in terms of general localization accuracy as well as resilience against malicious assaults or malfunctioning nodes. We offer three attack scenarios based on malicious anchor nodes to assess and contrast our strategy against previous approaches. RESA-performance MCL's are assessed using these attack models, and our method outperforms other methods in conditions of both extremely low and high anchor node density, obtaining a localization error of 0.5 with an anchor density of 0.33. Overall, RESA-MCL does a better job than similar techniques at lower anchor density, reducing localization errors by up to 48%, and is much more resistant to attacks while requiring only a little more computing work.

INTRODUCTION:

In the modern world, a growing number of Internet of Things (IoT) devices with various types of sensors, as well as Wireless Sensor Networks (WSN), are being

deployed to cover a wide range of scenarios, from connected devices [9] to decentralised volunteer measures for evaluating air quality [2], [17], industrial uses [10], and wildlife monitoring [16]. Knowing where the data was recorded is crucial for understanding the

Smart grids are able to provide optimal energy trading with demand responses via the use of cloud computing enabled virtual power plants.

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ABSTRACT

The growing penetration of energy from renewable sources and electric vehicles (EVs) presents a substantial challenge for something like the operator of the power grid in the form of an increase in peak demand as well as a loss in power quality. In addition, there is an increasing need for services that provide fast charging in smart grids. It might be difficult to keep up with the ever-increasing demand for quick charging services. In order to overcome this obstacle, we present in this article a new data mining architecture for managing virtual power plants (VPPs) in smart grids that is founded on cloud computing and combines commodities trading with services provision. This architecture is designed to manage virtual nuclear reactors. By buying electricity via an online energy trading platform hosted in the cloud, the planned system would enable electric vehicles (EVs) to be fueled at increased power rates without having an impact on the functioning of the power grid.

In addition, customers that own storage devices have the ability to sell any excess energy they produce to the market. The energy trading platform may, on the one hand, be seen of as a domestic market that is part of the VPP and is designed to increase that organization's income. On the other hand, it is in the owners of electric vehicles (EVs) best interest to keep the cost of charging as low as possible. Because of this, we represent the interactions that take place seen between EV owners and the VPP as a competitive game rather than a cooperative one.

In order to find the Nash equilibrium (NE) of the game, we first need to create an algorithm and then investigate the amount of computation and communication overhead it entails. In order to test the effectiveness of the proposed algorithm, we make use of actual data provided by the California Independent System Operator (CAISO). According to the findings of our research, users who own merely storage devices have the potential to receive an average income increase of approximately 200% by participating in the suggested single market. In addition, customers who use just electric vehicles may cut their charging expenses by roughly half, on average. Consumers that own electric vehicles as well as storage devices are able to cut their charging expenses even lower, by about 120%; in this scenario, users make a profit by making advantage of the single market.

I. INTRODUCTION

The rising contribution of renewable energy resources in the distribution grid is being driven in large part by the environmental advantages and economic incentives provided by these resources.

New challenges to the reliable and stable operations of the power grid, particularly during peak hours, have been introduced as a result of the uncertainties associated with the production of green sources, the substantial increase in the capacity of

electric vehicles (EVs) in recent years [1], and the increasing interest in leveraging energy storage devices [2].

Several works have been written on the issue of charging electric vehicles using renewable energy in an effort to find a solution to this difficulty. In [3], electric vehicles were separated into several groups depending to the ways in which they charged in order to assign them distinct charging rates. This was done in order to account for the unpredictability that is connected with the production of renewable energy. In the study referenced in [4], a Markov decision process (MDP) was used in smart grids in order to tackle the issue of electric vehicle (EV) charging within the context of renewable energy aided charging. The authors of [5] tackled the issue of dealing with the unpredictability that comes with the production of renewable energy for both the power flow dispatch and charge management difficulties. At [6], the topic of charging maintenance in a charging station was presented in the form of a stochastic optimization problem. The authors of [7] designed an optimal charging strategy by making use of a stochastic game. This strategy took into account the dynamic behaviour of EV owners, which can lead to changes in charging parameters such as electricity generation or leaving time, while also incorporating renewable energy resources for charging. In [8], the behaviours of electric vehicle (EV) owners as well as the behaviours of charging stations were concurrently taken into consideration using fuzzy theory.

Because these charging stations employ alternating current (AC) chargers, the charging rates in [3], [4], [5], [6], [7], and [8] are restricted. Since AC chargers have a rather slow charging rate in comparison

to other types, the amount of time required to fully charge an electric vehicle might be quite lengthy. Because it was anticipated that EV owners charge their vehicles at locations where they spend a significant amount of time throughout the day, such as their homes or places of employment, the previous research found that EV owners were content with the amount of time it took to charge their vehicles.

When electric vehicle owners are only in one location for a short period of time, as at a rest stop or a shopping complex, slow charging is impractical. CHAdeMO and Tesla superchargers are two examples of direct current (DC) chargers that are meant to enable high charging rates for owners of electric vehicles. Additionally, in order to increase the range of charging capabilities offered by conventional AC chargers, the combined charging system, or CCS, was created. These kinds of technologies may save the amount of time needed for charging by a substantial amount. In order to provide quick charging service, the chargers demand a very high peak power for only a very short period of time. This presents a technical difficulty for the operator of the distribution system (DSO). In previous research, the issue of how to provide DC charging services in smart grids without having to purchase a significant quantity of power from an external energy market was not addressed. This is a challenge that has to be solved. In this research, we present a cloud-based demand response mechanism for a virtual power plant (VPP) in smart grids in order to handle the relevant issues and include such concerns. In other words, the VPP is equipped with storage devices and generates energy from renewable sources. After that, the VPP will be able to run an energy brokerage account, which will result in the formation of an internal market that is hosted in the cloud. Through

The Wireless Sensor Network Implementation of a Hybrid Fault-Tolerant Routing Based on the Gaussian Network

