Abstracts

PID-002

Nonlinear Adaptive Controller Design for Velocity Control of a DC Motor Driven by a DC-DC Buck Converter Using Backstepping Approach

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In this paper, a nonlinear adaptive controller is proposed to control the velocity of DC motors driven by DC-DC buck converters. The proposed controller is designed recursively based on the Lyapunov theory by considering the load torque of the DC motor is unknown. This unknown parameter is estimated through the adaptation law and the stability of the whole system is ensured based on the control Lyapunov function (CLF). Another main feature of the proposed control scheme is that it overcomes the over-parameterization problems of unknown parameter which generally emerges in some conformist adaptive methods. At last, the usefulness of the proposed control scheme is verified through the simulation results and performances of the designed controller are compared with an existing proportional integral (PI) controller. Simulations results demonstrate the superiority of the proposed control scheme over an existing PI controller in term of settling time.

PID-007

Inhomogeneous Line shape Broadening of Glass Laser and Improvement of the Line shape by Crystallization

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Glass lasers are one type of solid state laser that uses glass as gain medium where active ions (Nd 3+ ,Er 3+, Ho3+, Tm3+ etc.) are doped . Materials for laser operation must possess sharp fluorescent lines, strong absorption bands, and reasonably high quantum efficiency for the fluorescent transition of interest. These characteristics are generally shown by solids (crystals or glass) which incorporate in small amount of elements in which optical transitions can occur between states of inner, incomplete electron shells. Thus the transition metals, the rare earth (lanthanide) series, and the actinide series are of interest in this connection. For this paper Nd:glass is of interest that shows inhomogeneous broadening. For inhomogeneous broadening central frequency is shifted due to local variation of electric field and thus gain reduces as gain is inversely to line width. But in case of homogeneous broadening each atom response in an identical fashion causes line broadening .However, this broadening is much less than inhomogeneous broadening and affect gain profile less severely. On the other hand, if the glass structure can be crystallize by external parameter like temperature, pressure etc. than local field variation will be compensated and we might reachto homogeneous broadening.

PID-008

Removing EOG artifacts from EEG Signal Using Noise-Assisted Multivariate Empirical Mode Decomposition

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Electroencephalogram (EEG) has significant applications on medical diagnosis and Brain Computer Interfacing (BCI). But the mainobstacle of analyzing EEG signal is various types of noises to get actual information. Electro-oculogram (EOG) is a vital noise in EEG signal that can be produced by eye movements. De-noising EOG from EEG signal is the key issue in this research. Many research has been done on this purpose mainly Independent Component Analysis (ICA) based EOG separation with reference signal and wavelet based EOG separation. In this research, multivariate Fractional Gaussian noise channel will be used to establish a uniformly distributed reference scale and to derive the energy based threshold to detect the low frequency trends caused by EOG artifact. Avoiding these artifacts, we can get EOG free EEG hoping better results than existing methods.

PID-010

Human Identification on the Basis of Gait Analysis Using Kohonen Self-Organizing Mapping Technique

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Gait recognition is one of the most recent emerging technique of human biometric which can be used for security based purposes. In comparison with other bio-metric techniques gait analysis has some special security features. Most of the biometric techniques use sequential template based component analysis for recognition. Here we have proposed a developed technique for gait identification using the feature Gait Energy Image (GEI). It is implemented using Kohonen Self-Organizing Mapping (KSOM) neural network. GEI representation of gait contains all information of each image in one complete gait cycle and requires less storage and low processing speed. As only one image is enough to store the necessary information in GEI feature, recognition process is a bit easier than any other feature of gait recognition. Gait recognition has some limitations like viewing angle variation, walking speed, clothes, carrying load etc. Robust View Transformation Model (RVTM) is used to solve the problem of viewing angle. RVTM t ansforms the viewing angle data from various angle to specific angle. RVTM enhances recognition performance. Our proposed method compares the recognition performance with template based feature extraction which needs to process each frame in the cycle. We use GEI which gives all possible information about all the frames in one cycle and results in better performance than other feature of gait analysis.

PID-014

Wireless Security in Selection Decode-and-Forward Relay Networks

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In this paper, a confidential communication scenario is considered through selection decode-and-forward cooperative relay networks over Rayleigh fading channel in which a source communicates with a destination via multiple relays. A best relay is selected using selection combining technique which com- municates with the destination. An eavesdropper observes their communication and tries to decode confidential information. In this situation, an interest is given to ensure secure communication between the best relay and the destination so that eavesdropper is unable to decode any information from the main channel (i.e. channel between relay and destination). The performance of the proposed model is analyzed based on the closed-form analytical expressions of the ergodic secrecy capacity and the secure outage probability taking into account the distances of relays from the source, destination and the eavesdropper. Analytical results show that the additional diversity provided by the best relay situated in a strategic location significantly improves the secure outage performance of the selection decode-and-forward relay networks.

PID-015

A Frequency Converter Control Strategy of DFIG Based Wind Turbine to Meet Grid Code Requirements

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Fixed speed wind turbine generator systems suffer from various problems specially in transient conditions. So, in recent years the use of doubly fed induction generators (DFIGs) has increased significantly. DFIGs are sensitive to external faults. However, no attempts have been made to investigate the impact of increasing the carrier frequency of frequency converter/inverter for variable speed wind generators during voltage dip conditions. In this paper a suitable control strategy is developed for frequency converter/inverter to improve the low voltage ride through (LVRT) capability of DFIG based wind turbines. Simulation results indicate that the proposed topology improve the LVRT capability under grid codes. PSCAD/EMTDC software has been
used for simulations under real wind speed data.

PID-018

A Solution for the Conventional Wind Farms by Using Semi-Converter Based PMSG with a Higher Capacity

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The performance of induction generator (IG) based wind farms is not satisfactory these days. The existing IG based farms create a huge problem especially in case of expanding the capacity of the wind farm. This paper introduces a new solution for the problem. It suggests that the introduction of permanent magnet synchronous generator (PMSG) with IG, not only expands the capacity of the wind farm, but also it produces a stable output. A practical case considering Synchronous Generator (SG) in combination with a wind farm having both IG and PMSG has been used. The proposed PMSG has been equipped with the full-rated power converters. The results prove the effectiveness of the proposed model. Simulations have been done by using the engineering software PSCAD/EMTDC. Real wind speed data have been considered for this study.

PID-019

Enhancing Multicast Capacity Using Opportunistic Relaying

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An opportunistic relaying strategy is introduced in this paper to enhance the performance of multicasting. The key feature of this work is to provide an additional diversity to the multicast users selecting best relay from a group of multiple relays. It is assumed that there is no direct path between the source and the destinations and communication occurs only through the relays. The best relay is selected employing selection combining technique and the performance of multicast channels is analyzed in terms of the multicast capacity and the outage probability. In order to clarify the insight of numerical results, all the expressions are derived in analytical form and the validity of derived expressions are justified via Monte-Carlo simulation.

PID-021

Guiding Properties of a Hybrid Core Porous Fiber (HCPF) for Terahertz Wave Propagation

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This paper presents the guiding properties of a porous core photonic crystal fiber for Terahertz (THz) wave propagation. The reported porous core fiber has a hybrid (triangular + circular) air hole arrangement at the core region with hexagonal cladding. Simulation results show a low EML of 0.425 dB/cm at 0.7 THz frequency with negligible (< 10-2 dB/cm) confinement and bending losses for the proposed porous fiber. Numerical results also show a 0.46 THz band of near zero flat dispersion at 0.9±0.05 ps/THz/cm. Changes in the guiding properties for tuning the design parameters of the core region of the hybrid core porous fiber (HCPF) are reported elaborately in this paper.

PID-022

An Investigation of SAR inside Human Heart for Antenna Directivity, Surface Current Variations and Effect on Antenna Frequency in Presence of Heart

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In this work, the impact of human heart on an 800 MHz inset fed rectangular microstrip patch antenna characteristics were investigatedusing CST Microwave Studio. The antenna was simulated over a mimic human heart muscle and the distance between them was varied to analyze the changes in Specific Absorption Rate (SAR) upon antenna performance parameters (specifically, directivity & surface current) for discreet and waveguide port feeding. The results exhibited that the center frequency of the antenna was shifted to lower value and an increase in SAR values when the antenna was closer to heart for both the feeding techniques. However, the discrete port had more values of SAR than the waveguide port but for both cases SAR decreased with the increment of antenna distance from heart. SAR values for up to 4 mm distance in between the antenna and human heart did not satisfy IEEE and ICNIRP standards. For increasing surface current, the SAR values decreases due to less penetration of flux inside the tissue for both feeding techniques. Increasing directivity resulted decrement of SAR values due to the fact that more reflection of the wave from the tissue happened for more directivity. This work demonstrates how mobile phone antennas of GSM band affect human heart and how human heart affects antenna resonance frequency when mobile phones are kept in chest pocket.

PID-024

Sensitivity Enhancement of Porous Silicon Based SPR Sensor Using Graphene-M_oS_2 Hybrid Structure

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In this paper a theoretical porous silicon surface based plasmon resonance (SPR) sensor has been presented consisting graphene-Melybdenum sulphide (M_oS_2) hybrid structure for enhancing sensor detection sensitivity. The biosensor uses perfectly matched layer (PML) boundary condition incorporating on its computational domain to improve its surface plasmon resonance characteristics. Here, graphene- M_oS_2 hybrid sheet is used to detect the refractive index change of the sensor surface, which is cause of the reaction of biomolecules. Our calculations show that the graphene-M_oS_2 hybrid structure on silicon porous sensor has 25% more sensitivity than the conventional silicon resonant sensor. The enhanced sensitivity is for increasing SPR angle about 25% by adding graphene-M_oS_2 hybrid structure.

PID-025

Low Voltage Ride Through Capability Enhancement of DFIG-Based Wind Turbine by a New Topology of Fault Current Limiter

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Due to rapid depletion of fossil fuel and environment concern, clean and non-polluting energy i.e. renewable energy is highly needed. Among the various renewable resources, wind energy is one of the most important and promising sources. In the recent year doubly fed induction generator (DFIG) is one of the most widely used in wind farms. But the transient stability of DFIGbecomes very much sensitive and challenging concern. Three phase line-to-ground fault (3LG) is one of the worst cases of DFIG. During fault at grid side, DFIG is much affected because its stator windings are directly connected to grid. So it is important to analyse the transient stability of DFIG during fault according to fulfil the grid code requirement. To improve the transient stability and fault ride through capability of DFIG a new topology of fault current limiter (FCL) is proposed in this paper. The proposed FCL is not only limit the fault current but also faster voltage recovery. Thus improve the transient stability and fulfil the grid code requirements. For simulation analysis, PSCAD/EMTDC software is used. To determine the advantageousness of proposed FCL, its performance is compared with the conventional series dynamic resistor (SDR). Simulation results show that the proposed FCL enhances the transient stability of DFIG and better performance than SDR

PID-027

Improved Two-Vector Direct Power Control Algorithm-Based Three-Phase Pulse Width Modulation Rectifier

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Direct power control (DPC) has received a significant amount of research attention because of its benefits such as simplicity, robustness and excellent dynamic response. Conventional switching-table-based single-vector DPC (SV-DPC) presents irregular power ripples and variable switching frequency, due to the use of predefined switching table and hysteresis comparators. To solve these problems, two-vector DPC (TV-DPC) and three-vector DPC (THV-DPC) based threephase pulse width modulation (PWM) rectifier are proposed. Although the performance of the THV-DPC is better than that of TV-DPC, its algorithm implementation is very complex and time consuming. In this paper, two-three combined vector DPC (TTCV-DPC) algorithm is presented which combines two and three voltage vectors by the help of the new switching table. The proposed algorithm has less complexity than the THV-DPC and better performance than the TV-DPC. Comprehensive simulations demonstrate the proposed method can get lower power ripple and lower grid-side current total harmonic distortion (THD) than that of TV-DPC.

PID-028

Human Iris as a Biometric for Identity Verification

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The use of human biometrics for automatic identity verification has become widespread. Mostly used human biometrics are face, fingerprint, iris, gait, retina, voice, hand geometry etc. Among them iris is an externally visible, yet protected organ whose unique epigenetic pattern remains stable throughout one's whole life. These characteristics make it very attractive to use as a biometric for identifying individuals. This paper presents a detailed study of iris recognition technique. It encompasses an analysis of the reliability and the accuracy of iris as a biometric of person identification. The main phases of iris recognition are segmentation, normalization, feature encoding and matching. In this work automatic segmentation is performed using circular Hough transform method. Daugman's rubber sheet model is used in normalization process. Four level phase quantization based 1D Log-Gabor filters are used to encode the unique features of iris into binary template. And finally the Hamming distance is considered to examine the affinity of two templates in matching stage. We have experimented a better recognition result for CASIA-iris-v4 database.

PID-033

Stock Market Prediction Using an Improved Training Algorithm of Neural Network

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Predicting closing stock price accurately is an challenging task. Computer aided systems have been proved to be helpful tool for stock prediction such as Artificial Neural Network(ANN), Adaptive Neuro Fuzzy Inference System (ANFIS) etc. Latest research works prove that Adaptive Neuro Fuzzy Inference System shows better results than Neural Network for stock prediction. In this paper, an improved Levenberg Marquardt(LM) training algorithm of artificial neural network has been proposed. Improved Levenberg Marquardt algorithm of neural network can predict the possible day-end closing stock price with less memory and time needed, provided previous historical stock market data of Dhaka Stock Exchange such as opening price, highest price, lowest price, total share traded. Morever, improved LM algorithm can predict day-end stock price with 53% less error than ANFIS and traditional LM algorithm. It also requires 30% less time, 54% less memory than traditional LM and 47% less time, 59% less memory than ANFIS.

PID-034

Designing a Double Sourced Converter

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This paper proposes a double sourced converter which performs both rectifier (ac to dc) and chopper (dc to dc) actions in a single circuit instead of two separate converters. Switching signals for two different modes are simulated by designing a controller to get the desired output from the proposed converter. In both modes of operation the output is dc. All necessary simulations are performed in PSIM.

PID-035

Stability Improvement of Simultaneous AC-DC Power Transmission System

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This paper presents the concept of simultaneous ac dc power transmission system withnewly designed self adaptive VDCOL control procedure. Long actransmission lines cannot be loaded to their thermal limits due to instability occurs in the power system. It is difficult to load long ac lines to their thermal limits as a sufficient margin is kept against transient instability. With the model proposed in this thesis, it will be possible to load these lines close to their thermal limits. The transmission lines and the conductors are allowed to carry usual ac along with dc superimposed on it. This thesis with newly designed self adaptive VDCOL controller gives us the feasibility of composite ac-dc power transmission line to get the advantages of parallel ac-dc transmission in order to transient stability and dynamic stability and dampen out oscillations. Simulation has been carried out during 1-phase and 3-phase fault in MATLAB software package (Simulink) to prove systemstability enhancement.

PID-037

Minimization of Output Fluctuations of Wind Farm Integrated Hybrid Power System Using New Pitch Controller

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In this paper a central supervisory control system based on wind speed data is proposed for calculating reference power for the blade pitch angle of each wind turbine. Low Pass Filter (LPF) technique is used to generate proposed blade control system of wind farm. The wind farm consists of 5 induction generators (IG) and is connected to a multi machine power system composed of 4 synchronous generators (SG) and a load. An extra LPF is used for calculating reference power for IG4 and IG5. Simulations have been done by PSCAD/EMTDC program by using real wind speed data. Simulation results clearly indicate that proposed blade control system can maintain frequency with less energy losses.

PID-038

Optical Character Recognition using Back Propagation Neural Network

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This paper represents an Artificial Neural Network based approach for the recognition ofEnglish characters using feed forward neural network. Noise has been considered as one of the major issue that degrades the performance of character recognition system. Our feed forward network has one input, one hidden and one output layer. The entire recognition system is divided into two sections such as training and recognition section. Both sections include image acquisition, preprocessing and feature extraction. Training and recognition section also include training of the classifier and simulation of the classifier respectively. Preprocessing involves digitization, noise removal, binarization, line segmentation and character extraction. After character extraction, the extracted character matrix is normalized into 12x8 matrix. Then features are extracted from the normalized image matrix which is fed to the network. The network consists of 96 input neurons and 62 output neurons. We train our network by proposed training algorithm in a supervised manner and establish the network. Eventually, we have tested our trained network with more than 10 samples per character and gives 99% accuracy for numeric digits (0~9), 97% accuracy for capital letters (A~Z), 96% accuracy for small letters (a~z) and 93% accuracy for alphanumeric characters by considering inter-class similarity measurement.