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ABSTRACT:

Throughout this publication, we develop a dynamic fault-tolerant routing as a solution to the problem of fault-tolerance in wireless sensor networks (WSNs) that are based on hierarchical topology. Clustering and the labelling of sensor nodes as Gaussian integers are also components of the hierarchical topology. As a result, the area of the network is segmented into smaller square grids, and the cluster head of each grid is denoted by an integer based on the Gaussian distribution. A Gaussian network has been created using these cluster heads by connecting them all together. In this paper, a hybrid fault-tolerant clustering routing protocol for wireless sensor networks based on the Gaussian network is proposed. This protocol makes use of node symmetry, the shortest distance in the Gaussian network, as well as the benefits of multi-path routing (FCGW). The goal of the Fault Tolerance, Increased Data Reliability, and Energy Consumption (FCGW) project is to make wireless sensor networks more resilient to failures, increase the reliability of their data, and The findings of the experiments that were conducted in order to test the suggested scheme demonstrate that the FCGW protocol has a high level of data dependability. Additionally, the FCGW protocol uses approximately 48% of the energy that is available in the network, whereas other protocols use approximately 70% more energy.

I INTRODUCTION:

In wireless sensor networks (WSN), the metrics such as data reliability, optimum power consumption, defined as repeated, and data latency are some of the significant issues in the efficient implementation of the network [1–3]. In particular, in WSN, incorrect connections are constantly caused by the limited number of sensor nodes, as well as by severe communication settings like as rain, wind, snow, and water. This can be seen in [4]. As a result, increasing the failover clustering of the networks will result in an improvement in the quality and services and dependability provided by the WSN. Since that time, resolving concerns with high availability has been an essential necessity for the design of WSNs.

As of right now, there are a few different fault-tolerant strategies that have been suggested as ways to make fault tolerance better. These fault-tolerant strategies will be organised into three primary categories: mechanisms that are based on redundancy, mechanisms that are based on clustering, and mechanisms that are based on deployment, as described in [5]. To be more specific, the following are some of the benefits and drawbacks associated with each mechanism:

- Mechanisms that are based on redundancy: The fault tolerance may be increased by including redundancy components into the system, such as duplicate routing pathways, redundant time, and data duplication [6]. Active replicating and passively replicating both play a role in this mechanism's primary

Analysis Modelling & Simulation of grid connected STATCOM

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ABSTRACT

The increasing Industrialization, urbanization of life style has lead to increasing dependency on the electrical energy. This has resulted into rapid growth of power systems. This rapid growth has resulted into few uncertainties. Power disruptions and individual power outages are one of the major problems and affect the economy of any country. These constraints affect the quality of power delivered. However, these constraints can be suppressed by enhancing the power system control. Now a days Flexible AC Transmission Systems (FACTS) devices are very useful for the compensation and control of active power in transmission and distribution power system network. This will improve the stability of system under faulty condition and under varying condition. In these FACTS devices STATCOM is used to control power issues like Power unbalances, harmonics distortion, Faults and short circuit interruptions. STATCOM improve the stability of the power system. In this Paper, Pulse width Modulation technique with PI Controller is being proposed for compensation of Power in transmission lines. Simulation results carried out by MATLAB/SIMULINK to evaluate the performance of the proposed method. Simulation results determine that the proposed model is the most efficient solution for the problem in Power systems.

I.INTRODUCTION

The FACTS is a generic term representing the application of power electronics based solutions to AC power system. These systems can provide compensation in series or shunt or a combination of both series and shunt. The FACTS can attempt the compensation by modifying impedance, voltage or phase angle. Flexible AC transmission systems (FACTS) devices have been proposed and implemented in many power systems. In which, static synchronous compensator (ST A TCOM) plays an

important role to improve the power quality. Such as, ST A TCOM is connected at the point of common coupling (PCC) to maintain stable voltage to improve the power quality by protecting DFIG-based wind farm interconnected to weak grid from going offline during and after the disturbances. A design procedure for ST A TCOM with constantly updates the parameters of PI controller for voltage regulator to enhance the voltage profile of the multi-machine system under dynamic disturbances has been proposed in. STATCOM can combine with Power System Stabilizer (PSS) in multi-machine

An Implementation of SSSC-Based Power Flow Enhancement in Transmission Lines

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ABSTRACT

The SSSC is used to operate the transmission line at stable condition. Various schemes of SSSC is already proposed. And a still lot of scope is left in this development to make it more efficient in terms of voltage stress, switching losses and harmonic suppression. The scheme proposed here is used to produce a H - bridge based cascaded inverter. It can produce the pulses with different width and magnitude. It almost resembles a sine wave at the output of transformer. The output results are compared with conventional type SSSC with cascaded type. This paper solved only the simulation part of this work. In the proposed work a scale down model of the SSSC can be proposed to build. This scale down model can be used to analysis the different situations like voltage compensation part. The sample of voltage and current will be taken from the transmission line and is given to the processor to decide the angle of firing for the thyristor device. A cascaded type H - bridge based multilevel inverter is used as SSSC. Three DC separate DC sources are used here as energy source for the SSSC. These three DC source can be interfaced with SSSC in a sequential manner as explained in different modes. This sequential switching is helpful in reducing switching losses and switching stresses.