PID-041

Smoothening of Wind Farm Output FluctuationsUsing New Pitch Controller

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Recently, renewable energy sources, like wind power generation, are widely being used in the world. Among various renewable resources, wind energy seems to be promising solution to provide reliable power supply with improved system efficiency. It is essential for wind farm to control the frequency as well as power. Some methods for smoothing the wind generator output fluctuations using several types of energy storage systems have been proposed, but these methods have a cost of problem. This paper proposes a new pitch control system for smoothing the wind generator output fluctuations. The simulation results show that the wind farm output fluctuations due to the wind speed variations can be smooth more effectively by the new pitch controller than the conventional pitch controller. It is confirmed that the wind farm output gives rise to fluctuations of system frequency more as the power capacity of wind farm becomes large. The wind farm output fluctuations, as well as energy and the power system frequency can be made more accurate by using new pitch controller. PSCAD software has been used for
simulation analyses.

PID-046

A New Machine Learning Approach to Select Adaptive IMFs of EMD

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An adaptive algorithm for selection of Intrinsic Mode Functions (IMF) of Empirical Mode Decomposition (EMD) is a time demand in the field of signalprocessing. This paper presents a new model of an effective algorithm for the adaptive selection of IMFs for the EMD. Our proposed model suggests the decomposition of an input signal using EMD, and the resultant IMFs are classified into two categories the relevant noise free IMFs and the irrelevant noise dominant IMFs using a trained Support Vector Machine (SVM). The Pearson Correlation Coefficient (PCC) is used for the supervised training of SVM. Noise dominant IMFs are then de-noised using the SavitzkyGolay filter. The signal is reconstructed using both noise free and de-noised IMFs. Our proposed model makes the selection process of IMFs adaptive and it achieves high Signal to Noise Ratio (SNR) while the Percentage of RMS Difference (PRD) and Max Error values are low. Experimental result attained up to 41.79% SNR value, PRD and Max Error value reduced to 0.814% and 0.081%, respectively compared to other models.

PID-052

Double Compartment Microbial Fuel Cell Design using Salt Bridge as Membrane with Sucrose and Starch as a Substrate

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Most of the microbial fuel cell (MFC) designs need the separation of the cathode and anode cell by using proton exchange membrane (PEM). The majority used nafion or ultrex CMI-7000 as a PEM. But both of these membranes are too much costly and not too available to use. As an alternate of nafion, we use salt bridge in this study as a PEM which is pervious to other ions & substrate. Different organic materials like sucrose, glucose, starch can be used as substrate. This research paper analyses the performance of a double compartment microbial fuel cell for different substrate concentrations as well as surface area of the chambers with salt bridge as a membrane. Sucrose and starch were treated here as substrate and potassium permanganate was used as electron acceptor. Dhaka city's drain water was utilized as the container of bacteria. Better output was observed for sucrose as substrate due to higher solubility in water than starch.

PID-053

Controlling of frequency fluctuation of wind turbine generator using wind speed controlled pitch controller

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Due to the growing electricity concern, it is very much needed to use wind power for the generation of electricity. But for the random variation of wind speed, the output power of the wind generator fluctuates randomly as well as the fluctuation of the frequency occurs. As a result this decreases the energy. This paper represents a wind speed controlled pitch controller to control the wind generator output power fluctuation and also reduce the frequency fluctuations .For simulation analysis, real wind speed data is used and the simulation analysis have been performed by using PSCAD/EMTDC [1].

PID-057

Gaussian Mixture Based Semi Supervised Boosting For Imbalanced Data Classification

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Semi supervised approaches are practical in problem domain where pattern clustering is supposed to provide good classification. Gaussian Mixture Model (GMM) can approximate arbitrary probability distribution, thus is considered as a dominant tool for classification in such domains. This paper appraises the functioning for GMM as it is applied to imbalanced datasets which consists of uneven distribution of samples from all the classes. Later, an ensemble approach is presented to boost the GMMs in a semi supervised manner via Adaptive Boosting technique. Experiment on benchmark imbalanced datasets with different imbalance ratio has been carried out. Empirical result demonstrates the efficacy of the proposed BoostedGMM classifier compared to baseline approaches like K-means and GMM.

PID-060

Regenerative Braking Characteristics of PMDC Motor by Applying Different Armature Voltage

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Energy saving and prolonging mileage are very important for battery-operated electric vehicles (BEV). For saving energy in BEV's the key parts are regenerative braking performance. Permanent magnet DC (PMDC) motor based regenerative braking can be a solution to improve energy saving efficiency in BEV. In this paper a novel regenerative braking mechanism based on PMDC motor is proposed. Based on proposed method braking can be achieved by applying different armature voltage from a battery bank without using additional converter with complex switching technique , ultra capacitor, or complex winding-changeover. An experimental setup has been used to evaluate the performance of the proposed braking system. Simulated results prove that the proposed regenerative braking technique is feasible and effective. Also this research provides simplest system for regenerative braking using PMDC motor to improve the mileage of electric vehicles.

PID-061

Adaptive Controller Design for Grid Current Regulation of a CSI Based PV System

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A nonlinear adaptive controller for regulating the grid of a current source inverter (CSI) based three-phase grid- connected photovoltaic (PV) system is proposed in this paper. The proposed control structure is composed of an outer current loop which is responsible for controlling the DC-side inductor current and the inner current control loop is responsible for controlling injected current into the grid. The proposed controller is designed recursively by considering some parameters of the system parameters as unknown and these unknown parameters are estimated through the adaption laws. In order to prove the overall stability of the whole system control Lyapunov functions (CLFs) are formulated at different stages of the design process. Finally, the effectiveness of the proposed control scheme is tested on a CSI based three-phase grid- connected PV system under different atmospheric conditions. Simulation results show that the proposed control scheme can effectively meet the desired control objectives.

PID-063

Improvement of the Output Performance of CZTS Thin Film Solar Cell

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In this work, 1D simulation has been performed to improve the output performance of CZTS solar cells. Three device parameters: back metal work function, CZTS absorber layer thickness and acceptor doping concentration of the absorber layer have been varied to optimize the overall solar cell performance. It has been found that back metal work function plays the most critical role and Au and Pd gives superior performance when use d as back metal contact. Overall the best parameters for achieving high efficiency of a CZTS solar cell is reported.

PID-067

Linear Pocket Profile Based Pinch-Off Voltage Model for Nano Scale nMOSFET

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This paper focuses on developing an analytical pinch-off voltage model for the pocket implanted nano scale n- MOSFETs based on symmetric linear pocket profiles both at the source and drain sides under the gate of the device. Straight line approximated equation is used to simulate the pocket profiles along the gate length at the surface of the MOS device. The effective doping concentration is derived for the whole gate length and is incorporated in the pinch-off voltage model that is obtained from the strong inversion charge expression at the surface. Then the pinch-off voltage is simulated for various drain and gate biases as well as for various device parameters. To observe the model validity, drain current vs. drain voltage curve is plotted for various gate biases by incorporating this pinch-off voltage model. The simulation results approve that the developed pinch-off voltage model can be used to study and characterize the pocket implanted advanced ULSI devices.

PID-068

Feasibility Study of Low Voltage DC Distribution System for Residentia Buildings in Bangladesh and Hybrid Home Appliance Design for Tropical Climate

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This paper describes a process to make the residential buildings more energy efficient. Three low voltage direct current (DC) distribution system of different voltage levels are compared with the existing alternating current (AC) system in Bangladesh. Losses in the cable, internal losses of the devices, energy consumption cost, efficiency of the converters and initial cost for new wiring are the factors which have beenassessed to obtain the best system. Through the analysis it is found that 48V DC system with optimized cable area is the most economical system among the others as it saves 1,36,859.2 BDT within a life time of 20 years. Besides, a hybrid appliance is prototyped consisting of air-cooler, refrigerator and electric stove altogether for higher efficiency. The wasted heat energies from the cooling devices are stored in a thermal storage by thermoelectric modules and used later for heating purposes for the better overall efficiency.

PID-070

Energy Cooperation Among BS with Hybrid Power Supply for DPS CoMP Based Cellular Networks

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Green cellular networking has drawn intensive attention recently for cellular operators in order to reduce the network operation cost and carbon footprints. In this paper, we consider base stations (BSs) powered by hybrid power supplies including both the conventional grid and the renewable solar energy. We propose a model for energy cooperation among BSs having individual energy storages which are connected through resistive power lines for energy sharing. Furthermore, dynamic point selection (DPS) CoMP technique is applied for selecting the best serving BS for users equipment (UE). Our goal is to maximize the green energy utilization leading to higher energy efficiency. Tempo-spatial variations of both the renewable energy generation and the traffic demand are exploited for the proposed BS cooperation. Extensive simulations are carried out for evaluating energy efficiency (EE) performance of the proposed cellular network in conjunction with DPS CoMP technique and energy sharing scheme. From simulation results we investigate the benefits of energy cooperation and effectiveness of CoMP technique in this regime.

PID-071

Detecting Real Time Object Along With The Moving Direction For Visually Impaired People

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Detection of real time moving object along with the moving direction in respect with visually impaired people is a challenging research area. The recent advancement in technology for real world scene capturing and portable devices like Microsoft Kinect necessitate the need of simple, reliable and faster technique for assisting blind navigation. This paper aims to develop a suitable and effective technique for moving object detection along with its moving direction in indoor environment. Depth information of the front scene of a blind people is captured using Microsoft Kinect. Three consecutive depth frames are extracted from video taken in one second and Distance along Line Profile graph is generated for four predefined lines of each depth frame. These line profile graphs are then analyzed for detecting any presence of moving object and its moving direction. After detail investigation, experimental result shows that the proposed method can successfully detect moving object along with its direction with 92% accuracy and still objects detection accuracy rate is 87%. The overall accuracy of the proposed method is 90%.

PID-072

EEG Biometrics Based on Small Intra-individual and Large Inter-individual Difference of Extracted Features

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Biometrics refers to the process of identifying an individual from others by biological means. Most of the biometric systems are unreliable, can be imitated or even can be stolen. As a result, we need to search for a new biometrics and Electroencephalogram (EEG) based biometrics is a promising field in this aspect. By using the small intra-individual and large inter-individual difference in features with different trials, individuals can be identified with more accuracy. In this paper, a methodology for identifying an individual is proposed by determining the most effective domain and features of EEG signal. Three feed forward, back propagation multi-layer neural networks were built using the most effective features. The relative comparison shows that the network designed using the features of time domain gives the worst performance whereas the network designed using the features of both time and frequency domain gives the best performance for identifying an individual having relatively lower mean square error.

PID-073

Impact of Energy Storage Devices on Reliability of Distribution System

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Modern society expects the power supply to be continuously available on demand because of its pattern of social and working habits. Hence, reliability is a key factor in power system designing and planning. Reliability of power system can be monitored at various levels of generation, transmission and distribution. This paper examines the impact of large scale energy storage on distribution system reliability. Both distributed and lumped placement of energy storage devices have been considered to calculate its impact on feeder as well as overall system reliability. DIgSILENT Power Factory 14.1 has been used as simulation tool. Results show that with introduction of energy storage devices into distribution system, duration of outage decreases in an annum. However, the inclusion of storage devices increases the frequency of outage to some extents.

PID-074

A Comparative Study on Power Converters for PMSG Based Wind Turbine Generation System

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This paper focuses on modeling and simulation of a Permanent Magnet Synchronous Generator (PMSG) based wind turbine with three different types of inverter with the same configuration in its control section.In this research, a Two-Level, Three-Level and a Five-Level inverter has been used in three different simulation program to justify their performance under the same control system and same PMSG system. Based on their performance, corresponding graphical analysis has also been shown.This paper also deals with the both dynamic and transient stability of the system. Proper comparison between these three inverters has been included on the basis of their simulation performance. The performance of the system is verified by proper simulations with PSCAD Professional 4.2.0 and the obtained results are presented with brief graphical analysis.

PID-075

Design and Implementation of Amphibious Smart Rescue Robot

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Now-a-days robots make all tasks easier. Research is going on for developing robots for rescue and survey purposes. This paper presents a new type of rescue robot that can run on any rough surface including staircase. The robot also can float on the water and dive under the water. A new communication technology is used here which make it a unique rescue robot based on internet of things (IoT). So it can be easily controlled from anywhere at any time simply using computer or smartphone. Various sensors installed in this robot enable it to sense the environment. So, this amphibious robotic vehicle can be effectively used in rescue, survey at any hostile region and also in defense and research fields. Its flexible structure provide it to be modified and updated for expandingthe fields of application.

PID-078

Low Effective Material Loss Microstructure Fiber for THz wave Guidance

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In this paper we report a porous-core photonic crystal fiber having low material loss and nearly zero dispersion which is suitable for THz wave transmission. This proposed design exhibits a low effective material loss which is approximately 0.225 dB/cm at an operating frequency 1.0 THz and nearly zero flattened dispersion of ± 0.05 ps/THz/cm at frequency range of 0.9-1.2 THz. Moreover, other important guiding characteristics including confinement loss and power fraction of the proposed fiber is discussed. The proposed microstructure fiber has potential applications for efficient transmission of THz radiation band.

PID-080

Linear Precoding Techniques in Enhancing Security of Cognitive Radio Networks

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In this paper, the problem of security in multiple input multiple output (MIMO) system has been analysed in the presence of an eavesdropper in cognitive radio networks. Multiple primary and secondary users communicate with the primary and secondary receiver, respectively. The secrecy capacity at primary receiver (PR) and secondary receiver (SR) have been calculated. At first, we use zero-forcing (ZF) precoding at the relay which enhances the secrecy capacity of PR and SR by nullifying the impact of interference. Secondly, we use a scheme to improve the secrecy capacity of the PR and SR using the existing interference energy of the communication medium employing selective precoding (SP) at the relay. Finally, we employ phase alignment precoding (PAP) for further increase in the secrecy capacity for PR and SR by using the destructive part of interference. Our analysis shows that among the three precoding techniques, the best performance is achieved by using the PAP at the relay in terms of secrecy capacity, complementary cumulative distribution function (CCDF) and outage probability analysis.

PID-083

Terminal Voltage Regulation & Output Fluctuations Minimization Using Governor-Exciter Controller

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Energy is essential to life and the major source of energy comes from fossil fuels. As the human population increases, our rate of consumption of these fossil fuels also increases. On the other hand, world population continues to grow and the limited amount of fossil fuels begin to diminish, it may not be possible to provide the amount of energy demanded by the world by only using fossil fuels to convert energy. The solution to the problems of limited fossil fuels and their impact on the environment is to have renewable resources play a larger role in the supply of energy. In this case wind energy is the most promising green energy. As wind turbine output is proportional to the cube of wind speed, the wind turbine generator output fluctuates due to wind speed variation. Thus this paper focuses on the comparative study between conventional wind turbine models with modified pitch controller and proposed a new technique called modified pitch governor with exciter controller to control output voltage and frequency without using any costly energy storage devices. In this study variable load is considered and real wind speed data is taken to obtain realistic response. PSCAD/EMTDC software is used for simulation analyses.

PID-088

Support Vector Machine for Overcoming the Problem of Vanishing Point during Stairways Detection

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Stairways region detection from a stairways image is a challenging activity to support autonomous system and visually impaired people for navigating safely. This paper proposes a framework for investigating the problem of vanishing point during stairways candidate region verification. For that, initially stairways candidate region is detected utilizing the unique natural and geometrical features of stairways. One unique natural feature is three connected point (3CP). This 3CP is formed at every stairways step's horizontal edges end points with stairways step's width and height edge's intersection point. Another geometrical feature is stairways step's edges are exhibited in sorted order. These geometrical features are used to detect stairways candidate region from stairways images. Where, the 3CP geometrical feature of stairways is used to validate the stairways step's horizontal edge segments. After that, the validated stairways edges are justified by computing vanishing point (VP). This justification ensures that the edge segments are arrived in increasing parallel order. Finally, the y coordinate value of VP is utilized to verify the edge segments of stairways from other analogous looking objects and ensure the detection of stairways region. However, in some cases the vanishing point does not distinguish the stairways region from other stairways like objects such as zebra-crossing or rail-line. This paper investigates this problem and verified the stairways candidate region using the SVM classifier where Gabor filters are used to extract the features. Various stair images are utilized to evaluate the proposed framework and presented outcomes demonstrate the adequacy.