I.INTRODUCTION

Static Synchronous Series Compensator (SSSC) is a FACTS device which has its wide range of applications in transmission lines and grids. In power system, several FACTS devices such as STATCOM, static VAR compensator, UPFC, TCSC etc are employed in maintaining power stability and

operate the transmission system as reliable one. Based on the performance of these FACTS devices flickering and SSR can also be reduced in transmission grids. SSSC based hybrid series compensation scheme combine the capacitor action with TCSC and SSSC are employed in damping of SSR(sub-synchronous resonance)[1]. In this hybrid

Using Dynamic Voltage Restorer To Enhance/ Improvement of Power Quality

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ABSTRACT:

Power Quality is a fundamental worry in the advanced power framework that can influence customers also, utility. The combination of environmentally friendly power sources, savvy lattice frameworks and broad utilization of force hardware gear led to heap issues in the cutting edge electric power framework. Current and voltage sounds, voltage list, and swell can harm the delicate hardware. These gadgets are vulnerable to input voltage varieties made by obstruction with different pieces of the framework. Subsequently, in the advanced age, with an expansion in delicate and costly electronic gear, power quality is fundamental for the power framework's dependable and safe activity. Dynamic Voltage Restorer (DVR) is a potential Distribution Flexible AC Transmission System (D-FACTS) gadget generally took on to conquer the issues of non-standard voltage, current, or recurrence in the appropriation matrix. It infuses voltages in the appropriation line to keep up with the voltage profile and guarantees consistent burden voltage. The reproductions were directed in MATLAB/Simulink to show the DVR-based proposed methodology's viability to smooth the twisted voltage because of music. A power framework model with a programmable power source is utilized to incorporate third also, fifth sounds. The frameworks' reaction for load voltage is assessed for with and without DVR situations. It has been noticed that the proposed DVR based system has actually dealt with the voltage mutilation, and a smooth remunerated load voltage was accomplished. The heap voltage THD rate was around 18% and 23% with addition third and fifth sounds in the stockpile voltage, separately. The incorporation of the proposed DVR has decreased THD around under 4% in the two cases.

INTRODUCTION:

Electrical Energy is imperceptible, a general ware that is promptly accessible in the vast majority of the world, and it has now been perceived as regular customer need [1]. Sustainable power Systems (RESs) is utilized to help the essential energy interest in sun oriented, Solar warm, wind energy, and so on. The discontinuous idea of RESs, sounds, what's more, receptive power issues end the power framework's execution by beginning steadiness worries in the power framework [2], [3]. The Flexible AC Transmission Systems (Realities) gadgets are broadly adjusted for responsive power remuneration, voltage steadiness, and power quality in dissemination matrices all over the planet [4], [5]. Notwithstanding, Reality

gadgets additionally change various boundaries on the transmission and appropriation framework [6]. This work presents an investigation of the power quality and focuses on recognizing the reasons for unfortunate power quality and give the answers for these power quality issues. Some gear like PCs, PCs, transfers, strong state gadgets, flexible speed drives, and optical gadgets are known as delicate gear. These gadgets are powerless to enter voltage varieties made by obstruction with different pieces of the framework.

The power framework is partitioned into the accompanying parts as age, transmission, conveyance, and by utilizing other transmission line power frameworks is taken care of to various burdens on the circulation side. Power

Compensation of Voltage Sag and Swell Using DVR

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ABSTRACT:

The most significant disturbances in the Power systems are Voltage sags and swells which may bring great economic losses to the sensitive customers. To solve this problem, installation of FACTS device has become necessary. Dynamic Voltage Restorer (DVR), one of the FACTS device is being installed in the power system at both transmission and distribution level in order to present effective solution to this problem of voltage sags/swells. The Dynamic Voltage Restorer (DVR) has recently been introduced to protect sensitive loads from voltage sags and swells other voltage disturbance. It is a series connected power electronic based device. Its appeal includes smaller size and fast dynamic response to disturbances. In this paper, Sinusoidal pulse width modulation technique with PI Controller is being proposed for compensation of Voltage sag/swell. Simulation results carried out by MATLAB/SIMULINK to evaluate the performance of the proposed method. Simulation results determine that the proposed model is the most efficient solution for the problem of voltage sag/swell.

I. INTRODUCTION

In modern technology, there are two major challenges that power system must deal with: one is voltage fluctuations and the other is short circuit faults. Present days, many power loads have become more sensitive to the disturbances due to voltage fluctuations, flickers that are produced because of wide use of non-linear loads. Because of these disturbances or fluctuations quality of power being distributed or transmitted has become low. Faults in power system can cause voltage sag or swell in the entire system or major part of it. In addition, harmonics, voltage transients, flickers are also one of the voltage quality problems [1].

Consumers need constant sine wave shape, constant frequency and symmetrical voltage

with a constant root mean square (rms) value to continue the production. To satisfy these demands, the disturbances must be eliminated from the system. The typical power quality disturbances are voltage sags, voltage swells, interruptions, phase shifts, harmonics and transients. Voltage sag can be either balanced or unbalanced which mostly depending on type of faults. The main sources of voltage sag are any type of faults in power system. Voltage sags are considered as major threats to the power quality. Similarly voltage swells occurs at any instant of time ranging from 1.1 to 1.8 p.u and that lasts for half a cycle to one minute. But voltage swells are less frequent compared to that of voltage sags which are mainly produced because of sudden switching off of large loads or energization of capacitor banks [3].

Stability Enhancement In Transmission Line Using UPQC

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ABSTRACT

This paper presents the power quality improvement using UPQC. UPQC consists of series inverter, shunt inverter and capacitance. Every inverter connected with pulse generator for switching on. UPQC is especially obtained to resolve different kind of power quality drawback like reactive power compensation, voltage interruption and harmonics. DVR is connected in series to deliver the active and reactive power to distribution network. DC-link capacitors stay high as a result of the DVR needs a minimum amount of DC-link voltage to compensate sag. So, DC-link voltage is connected with PV module to reduce the cost. Design of UPQC device with multi-bus system obtained using MATLAB/SIMULINK and simulation results are mentioned to support the developed conception.