PID-098

Design of a Peripheral Interface Controller Based MPPT Charge Controller

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This paper presents a smart charge controller (SCC) that can extract maximum power from solar panel and could make instant decision to protect the system. In the same time the designed controller can control high voltage disconnect (HVD)- reconnect, and low voltage disconnect (LVD)-reconnect. An improved maximum power point tracking (MPPT) is achieved through a Peripheral interface controller (PIC) based Perturb and Observe (P&O) algorithm. Additionally, light emitting diode (LED) used as indicator and a display is featured to show the system status. A blue-tooth device is used to work it as a data logger to monitor system status by smart phone or Laptop. Furthermore, this SCC is developed to increase the efficiency with low cost. Experimented highest efficiency 99% is recorded within the cost of BDT 2050 taka only.

PID-099

A Comparative Performance Analysis of CdS and In_2S_3 Buffer Layer in CIGS Solar Cell

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Thin-film solar cells (TFSCs) have the potential to reach cost effective photovoltaic generated electricity. Cadmium Sulfide (CdS) and Indium Sulfide (In_2S_3) buffer layer based Copper Indium Gallium Selenide (CIGS) solar cell offers higher efficiency with low manufacturing cost. Therefore, this paper presents a comparative study between CdS and In_2S_3 buffer layer based CIGS solar cell. The numerical study has been performed using a Solar Cell Capacitance Simulator named SCAPS-1D. The performance of CIGS solar cell is observed by adjusting the buffer layer thickness of both CdS and In_2S_3. The efficiency of CdS/CIGS solar cell is found 25.56% that is higher than the efficiency of In_2S_3/CIGS (24.41%) solar cell for 50 nm buffer layer thickness. It is also found that, the increase in buffer layer thickness from the optimum level degrades the performance of CdS/CIGS solar cell as compared to In_2S_3/CIGS solar cell. Therefore, In_2S_3 based CIGS cell could be an ideal candidate as a substitute of toxic CdS buffer layer based CIGS solar cell.

PID-111

Fabrication and Characterization of Dye-Sensitized Solar Cell Using Syzygium Cumini Dye

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Dye-Sensitized solar cell (DSSC) has long been regarded as one auspicious choice for the alternative way to convert the solar energy to electric energy. In this work, DSSC has been fabricated using the natural dye extracted from Syzygium cuminifruits. Here, nanocrystalline TiO_2deposited on the fluorine doped tin-oxide (FTO) glass substrate has been used as dye absorber due to their high surface area and it shows high electron mobility, and carbon counter electrode has been used as a back electrode. The performance parameters of the solar cell have been achieved under AM 1.5 illumination. Optical and surface morphological studies of TiO_2film have been observed. The solar cell efficiency of 0.161%, short circuit current density of 0.952 mA/cm^2, open circuit voltage of 735 mV and fill factor of 0.230 have been achieved in this study

PID-112

Numerical Simulation for the High Efficiency p-n Si Solar Cell with HT-EBL and ET-HBL

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The Hole Transport-Electron Blocking Layer (HTEBL) and Electron Transport-HoleBlocking Layer (ET-HBL) are added on the front surface and back surface of the silicon wafer respectively for designing the high efficiency p-n homojunction Si solar cell in this simulation. The cell was simulated using A OneDimensional Device Simulation Program for Analysis of Microelectronic and Photonic Structures (AMPS-1D) by varying the doping density and layer thickness of the p type and n type Si layer. It has been investigated that there have a great effect of doping density and layer thickness on the efficiency of solar cell and optimum efficiency has been achieved. The maximum efficiency of 28.198% has been investigated at the doping density of 1.0e+021 cm^{-3} and layer thickness of 8000 nm.

PID-115

Synchronization of Different Frequency Power Grids by Back-to-Back Modular Multilevel Converter with CSMC-SPWM Algorithm

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This paper presents a control process and the functioning of Back-to-Back Modular Multilevel Converter (MMC) in connecting asynchronous grids of high-voltage DC transmission system. CSMC-SPWM algorithm is used to generate gate pulses of the switching devices of back-to-back MMC for running, shifting the system from higher to any other lower level of operation and connecting of two different frequencies power grids. In this research two power grids having different frequencies of 50Hz and 60Hz are connected. The simulation results shows that the MMC operates well and synchronized properly with asynchronous grids and power can transmitted in both direction. A tap changing transformer is used to step up the output voltage of the converter during reduced number of level operation.

PID-121

Novel Approach of Antenna Array with Beam Steering Technology for Microwave Power Transmission from SSPS System

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A novel approach of antenna array with beam steering technology is addressed in this paper which can transmit microwave power from Space Solar Power Satellite (SSPS) system. Array antennas are critically important component in the development of future wireless systems with applications in communications, radar and satellite technologies. The Microwave Power Transmission (MPT) technology is a key technology for SSPS system, which is being spotlighted as a technology capable of solving global environment problem as well as the energy problem. This paper presents a robust technique for MPT which is able to steer the main beam at any desired direction in the presence of array imperfections. The proposed beamforming technique is proficient to cancel the directional interferences. The simulation results show that the proposed SSPS scheme has better performance than the existing systems.

PID-122

Robust Beamforming Synthesis Technique for Low Side Lobe Level using Taylor Excited Antenna Array

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Antenna array is one of the most useable technologies in present day communication system. There are many applications like biomedical imaging, military communication and radar system where low side lobe level is an essential feature of array processor. There is a trade-off between side lobe level (SLL) and the directivity of the array. Designing an antenna array system with optimum trade-off between SLL and directivity has become a crucial problem. To suppress high SLL of output beam pattern and signal direction mismatches, some notable optimization techniques have been developed. Amplitude weighting of array elements is a well known approach for SLL control. In real-time implementation of antenna array system, the main beam may not be in the assumed direction and the actual signal is treated as an interference signal which is undesirable. Hence the robustness of an array processor against uncertainties is an important issue. In this paper, a method is proposed to keep the SLL at the desired value as well as makes the array system more applicable for real time implementation considering array uncertainties and imperfections.

PID-126

Comparison of Two Types of Graphene Coated Fiber Optic SPR Biosensors

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In the present paper, surface plasmon resonance based two graphene coated fiber optic biosensors are analyzed using a four layer model. Graphene is used as third layer of a four layer model. Gold or silver is used as second layer and graphene is coated around the silver or gold. A theoretical study has been carried out for two sensors using gold and silver. Two biosensors have been studied separately and then a comparison has been made. Sensitivity has been studied for different number of graphene layers.

PID-128

Human Activity Recognition Based On Gaussian Mixture Model and Directive Local Binary Pattern

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Recognizing human activitieshas become an active research area in computer vision because of its promising need and use in many applications. In this paper, we represent a method for recognizing human activities in video. In order to recognize different activities accurately a distinctive and informative feature vector is required which can encode more distinctive information. We introduce a feature named Directive Local Binary Pattern (DLBP) which we develop on the basis of our experimental result that is orientation information is more informative than magnitude information for binary silhouette based recognition. The proposed Directive Local Binary Pattern (DLBP) incorporates orientation information with intensity differences of binary silhouette images. It is further combined with Edge Orientation Histogram (EOH) and forms a more distinctive and informative feature set. By means of the extracted features, Support vector machine is used for training and recognition which is a robust classifier. The proposed method for recognizing human activities is experimented on different videos containing various moving humans and the outcomes of our method are encouraging.

PID-129

Sentiment Mining from Bangla Data using Mutual Information

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Due to the explosion of social networking sites, blogs and review sites (for example, Amazon, Twitter, and Facebook, etc.) it provides an overwhelming amount of textual information. We need to organize, explore, analyze this kind of information for making a better decision from the side of customers and companies. Thus, sentiment analysis is the best way in which it determines the author's feelings expressed in reviews as positive or negative opinions by analyzing an enormous number of documents. In this work, we used Mutual Information (MI) for the feature selection process and also used Multinomial Naive Bayes (MNB) for the classification of Bangla and English reviews. Finally, from the experimental outcomes, the system gives satisfactory accuracy for both Bangla and English datasets.

PID-131

A Statistical Approach for Offline Signature Verification using Local Gradient Features

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Signature is widely used as a means of personal verification which emphasizes the need for a signature verification system. Often the single signature feature may produce unacceptable error rates. Features used in this method are mainly local key-point feature that deals with the orientation around each key-point. Before extracting the features, preprocessing of a scanned image is necessary to isolate the region of interest part of a signature and to remove any spurious noise present. The system is initially trained using a database of signatures obtained from those individuals whose signatures are to be authenticated by the system. For extracting the feature, key-points of the image are detected. For each point, orientation around the point is calculated as the feature. By matching the features of sample signature and testing signature decision is taken. If a query signature is in the acceptance range

PID-132

Performance Analysis of Multiple Relay Multi-cellular Interference Networks

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We consider a single-input multiple-output (SIMO) multiple-access channel (MAC) multi-cellular communication scenario in which two base stations having a group of users each, are situated in two adjacent cells. In order to provide cooperative diversity at the base stations (BSs), multiple relays are used. Each group of users transmits information to its corresponding BS directly as well as via relays, but at the same time it provides interference at the BS of adjacent cell. The BSs are equipped with multiple antennas while the users of each group and relays are equipped with single antenna. We are interested to study the capacity of the each base station in both the optimal and normal cases with and without interference. Considering maximal ratio combining (MRC) at the BSs, at first, we derive the expression of combiner output signal-to-interference plus noise ratio (SINR) using optimum weighting vector. Then we use this SINR to calculate the optimal ergodic capacity. Finally, we derive the expression of normal ergodic capacity for both the base stations. Our results show that, optimization of combiner output SINR by weighting vector at the base stations enhances the ergodic capacity in multi-cellular interference channels.

PID-138

Investigation of low switching frequency control of a Three phase Cascaded H-bridge multilevel inverter

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This paper presents analysis of a three phase hybrid multilevel inverter (MLI) by applying low frequency stair case control strategy. The proposed MLI contains three cascaded stages, auxiliary stage-1, auxiliary stage-2, and main stage. The main stage contains three half-bridge cells which are connected in parallel with a common DC power supply. Each of the stages in the auxiliary stages consists of three H-bridge where the H-bridge cells contain isolated DC power supplies. The proposed hybrid MLI is tested for symmetric and asymmetric configurations of input voltage sources of the main and auxiliary stages. A scaled down prototype of the proposed hybrid three-phase hybrid MLI is developed to verify the control concept and the real time performance of the inverter.

PID-141

Performance Analysis of Graphene Based Nano Dipole Antenna on Stacked Substrate

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The design of a graphene based nano dipole antenna on stacked substrate is reported. A stack of substrate is formed from two different dielectric substrate materials, each of equal height. The performance of the designed antenna is investigated for three different substrate stacks such as Quartz-Silicon, GaAs-Silicon Nitride, and Polyimide-Glass. For each stack, total substrate height is varied from 80 ?m to 120 ?m, taking 20 ?m as step size. The considered performance parameters of the designed antenna are return loss, bandwidth, radiation efficiency, gain, and directivity at a targeted resonance frequency of 1.02 THz. The simulation results confirm that Quartz-Silicon substrate pair with a height of 100 ?m provides the best antenna performance. The enhanced outcomes are compared with other similar graphene antennas to ensure the effectiveness of the proposed design. The attractive properties and significant performances of the proposed graphene antenna make it a potential candidate to be used in wireless communication in nanosystems and THz sensing applications.

PID-144

Modelling & Simulation of a Grid Connected Hybrid Power Plant with Photovoltaic, Wind & Diesel Power for Cox's Bazar

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This paper emphasis on establishing a hybrid power plant which consists of two renewable sources photovoltaic, wind energy and non renewable diesel source for the production of energy to contribute national power demand in Bangladesh. Solar power & wind power are our main source and diesel power is used as a standby power. If we will not able to fulfil our target demand, then we will use diesel energy. We consider renewable source because it provides clean energy. On the other hand, non renewable sources such as, oil, coal, gas will finish approximately within next 20 years. So, it is very necessary for us to find out new source of energy to overcome our power crisis. In this proposed system we came up with an idea to establish an environment friendly power plant combining Photovoltaic and wind energy at various sea shores throughout the country. For design and optimization, we have chosen Cox's Bazar sea shore where wind flow is available as well as solar radiation is optimal. The system is connected to national grid for contributing our national electricity demand.

PID-145

Exploiting Parallelism for Faster Implementation of Bubble Sort Algorithm Using FPGA

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Sorting is a classic problem that has been studied for decades. From the beginning of computing, many Sorting algorithms have been investigated. Bubble sort is a very common and powerful sorting technique used in different applications. For high speed data processing, we need faster and efficient environment for any sorting algorithm. In this purpose, FPGA based hardware accelerators can show better performance for high speed data processing than the general purpose processors. In this paper, the sequential and parallel bubble sort algorithm is implemented using FPGA. We show that parallel implementation of Bubble sort algorithm is almost 10 times faster than that of sequential implementation for 20 different data inputs. However, this implementation is faster for more data inputs.

PID-146

Real Time Google Map and Arduino Based Vehicle Tracking System

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A vehicle tracking system is very useful for tracking the movement of a vehicle from any location at any time. In this work, real time Google map and Arduino based vehicle tracking system is implemented with Global Positioning System (GPS) and Global system for mobile communication (GSM) technology. GPS module provides geographic coordinates at regular time intervals. Then the GSM module transmits the location of vehicle to cell phone of owner/user in terms of latitude and longitude. At the same time, location is displayed on LCD. Finally, Google map displays the location and name of the place on cell phone. Thus, owner/user will be able to continuously monitor a moving vehicle using the cell phone. In order to show the feasibility and effectiveness of the system, this work presents experimental result of the vehicle tracking system. The proposed system is user friendly and ensures safety and surveillance at low maintenance cost.

PID-153

Security Analysis of Co-located and Distributed MIMO Interference Networks with Linear Receivers

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In this paper, we compare the performance of the linear receivers such as maximum-ratio combining (MRC), zero- forcing (ZF) and minimum mean-square error (MMSE) receivers in enhancing security for co-located MIMO (C-MIMO) and distributed MIMO (D-MIMO) interference network. We derive the expressions for secrecy achievable rates in case of MRC, ZF and MMSE receivers for both C-MIMO and D-MIMO systems. Then, we determine the effect of interference on secrecy achievable rate for C-MIMO and D-MIMO system with MRC, ZF and MMSE receivers. Our results show that, the performance of D-MIMO system in enhancing security is better than C-MIMO system in case of all three receivers. It is also observed that ZF and MMSE receivers are more affected by interferences in D- MIMO system with compared to C-MIMO system. Index Terms-Co-located MIMO, distributed MIMO, linear receivers and secrecy achievable rate.

PID-159

Faster Implementation of Booth's Algorithm Using FPGA

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Modern world has become more dependent on electronics and hence speed is a major factor in the field of their functionalities. Modern CPUs work lot faster and efficiently than older versions. Still humans require more and more time efficiency in their daily computational works. In this paper, the main focus is on the increase of time efficiency in computing. Hence this paper shows a time performance comparison between FPGA and CPU implementation. In this regard, Booth's multiplication algorithm has been implemented on both CPU and FPGA to compare the running time. The FPGA implementation is found out to be around 9 times faster than that of a modern CPU implementation.

PID-161

Modeling of Graphene Conductivity Using FDTD in the Near Infrared Frequency

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This paper investigates the modeling of graphene interband conductivity in near infared frequency range. First, the interband graphene conductivity is incorporated in surface boundary condition (SBC). Then, SBC is applied in finite- difference time domain (FDTD) method for modeling graphene sheet. Moreover, auxiliary differential equation (ADE) is used to characterize frequency dependent graphene conductivity in FDTD method. Advantages, accuracy, applicability and stability of the proposed method are analyzed by numerical examples. The method is validated by comparing the existing analytical results. This method can be easily implemented to model the graphene interband conductivity for optical device applications.