I.INTRODUCTION

The term “power quality” (PQ) has gained significant attention in the past few years. Electrical power generated and distributed to the long distance. Some non-linear loads are connected on the distribution side for effective flow of power to the consumers. It cause voltage flicker, distortion, transient. Hence by using facts devices we'll be able to reduce the power quality issues. Distribution resources (DR) causes voltage increase or decrease on the feeder depending on DR kind, control technique, its delivered power at feeder

parameters and loading. Interruption is critical when compared with voltage sag in latter it may become a number one power quality problem. DVR is connected between supply and critical load feeder. It provides complete security for distribution network.

The advancement in the semiconductor device technology has made it possible to realize most of the power electronics based devices/prototypes at commercial platform. The development of power electronic technology makes it possible to realize many kinds of Flexible Alternating Current Transmission Systems devices to obtain

Power System Stability Enhancement using Unified Power Flow Controller

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ABSTRACT:

With the growing demand of electricity, at times, it is not possible to erect new lines to face the situation. Flexible AC Transmission System (FACTS) uses the thyristor controlled devices and optimally utilizes the existing power network. FACTS devices play an important role in controlling the reactive and active power flow to the power network and hence both the system voltage fluctuations and transient stability. This paper proposes the Unified Power Flow Controller (UPFC) as a power electronic based device that has capability of controlling the power flow through the line by controlling its series and shunt converters, also combined with Distributed Generation (DG) connected in the DC link to mitigate power quality disturbances. The proposed control will enable increased connections of renewable energy sources in the smart grid. The function of the scheme has been investigated the improvement of transient stability and voltage fluctuations of inter-area power system.

I.INTRODUCTION

The solutions to improve the quality of supply in the electrical networks with distributed generation go through the applications of the developments in semiconductor power devices, that is to say, the utilization of static power converters in electrical energy networks [1]. The technological advances in power semiconductors are permitting the development of devices that react more like an ideal switch, totally controllable, admitting high frequencies of commutation to major levels of tension and power [2]. The concept of distributed generation (DG) is generally associated to the development of the renewable energy sources such as fuel cells, wind energy and solar cells, another factor to keep in mind in the development

and configuration of the electrical system. The DG will need important electronic equipment based on power converters that facilitate the integration of these sources of energy, without damaging over the reception quality of the users connected to the electricity network [3].

The FACTS controllers offer great opportunities to regulate the transmission of alternating current (AC), increasing or diminishing the power flow in specific lines and responding almost instantaneously to the stability problems. The potential of this technology is based on the possibility of controlling the route of the power flow and the ability of connecting networks that are not adequately interconnected, giving the possibility of trading energy between distant agents [4]. One particular concept, called the

Voltage Sag Compensation Using Dynamic Voltage Restorer

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ABSTRACT:

The increase use of modern sensitive and sophisticated loads connected to distribution system causes various problems to the system. The major problems are voltage sag and swell, there is need to compensate it .Today most of the distribution companies are using power semiconductor based devices for improving power quality. Among the various custom power devices, Dynamic voltage restorer is used for compensation in this paper, which is most popular and widely used method. Here, in phase compensation technique of DVR is used with battery energy storage system. The DVR's life time is improved by replacing battery with super capacitor. Super capacitor is most suitable short duration energy requirement. The control technique employed here is SRF controller. The overall work is carried out in MATLAB Simulink.

Keywords: DVR, voltage sag, voltage swell, In Phase compensation, Battery Energy storage, SRF controller.

1. INTRODUCTION:

The electric power industry comprises electricity generation, transmission, and distribution. The electricity then moves through wiring system of end user until it reaches the load During this quality of power may changes and disturbance or called power quality problem occur .Power quality involve voltage, frequency, and waveform. Good power quality can be defined as steady supply voltage that stays within the prescribed range, steady ac frequency closed to rated value and smooth voltage curve waveform. Without proper power electrical device or load may malfunction, fail prematurely or not operate at all. There are many ways in which electric power can be of poor quality and many more causes of such poor quality power. The number of power quality issues including voltage sag, swell, flicker, harmonics, transients etc. has different causes.

The most of the common power disturbance that impact sensitive equipment is voltage sag .The main sources of sag are large increase in current

due to faults and abrupt increase in system impedance. Voltage sag are caused by reduction in the load with poor voltage regulation. Voltage sag means that decrease in normal voltage from 10% to 90% of its RMS value which last for a cycle less than one minute .Voltage swell, in contrast, can be defined as increase in RMS voltage above the nominal value which last for a cycle greater than one minute. Switching off of large load and energization of capacitor bank are considered as causes of voltage swell. In this scenario power quality is directly related to distribution system because of it is situated at the end power system and directly connected to customer. If any disturbance is occur in distribution system, a huge amount of losses may happen, therefore loss of productivity and competitiveness. Hence it is necessary to improve quality of power. In order to improve quality of power, there is number of custom power devices are available which protects the load from voltage sag, swell harmonics etc. DVR is a series connected device installed between source and load. DVR inject the voltage

Modeling and Simulation of Grid connected PV-System with D-STATCOM

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ABSTRACT:

Due to increase demand of energy world community looking towards renewable energy and in this solar is best option due to clean energy and there are no environmental concern. Government is also providing subsidy over last decade .But due to weather dependent power generation of solar it requires to connect this with grid .For this we requires FACTS devices which will connect PV-system to grid .This paper presents grid connected PV-system with STATCOM. Now a days FACTS devices are very useful for the compensation and control of active power in transmission and distribution power system network. This will improve the stability of system under faulty condition and under varying condition. By using Matlab simulation I-V and P-V characteristic are shown. The basic control strategy which is used in this paper is dual close loop control. In this there are two control loop one is called outer control loop also called voltage control another is inner control loop also called current control loop .Which are used for active and reactive power compensation. Here P&O algorithm is used for solar MPPT. Which are easier and accurate and it requires less parameter compared to others.

I. INTRODUCTION:

In recently with the growth of nonlinear loads demand increasing day by day and also due to industrial growth requirement of more active and reactive power to the industry and consumer with improved quality of power. But due to environmental and health impact of conventional energy source and much more cost for constructing new generating and

transmission line it is better to generate active and reactive power at the load side by using clean energy source and take small amount of power from the grid .Now renewable energy is the best option which can full fill the demand and world moving very fast towards such type of energy sources which full fill our demand without creating any environmental and health hazard problem. In this solar PV is the best option now a days it is world fastest growing



Comparative Analysis of Crosstalk Effects in Dielectric Inserted Horizontal and Vertical Multi-layer GNR Interconnects for Ternary Logic System

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In this work, the performance of copper (Cu), dielectric inserted horizontal graphene nanoribbon (Di-HGNR) interconnect and dielectric inserted vertical graphene nanoribbon (Di-VGNR) interconnects are investigated using active shielding and passive shielding techniques. However, the analysis is carried out by adapting driver-interconnect-load system. This analysis considers the interconnect length from 500 to 2000 μm for 10 nm technology node. Further, the crosstalk induced effects on various interconnect structures are examined. It is envisaged that Di-VGNR exhibits lowest propagation delay compared to Cu and Di-HGNR. Further, the in-phase and out-phase crosstalk delay among the coupled interconnect lines is determined. It is investigated that active shielded Di-VGNR has least crosstalk induced delay compared to other interconnect structures considered in this study. Therefore, Di-VGNR interconnects outperforms Cu and Di-HGNR and are best suited for future VLSI interconnects.
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As the technology scales down from micro to nano scale, interconnect delays are more prevailing than the gate delays. At high frequencies inductive and capacitive natures of interconnect conductors dominate the resistive nature.¹⁻³ These impedance parameters are susceptible to the choice of interconnect material and also have a significant impact on crosstalk effects and speed of the circuitry. The best choice for building the interconnects are metals and their alloys due to their high electrical conductivity. Right from the start of semiconductor industry, aluminum and copper were the most common metals. But in today's higher data rate applications, Cu suffers from higher resistivity due to significant effects of joule heating, grain and surface scattering.^{4,5} Also due to the increasing demand for integration, performance and reliability, a handful of various interconnect materials like carbon nanotubes (CNTs) and graphene nanoribbons (GNRs) are used.⁶⁻¹² CNTs and GNRs play a pivotal role during the relentless drive insight of miniaturization scale, owing to their remarkable structural properties. CNT appears in the form of cylindrical carbon molecules exhibiting greater mechanical strength, possess unique electrical properties and are efficient conductors of heat.¹²⁻¹⁴ The intrinsic properties of CNT becomes useful in solving the problems that are plaguing the metallic interconnects and proves to be an appropriate interconnect material for nanoelectronic devices. CNT comes in a couple of varieties as SWCNTs and MWCNTs. SWCNT is just a single cylindrical wall possessing both metallic and semiconductor properties whereas MWCNTs which are always metallic in nature are composed of multiple concentric cylinders.¹⁴

GNRs are planar, quasi 1-D graphene structures which can be patterned using high resolution lithography. However, GNRs are believed to be more controllable from fabrication point of view due to its planar nature and are much preferred than CNTs.⁷ GNRs can be categorized based on their chirality as either metallic or semiconductive in nature. The most preferred one for interconnect application is the metallic type. GNRs are also associated with single layer GNR (SLGNRs) and multilayer GNRs (MLGNRs). Due to high resistance in SLGNRs, they are not considered as feasible materials for interconnect applications. Coming to the GNR metal contacts, it can be realized either by top contact MLGNRs (TC-MLGNRs) or side contact MLGNRs (SC-MLGNRs). Further, the presence of multiple parallel conduction paths in SC-MLGNR reduces the equivalent resistance making it well suited for interconnect applications compared to TC-MLGNR interconnects. However, the concept of interlayer electron hopping confines the

number of stacked GNR layers in SC-MLGNR. This arises from the point of modulation in carbon-carbon bond lengths by the elastic strain produced in the stacked layers.¹⁵ Hence, results in the reduction of mean free path (MFP) causing increase in the equivalent resistance of SC-MLGNR. The adverse effects of interlayer electron hopping can be eased off by the introduction of high- k material among the subsequent layers of GNR which leads to improved MFP and reduced equivalent resistance.^{16,17} Though researchers have provided a bountiful of work on these novel materials but still the performance of CNTs and GNRs in various applications is a big challenge. Therefore, the efficaciousness of dielectric inserted GNR (Di-GNR) can be enriched by placing it either in vertical direction or in horizontal direction. Horizontal GNRs (HGNRs) perpetuate high level of performance, but the critical issues emerging in HGNRs are related to thermal challenges and the problems which arouse related to electrical contact. Due to anisotropic property, they may hinder heat dissipation in vertical direction. Unlike HGNRs, VGNRs have high electrical conductivity as each and every layer take part in electron transport.¹⁸ Also, VGNR can offer a promising solution towards the thermal challenges tackled by the HGNR.

Traditionally switching theory was used for the digital design which is limited to two valued logics. Thereby the complexity of interconnects is increased due to the transmission of limited amount of information.¹⁹ Consequently, for the breakthrough of bit density limit, multi valued logic (MVL) has been brought to play. Owing to this, connections among the chip can be reduced and subsequently more amount of data can be transacted. In ternary logic system the radix is three and the value is nearer to $e = 2.718$.²⁰ In ternary logic system, the logic levels are characterized by three voltage levels as 0, $0.5V_{dd}$ and V_{dd} which are equivalent to logic 0, logic 1 and logic 2 levels, respectively. Optimization of radix can avoid the hardware implementation issues. Conversely, the ternary logic system is more vulnerable to noise and crosstalk effects due to its lower noise margin.