PID-169

Face Recognition System Using Soft-output Classifier Fusion Method

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The objective is to develop a dynamic decision selection method for face recognition system where minimum number of information about face are available to take correct decision. Statically we can develop such system where Bayesian method has been preferred in most case. It is better to fuse two or more classifier whose outputs are not highly correlated. In this work, the output of two classifiers systems are not so much correlated. We considered more than one decision for each classifier so that the correlations of the output are varied. It has been proved that the Bayesian optimal decision boundaries can be produced decision in fusiontechnique. It also has been proposed two methods to determine the Bayesian optimal decision are performed correctly in different database. We have proposed a different technique to calculate prior and posterior probability. Finally the fusion decision has been taken based on the probability values and it has been shown that the performance of Bayesian fusiontechniques is better among the individual classifier technique. This fusion technique has been used in decision level and selected a class which is considered as correct output. Finally we have compared the performance among different classifier output and this soft-output classifier fusion method.

PID-171

Transformational Generative Grammar (TGG): An Efficient Way of Parsing Bangla Sentences

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Natural language processing (NLP) refers to the ability of systems to process sentences in a natural language such as Bangla, rather than in a specialized artificial computer language. Computer processing of Bangla language is a challenging task due to its varieties of words formation and way of speaking. The same meaning can be expressed in different ways which is a great challenge to face for translation by an automatic machine translation system. With the advent of internet technology and e-commerce, the demand of automatic machine translation has been increased. Parsing is essential for any type of natural language processing. Parsing of Bangla natural language can be used as a subsystem for Bangla to another language machine aided translation. A parser usually checks the validity of a sentence using grammatical rule. In this paper, we propose a set of transformational generative grammar (TGG) in conjunction with phrase structure grammar to generate parse tree and to recognize assertive, interrogative, imperative, optative and exclamatory sentences of Bangla language. It is applicable for many sentences that cannot be parsed using only phrase structure grammars. The process involves analysis of Bangla sentence morphologically, syntactically where tokens and grammatical information are passed through parsing stage and finally output can be achieved. A dictionary of lexicon is used which contains some syntactic, semantic, and possibly some pragmatic information. We have tested our system for different kinds of Bangla sentences and experimental result reveals that the overall success rate of the proposed system is 84.4%.

PID-176

Biocompatibility Analysis of a Battery Less Back- mountable DBS Device

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In this paper, the biocompatibility of a battery less back-mountable deep brain stimulation (DBS) device is analyzed. To conduct the work, a circular planar inverted F antenna (PIFA) at the resonance frequency of 915 MHz is proposed. The dimension of the antenna $20\times 19.8904 \times 1.5$ mm^3. In the proposed antenna, the radiating layer is meandered, and FR-4 material with $Er = 4.18$, tan$d = 0.02$ is used as the substrate with a thickness of 1.5 mm. The bandwidth of the designed antenna is 56.71 MHz at a return loss of -10 dB in free space. Functional and biological aspects are considered here. The functional aspect includes input impedance, resonance frequency, gain pattern, radiation efficiency of the antenna, and the biological aspect involves electric field distribution, and SAR value. A complete rat model is used here. Safety regulation is verified in this paper by the specific absorption rate (SAR) distribution in tissues surrounding the back-mountable passive DBS device. The finite difference time domain (FDTD) based EM simulation software XFdtd is used to determine the electric field distributions which has an impact on the SAR value.

PID-177

Effect of Low Cost Metal Contact on The Performance of Perovskite Solar Cell

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Organic-inorganic halide perovskite solar cells have attracted a great interest due to their superior optoelectronic behavior, high efficiency and low fabrication cost. A better understanding of the relationships between material parameters, device architectures and performances is still required for the continued development of the solar cell. This paper represents how the work function of metals can affect their photovoltaic characteristics. Comparatively cheap metals such as Al, Ag and C have been studied as the back contact electrodes for perovskite solar cell. The general trend observed is that the shunt resistance and open-circuit voltage of the devices decrease with the decreasing work function of the contact metal. Spiro- OMeTAD and TiO_2 have been used as HTM and ETM respectively in this solar cell. The results have showed that the materials of high work function can produce good ohmic contact with HTM. Maximum efficiency of 27.67% have been found for C-based TiO_2/$MAPbI_3$/spiro-OMeTAD cell.

PID-178

Device Modeling and Performance Analysis of Perovskite Solar Cells Based on Similarity with Inorganic Thin Film Solar Cells Structure

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The photovoltaic cells are the best way to use solar energy by absorbing the photons radiation. The aim of this paper work is to simulate perovskite solar cell and finding the optimum thickness of the absorber layer. Here we run a simulation of perovskite solar cells on SCAPS-1D simulator software. The cell structure employs similarity with other inorganic solar cells such like CIGS, CdTe and $Cu(In,Ga)Se_2$. The absorber layer is $CH_3NH_3PbI_3$-xCl_3 used here for its great attention as highly efficient absorber. A high open circuit voltage of 1.112 V achieved here and the efficiency is more than 22%. The effect of work function of front and back contact also has a great influence over the fill factor and on the efficiency. By varying the thickness of different layers optimum result has been achieved and demonstrates that in I-V characteristics and quantum efficiency (QE).

PID-179

Analysis of Induced Electromagnetic Fields in a Human Head Phantom by Different TMS Coil Configurations.

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The uses of transcranial magnetic stimulation (TMS) for the treatment of psychological disorders and other therapeutically purposes are increasing worldwide. The TMS process becomes popular because of its noninvasive operation method. The stimulation coil play one of the vital role for efficient treatment. In this paper three coils including halo, double cone, and halo and double cone assembly coil are designed, simulated, and evaluated. According to the simulation results, it is found that the halo and double cone assembly coil improves penetration depth and provides greater electric field and magnetic flux. It also gives concentrating electric field inside cortex region. Moreover, the halo coil working with double cone coil provide a flexible way to stimulate the deeper brain region.

PID-181

Performance Analysis of 4×4 FBG-OC-Based Bidirectional Optical Cross Connects Using Ten-Port ROC in WDM Networks

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In this paper, the crosstalk performance of a 4 × 4 fiber bragg grating optical circulator based bidirectional optical cross connects using ten-port rotatable optical circulator (ROC) in wavelength division multiplexing networks has been investigated. The bit-error rate and power penalty due to intraband crosstalk are also evaluated. Ten-port ROC provides better performance than that of four-port and five-port.

PID-184

Smart Load Management by Dual Mode Energy Meter for Rational Use of Generated Power

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Unfortunately electricity cannot be stored and hence it is the most perishable commodity in the world, it must therefore be used at the same second it is produced. But somehow if we can control the load of consumer section then it will be possible to use generated power of a country rationally for both using traditional and renewable resources. By using Dual Mode Energy Meter in consumer section which typically demonstrates two tariff modes, will inspire them to use more loads on off-peak hours which consequently reduces the loads in the peaking hours.

PID-185

Sensitivity Analysis of a Graphene based Surface Plasmon Resonance Biosensor in Terms of Number

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This research paper introduces the advantage of using graphene as a sensitivity enhancing material for the Surface Plasmon Resonance (SPR) Biosensor. Fresnel's four layer model has been used here for analyzing the performance parameters of SPR biosensor. The analysis shows that Surface Plasmon Resonance Frequency (SPRF) increases with the increasing concentration of target molecule for every graphene layer. It is found that the sensitivity curve for different graphene layer with respect to conventional SPR biosensor is non-linear. How the sensitivity increases with increasing graphene layer was studied in this work. The basic polynomial fitting is used and found that sensitivity increases nonlinearly with the increasing layers and the degree of nonlinearity also increases.

PID-190

Nonlinear Modeling and Control of DC Machines: A Partial Feedback Linearization Approach

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This paper presents the design of a partial feedback linearization controller for speed control of DC machines. The design of the controller is presented based on the nonlinear modeling of the plant. The model of the plant is obtained from differential dynamic equations. A stability analysis is presented to guarantee the stability of the proposed design. To validate the effectiveness of the controller, DC machine systems are simulated. Simulation studies show that the proposed controller provides the accuracy and high performance of DC machines.