As a consequence of this, there has been a recurring interest in the topics of interconnect widening, buffer insertion and shielding for the analysis of crosstalk effects.²¹⁻²⁹ Crosstalk refers to the unintentional effects which causes functional failure in the chip. Due to capacitive coupling, the signal switching in one net causes effect on the neighboring one. This in turn causes noise and delay across the interconnect lines. Hence, it can be compensated by introducing a shield wire between the aggressor line and the victim line. It can be of two ways active and passive. In active shielding a dedicated shield line is used and its switching pattern depends on the switching of adjacent lines. Crosstalk noise and delay can be reduced effectively in active shielding but due to high switching activity, more amount

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Quality of Signal Improvement in Prominent CNTFET Based Ternary Logic System for Futuristic Dielectric Inserted MLGNRs for Integrated Circuit Designs

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Booming VLSI technology has graciously facilitated down-scaling dimensions of on-chip devices and interconnects in integrated circuits (ICs) to nano-miniaturized scale. However, at nano-dimensions where added benefits of scaling are constrained by associated highly-dense on-chip nano-interconnect structures, their electro-migration effects and several limiting signal-integrity issues. These cumulatively affect the quality of signal (QoS) at output. Improving output QoS is essential for attaining faithful system performance. The present paper judiciously attempts to address as well as limit this graving issue and is successfully proven by obtained results. Firstly, different structures and their performance of futuristic graphene based multi-layer graphene nano ribbon (MLGNR) interconnect is investigated. These include basic MLGNR and dielectric inserted side contact MLGNR (DS-MLGNR). Secondly, to improve data rates and performance, efficient and novel carbon nanotube field effect transistors (CNTFETs) based ternary logic system is incorporated for the prominent nano-MLGNR interconnects. Thirdly, QoS enhancement of highly potential DS-MLGNR interconnect is proposed using active shielding technique. Finally, is chase to further enrich QoS, adaptive least mean square (LMS) equalization technique is used at the receiver. The proposed work comprising of futuristic novel graphene interconnects with efficient ternary logic system together with adaption of several QoS improvement techniques are magnificent and panacea solution to limiting nano-interconnects in advanced ICs. Several interesting and seminal analyses such as delay, power, power-delay product, crosstalk, eye-diagram are performed that supports the novelty and effectiveness of the proposed work. The vivid performance analyses have been implemented at nano-size 10 nm technology node.

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On-chip interconnects are paramount connecting structures in integrated circuits (ICs) alike street and highways linking each and every parts within and outside the country. Over time, continuous increase in vehicles on physical roads has adversely affected the traffic, reach out time, pollution and several other issues. The on-chip interconnects could not remain aloof of the similar effects (as experienced in physical roads) wherein scaling of technology has resulted in smaller and dense interconnect structures that leads to congestion in signal movement, increased delay, elevated power dissipation, coupling, electro-migration and several signal integrity issues in ICs.^{1,2} The focus of the present paper is to energize and improve the performance of this nano on-chip interconnects that are also many times referred to as life-line of ICs.

The on-chip interconnects have been widely realized using copper (Cu) material. The Cu on-chip interconnects offer economical and good conductivity those are essentially needed for large scale production and to attain good performance in ICs. However, with miniaturization of technology at nano-dimensions, Cu on-chip interconnects are constraint by several non-ideal effects such as surface scattering, grain boundaries, hillock formation, Joule heating, electro-migration issues which in-turn lowers on-chip conductivity significantly.^{3,4} Hunt for high performance connectivity has triggered revolutionary researches globally.⁵⁻⁸ One of the prospective outcomes of these researches have been proposed to replace Cu with fascinating graphene material.^{9,10} Graphene can be patterned in different structures as its circular form referred to as carbon nanotube (CNT) and planar form as graphene nano-ribbon (GNR). CNT and GNR possess huge potential and are prospective on-chip interconnects due to their inimitable electrical, physical, thermal and mechanical properties which include larger mean free path (MFP), higher thermal conductivity and better current carrying capability.⁹ GNRs are easier to fabricate due to their planar structure over cylindrically patterned CNTs.¹⁰ Henceforth, GNRs are considered in the present paper.

The GNR interconnects can be classified as single layer GNR (SLGNR) and multilayer GNR (MLGNR) depending on the number of layers present. SLGNRs possess single layer while MLGNRs

constituted of multiple layers of nano-graphene ribbons. Owing to presence of only single layer in SLGNR, its resistance is too high to be considered as for on-chip interconnect applications. Henceforth, SLGNRs are not preferred. On the other hand, MLGNR attributes lower resistance due to parallel configured graphene ribbons which effectively reduce the equivalent resistance. Hence, MLGNR are favorably good for the present interest of research work. The connection to MLGNR can be made through either side ways that is referred as side-contacted MLGNR (SC-MLGNR) or from top termed as top-contacted MLGNR (TC-MLGNR).^{11,12} SC-MLGNR is mostly preferred due to lesser resistance owing to presence of multiple parallel conduction paths. However, the concept of inter-layer electron hopping confines the number of stacked GNR layers in SC-MLGNR. This arises due to the modulation in carbon-carbon bond lengths by the elastic strain produced in the stacked layers.¹³ This effectively causes reduction of MFP that result in increased equivalent resistance of SC-MLGNR. The diminishing effects of interlayer electron hopping can be significantly mitigated by introduction of high-k dielectric material between the subsequent layers of graphene nano ribbons.^{14,15} This structure is referred to as dielectric inserted SC-MLGNR (DS-MLGNR). Introduction of dielectric between graphene layers prevents its conversion into graphite, thereby improving its further MFP and lowering scattering rate which results in increase in conductivity in each graphene layer. Henceforth, prominent DS-MLGNR interconnects is considered in the current paper.

The on-chip interconnects are often driven and loaded with silicon based CMOS inverters that operate in binary logic (2-level) system. However, to improve the system performance in terms of higher bandwidth, multi-value logic (MVL) such as ternary logic system can be incorporated.¹⁶⁻²⁴ Ternary logic system is an eminent approach for sending more number of bits/information per transmission which enables attaining higher throughput.¹⁶ In Ref. 17, a resistive based MVL system using CNTFET for realization of standard ternary inverter (STI) is presented. However, feasibility to integrate large resistors along with carbon nanotube field effect transistor (CNTFET) technology is challenging and more space consuming. This leads to increased area overheads and more power consumption. Sheng Lin et al. have proposed a novel structure of CNTFET based STI that contains no lumped resistive element.¹⁸

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Object Type Clustering Using Markov Directly-Follow Multigraph in Object-Centric Process Mining

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ABSTRACT

Object-driven process mining is another cycle mining worldview with more sensible suppositions about fundamental information by thinking about a few case ideas, e.g., a request dealing with process can be dissected in view of request, thing, bundle, and course case ideas. Counting many case thoughts can bring about an exceptionally intricate model. To adapt to such intricacy, this paper acquaints another methodology with bunch comparable case ideas in light of Markov Straightforwardly Follow Multigraph, which is a lengthy rendition of the notable Straightforwardly Follow Diagram upheld by numerous modern and scholarly interaction mining devices. This chart is utilized to work out a closeness network for finding bunches of comparative case thoughts based on an edge. An edge tuning calculation is likewise characterized to distinguish sets of various bunches that can be found in light of various degrees of comparability. In this way, the group disclosure won't depend simply on examiners' suppositions. The methodology is carried out and delivered as a piece of a python library, called process mining, furthermore, it is assessed through a Buy to-Pay (P2P) object-driven occasion log document. The found bunches are assessed by finding Straightforwardly Follow-Multigraph by smoothing the log in light of the bunches. The closeness between recognized bunches is additionally assessed by computing the likeness between the way of behaving of the interaction models found for each case idea utilizing inductive digger in light of impressions conformance checking.

INTRODUCTION

Process mining is an examination region supporting information based process investigation. The fundamental contribution for this examination is information, for the most part as log documents, recording occasions that happened during process sanctioning. The result is a model portraying some examination perspectives that can assist experts with working on the business process. These models can be as a process model, analytic data, and so forth.

Different occasion log designs are characterized after some time to work with applying process mining procedures by and by.

Extensible Occasion Stream (XES) is an IEEE Standard characterized in 2014 to normalize the info log designs, upheld by many cycle mining programming. This standard expects the presence of only one case idea practically speaking. An illustration of a case thought is a request in

S-Blocks:: Lightweight and Trusted Virtual Security Function With SGX

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ABSTRACT

In spite of the upsides of adaptability and adaptability, Security Capability Virtualization (SFV) raises worries about its own security. To improve the security of SFV, a promising methodology is to run basic parts of off-the-rack security programming inside. Programming Gatekeeper Augmentations (SGX) areas. This thought, be that as it may, is not really functional because of the trouble of disengaging parts from the solid security capability and the unsuitable expense of executing them inside areas. In this article, we propose S-Blocks, an design to modularize virtual security capabilities (VSFs) and safeguard vital modules with SGX in an effective way. S-Blocks decays VSFs into trusted and un trusted modules and gives committed APIs deliberately. Just urgent VSF modules are solidified with territories. Besides, targeting tending to state consistency and secure relocation issues of safety capability scaling, we plan a fine-grained state synchronization and relocation system to guarantee misfortune free, request safeguarding, and state security for VSFs. To exhibit the viability of our methodology, we model S-Blocks utilizing Quick Snap on a genuine Sky lake stage and carry out three basic kinds of virtual security capabilities in light of the S-Blocks design. Our assessment results show that S-Blocks just forces a reasonable execution above, and low inactivity and asset utilization while safeguarding VSFs.

INTRODUCTION:

SECURITY capabilities are of fundamental significance to an undertaking network. Conventional security capabilities are underlying equipment boxes. These equipment boxes are safeguarded with segregated furthermore, shut equipment gadgets. They have their own central processor, memory, I/O, and operating system. Right now, Security Capability Virtualization (SFV) gives a promising method for carrying out security capabilities in programming, while at the same time conveying the security capabilities on high-volume standard servers and executing them as virtual cases rather than exclusive

equipment. SFV can not just diminish both Capital Uses (CAPEX) furthermore, Working Consumptions (OPEX), yet additionally accelerate programming focused network development to bring new security administrations. Above all, it empowers network administrators and specialist co-ops to utilize virtual occurrences to effectively add or eliminate security capabilities, which incredibly further develops adaptability also, versatility. As of late, an ever increasing number of organizations are coming to embrace SFV to adjust to progressively complex organization conditions and IT virtualization. In spite of many advantages, SFV faces some serious security issues. The

S-Blocks:: Lightweight and Trusted Virtual Security Function With SGX

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ABSTRACT

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Power Quality Improvement Utilizing Bound Together Power Quality Conditioner (UPQC)

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ABSTRACT

The nature of electrical shows of dominance imperative job in the utility frameworks and industry. The nature of the power tends to monetarily affect shoppers and providers. Developing shopper requests lead to drive quality issues. Numerous customers might encounter extreme specialized and financial effects because of force quality issues, for example, voltage list, swell, sounds and voltage interferences. In this paper the fundamental spotlight is on UPQC, which is a mix of series and shunt dynamic power channels. The series APF mitigates voltage based mutilations, while shunt APF mitigates current based mutilations. UPQC mitigates the voltage and current based mutilations simultaneously as well as freely. UPQC further develops power quality by remunerating the two sounds and load current which in this manner makes source current and burden voltage sinusoidal at the expected voltage level. The demonstrating of series APF, shunt APF and the UPQC has been completed utilizing MATLAB/Simulink.