PID-191

Sensitivity Enhancement of Porous Silicon Waveguide Sensor Using Graphene by FDTD with Lumerical Software

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The aim of this paper is to analyze the effect of adding graphene layer on the porous silicon waveguide sensor. From rigorous theoretical calculations it is found that the resonant porous silicon sensor shows a 60-fold improvement in sensitivity over conventional SPR technology [1]. This paper proposes a Psi waveguide sensor designed in FDTD Lumerical software[2] with graphene layer. Due to having extraordinary properties, the added graphene layer increases the sensitivity of the sensor. This designed Psi waveguide sensor can be used as DNA detector[1], Optical gas sensor[3], Novel liquid sensor[4], Vapour sensor[5] with better sensitivity.

PID-193

Robust Uniform Concentric Circular Array Beamforming in the Existence of Look Direction Disparity

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The concentric circular array with robust algorithm is addressed in this paper. A uniform concentric circular array antenna (CCAA) geometry is targeted due to its symmetrical configuration which enables the phased array antenna to scan azimuthally with minimal changes in its beam width and sidelobe levels. This paper first compares the performances of CCAA configuration with existing uniform circular arrays (UCA) to validate the suitability of the presented beamformer. Then the performance of CCAA based optimal beamformer is compared with delay-and-sum beamformer in the presence of interfering signals. The performance of optimal CCAA processor is reduced if signal of interest is deviate from the look direction. This paper also presents a diagonal loading technique to make the system robust for resolving the degradation problem and compare the performance with existing beamforming technique. MATLAB software is used to analyze the performance of proposed CCAA processor.

PID-194

A Comparative Study of Optimization of Solid State Dye Sensitized Solar Cell Technologies for Power Grid Integration and Off-Grid Operation

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In this paper, the performance analyses of Solid State Dye Sensitized Solar Cells (SSDSSCs) are carried out with power grid integration and off-grid operation in the intertropical region being the main focus. It has been observed that electrodes of different compositions such as: TiO_2 and ZnO, surface morphology of the thin films used in SSDSSCs, use of different types of dyes as photo sensitizers, use of Nanorods/Nanoparticles as photoanodes - all correspond to different photoelectric conversion efficiencies (PCEs) in SSDSSCs. As the SSDSSCs are free of leakage and corrosion related problems prevalent in conventional liquid-based Dye Sensitized Solar Cells (DSSCs), it has the potential to lower the maintenance cost and improving longevity of a system, so far however SSDSSCs suffer from low PCEs when compared with conventional DSSCs, with a maximum efficiency record of approximately 15 per cent set in 2013 by using solid-state mesoscopic TiO_2 solar cells sensitized with lead iodide perovskite ($CH_3NH_3PbI_3$) pigments[1-4], in early 2014 which was further lifted to 16.7 per cent[26]. Careful selection of highly photosensitive dye in conjunction with proper nanotube photonic crystals can optimize the efficiency of SSDSSCs for the intertropicsl region.

PID-199

Performance Analysis of Acoustic Microphone Array Beamformer in the Presence of Interfering Signal

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The acoustic beamformer is an important tool which is used in many environments to focus on a specific sound among many reverberations. This paper presents an acoustic microphone array beamformer in the presence of unwanted signal. Time delay and Frost beamforming techniques are used with microphone array to reduce the noise and cancel the interfering signal respectively. The presented beamformers can be able to increase the system SNR without array mismatch. The performance of the time delay and Frost microphone arrays will degrade in the presence of array imperfections. To improve the system performance a robust algorithm is addressed in this paper. The extensive computer simulation is presented to analyze the performance of the acoustic beamformer with different scenarios.

PID-200

Performance Analysis of Grid Connected PV array with H-Bridge Inverter controlled by angular modulation scheme.

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This paper presents a modular cascaded H-tilevel photovoltaic (PV) inverter for three-bridge mul phase grid-connected solar cell. An angular controlled modulation scheme has been proposed for Modular Multilevel Converter in this application. To maximize the solar energy extraction in various irradiance, Incremental Conductance algorithm for maximum power point tracking is used, which allows independent control of each solar cell voltage. The performance of the system has also been analyzed at variable irradiance on the each cell. A simulation model of three-phase seventeen-level cascaded H-bridge inverter has been built by using twenty four number of H-bridge modules (eight modules per phase). Each H-bridge module is connected to a 270-W solar panel. Simulation results are presented to verify the feasibility of the proposed approach where on an average 1.5% THD is achieved in load phase voltage.

PID-202

Improved Robustness of 3D CT to 2D Fluoroscopy Image Registration Using Log Polar Transforms

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Automatic image registration algorithms that rely on a gradient descent based approach may fail when the initial misalignment between objects is large. The registration task is even more difficult for multi-modal images because of the non- linear relationship between the pixel intensities in the images to be aligned. In this paper we will present a multi-modal image registration algorithm which successfully registers 3D CT to 2D fluoroscopy data for large initial displacements between the images. The approach uses the conditional means (CM) of the joint probability distribution of the images to establish a model linear relationship between the pixel intensities of the images and then applies log-polar transforms (LPT) in the frequency domain to estimate the in-plane scale and rotation changes between the images. Our experimental results show that the proposed approach can increase the range of initial displacements for which the algorithm is able successfully register images by a factor of 4 when compared to the best of the existing gradient-descent based approaches.

PID-207

Mitigation of Frequency Disturbance in Power Systems during Cyber-Attack

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This article investigates the impact of cyberattack on a power station in frequency disturbing aspects during sudden changes of load of the system and proposes a solution method to make it stable. Stable limit of the speed regulation for load frequency control (LFC) and integral controller gain for automatic generation control (AGC) is derived from their characteristic equations. Depending upon the nature of cyberattack (positive biased or negative biased attack) simulations are performed to show the frequency deviations and oscillations of the power system. Finally a feedback LFC block with a three input switch is designed to remove these oscillations.

PID-209

Existing, Emerging and Future Solar Energy Applications: A Bangladesh Perspective

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This article presents the most up-to-date scenario of utilizing solar energy based applications across the country, Bangladesh. As, Bangladesh geographically situated in a region to harness solar energy most effectively, prospects and opportunities of solar energy based appliances are investigated here, along with the present energy situation of Bangladesh. Initiatives taken by Bangladesh government and non-government organizations to harness solar energy to fulfill the future energy demand of Bangladesh are also reviewed. Diverse utilization of solar energy in terms of off-grid or grid tied conditions are also presented.

PID-210

Electromagnetic Field Radiation Measurement for Occupational Settings using Three Axis Tesla Meter

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This paper presents an assessment of exposure to extremely low power frequency (ELF) magnetic field for occupational settings using three axis Tesla meter. The measurements are performed at the exposure level of PF magnetic field in some typical places where general public and occupational workers are subjected to the fields. In the occupational settings, high value of current radiates strong magnetic field that might exceed the safe limit of creating possible adverse health effects if proper shielding is not made. Radiated magnetic field from welding machines are measured and compared with international guidelines. In order to obtain space distribution, the work place is divided into meshes and fields are measured in the grid points. The measurements are performed using a single axis and three axis EMF meter (Gauss meter). Readings are taken in three axes to obtain a mean squared value for single axis EMF meter. The three axis EMF meter can directly measure the radiated field value without any calculation.

PID-211

Improvement of antenna performance using Stacked Microstrip Patch Antenna

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A rectangular stacked microstrip antenna has been designed in this paper to increase the performance of the conventional microstrip antenna. The antenna performances such as bandwidth, gain, directivity and return loss of the conventional and stacked antenna have been examined using coaxial probe feed and transmission line feed techniques. A comparative study has been also made between these two techniques. The antenna has been designed using ansoft HFSS software to operate in the C-band having resonant frequency 5.3 GHz.

PID-182

Developing a Framework for Analyzing Social Networks to Identify Human Behaviours

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Nowadays, online social networks become an important part in people's everyday life. Most of the people share their feelings, views, likings and disliking using social networks. By analysing social networks' data properly, it is possible to identify the behavioural patterns of the users. Considering this fact, in this paper we present a framework to analyse social networks' data to identify human behaviours. We have developed a framework for the collection and analysis of large data by crawling public data obtained from the users of online social networks. The system can analyze data posted by the users in two different languages. Experimental results show that social network is a good resource for estimating attitudes of the people.