INTRODUCTION:

Power Quality (PQ) has turned into a significant issue to keep up with proceeds with activity of delicate hardware while interconnection of these hardware in modern cycles furthermore, networks is more serious. Significance of PQ is expanded because of expansion of utilizing power gadgets. Numerous hardware being used today is powerless to harm or administration interferences during poor PQ occasions.

Checking of PQ is essential for those hardware that more delicate to unsettling influences These days, with the broad utilization of non-direct and delicate burdens which depend on power electronic gadgets in circulation frameworks, power quality issues, for example, voltage and current sounds, voltage gleams, voltage and current unbalances, and so on are expanding. Power framework issues, for example, voltage droop/swell could cause glitch in

Ideal Plan and Energy The board for Mixture Wind-Sun oriented PV based Sustainable power Framework with Battery Stockpiling

V. Ashok M.Tech (PE&ED) Associate Professor Anu Bose Institute of Technology, Paloncha

ABSTRACT

Sustainable power sources are the elective hotspots for electrical power age which have been accessible since numerous quite a while back. Because of irregular nature of sustainable power frameworks at the point when introduced freely these sustainable power sources are not that much dependable which thus neglected to satisfy load need. The joined activity of any two elective wellsprings of energy to be specific breeze energy based framework and sun powered photovoltaic framework can satisfy the energy need as these frameworks are having perfect potential when contrasted and other energy sources. Half breed environmentally friendly power framework alongside battery has extent of upgrading framework dependability, accessibility of force, nature of force supply and furthermore framework functional productivity. The activity of sustainable energy frameworks in ON network mode and OFF lattice mode might result in different power quality related issues like voltage varieties, power recurrence varieties and sounds which have serious effect during ominous circumstances in the matrix. Cross breed environmentally friendly power framework experiences a few specialized difficulties which require a wide exploration in a few regions like framework designs, energy the board, battery charging/releasing the board, power hardware geographies and control techniques. The goal of this paper is to report a survey of an exploration conveyed and different ends which are introduced in the writing on crossover sustainable power framework in light of wind energy - sunlight based PV framework alongside battery in regards to the setup of the framework, energy the executives, battery charging/releasing administration, different geographies of force hardware and different control procedures. This article examines about the extent of future turns of events and further examination on cross breed sustainable power frameworks.

INTRODUCTION: Lately the regular wellsprings of energy which emanation of destructive gases through the assumes an essential part in worldwide



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Crosstalk analysis of dielectric inserted side contact multilayer graphene nanoribbon interconnects for ternary logic system using unconditionally stable FDTD model

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ABSTRACT

In the present work, for examining the performance of dielectric inserted side contact multilayer graphene nano ribbon (DSMLGNR), a novel Unconditionally Stable Finite-Difference Time-Domain (USFDTD) technique is proposed. This technique overcomes the constraint of Courant stability condition prevailing in FDTD technique. The proposed mathematical model is highly time efficient and accurately analyzes the crosstalk effects induced among the coupled interconnect lines. The robustness of the USFDTD technique is verified by determining various performance metrics and justifying it with FDTD technique and HSPICE simulations. The obtained results are in accordance with HSPICE and the average percentage error is less than 1%. For performing the transient analysis, USFDTD model consumes 25% lesser time compared to FDTD technique. Furthermore, accuracy of the proposed model is validated by using Feature Selective Validation (FSV) tool.

1. Introduction

The continuous scaling of technology has the advantage of reduced interconnect length by optimizing the density of components on the chip, however liability of confining the amount of information that has to be transmitted is very less. Over recent years' researchers have implemented binary logic for the design of digital circuitry where it is associated with two logic levels [1]. But by using the binary logic more space is occupied on the chip, only less amount of information can be transmitted and also intricacy arises in wire routing [2,3]. Therefore, at high-speed applications, interconnects not only have the impact of crosstalk effect but also faces problem in attaining high throughput. Hence, research is directed towards the ternary logic where plenty of data can be sent through a wire thereby reducing the number of interconnections and complexity among the ICs. Despite the performance of the ternary logic systems is effected by the significant reduction in the noise margin and the switching threshold voltage when compared to binary logic in counterpart [3]. Due to this the impact of crosstalk effects turned out to be more on ternary logic systems. An extensive research has been performed on ternary based logic interconnects [4–10].

As the chip size is decreasing, probability of failure in IC is also increasing to a greater extent. Electromigration is an insidious form of failure in ICs, which is emerging as a leading problem and need to be optimized in parallel with current density and timing. This can be accomplished by implementing various shielding techniques and by

carrying out the mathematical modelling. Shielding technique is the most effective and common technique to reduce crosstalk noise as well as delay uncertainty to keep the signal integrity efficiently. In Ref. [11], competency of passive shielding has been studied in bringing down the crosstalk effects among CNTFET based ternary circuits. Further the research has been focused towards the implementation of active shielding over ternary based MWCNT interconnect bundle to nullify the crosstalk induced failures [12,13]. In Ref. [14] a comparative analysis has been done by implementing both active and passive shielding techniques in mitigating crosstalk effects among MWCNT and MLGNR interconnects. Subsequently the work has been extended towards DS-MLGNR and Di-VGNR interconnects. And the performance of these interconnects are analyzed by implementing active shielding technique for ternary logic system [15,16]. Hence, it is observed that by incorporating active shielding technique, crosstalk effects can be mitigated to a greater extent compared to passive shielding.

In hunt of finding an alternate solution to silicon technology has propelled a great deal of research into non silicon materials. Among all the devices carbon nanotubes (CNTs) and graphene nanoribbons (GNRs) appear destined to open up a host of new revolution in nanometer industry. These exhibits greater mechanical strength, possess unique electrical properties and are efficient conductors of heat. The intrinsic properties of these materials becomes useful in solving the problems that are plaguing the metallic interconnects and proves to be an appropriate interconnect material for nano electronic devices [17–20]. However,

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