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Welcome Address

It is a pleasure for us to offer you Abstracts Book for the 3rd International Conference on Advanced Technologies, Computer Engineering and Science ICATCES 2020. Our goal was to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and present their latest research results, ideas, developments, and applications about all aspects of advanced technologies, computer engineering and science. We decided to organize this event with the encouragement of our colleagues in the hope of transforming the event into a symposium series. Our warmest thanks go to all invited speakers, authors, and contributors of ICATCES 2020 for accepting our invitation. We hope that you enjoy the symposium and look forward to meeting you again in one of the forthcoming ICATCES 2021 event.

Contents

Session 1.1

Ship Detection on Highly Complex Satellite Imageries using CNN

I. GULATAS[1], M. TURAN[1]

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Satellite imagery has a wide variety of usage for various markets such as agriculture, defense and intelligence, energy, and finance. The recent improvements on the machine learning techniques help those markets to gather more information from the satellite imageries. One of the most challenging areas is detecting ships on large satellite imagery with complex environment. In this paper, we experiment a convolutional neural network model for detecting ships on the common shared satellite imageries. With the recent developments on the processing powers of the computers make it possible to use deep learning algorithms. The feature extraction part of and layers in the model were optimized and moreover because of the simple heuristic approach used for detecting ships on the complex backgrounds, resulted in both remarkable increment of accuracy and decrement of training speed than the researches have been done until now. Probability of detection metric and quality factor metric were obtained approximately 69% and 94% respectively.

Keywords— Ship Detection, Convolutional Neural Network, Deep Learning, Machine Learning.

Generalized Cost Effective Automatic Dictionary Creation Using the Big Data on the Web

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There has been need to obtain meaningful information from big data lately. Domain specific dictionaries can help in order to achieve this purpose. Therefore, studies in language lexicography have been focusing on automat-ic dictionary creation. In this study, a new approach is proposed to create a domain specific English dictionary without any interference. Moreover, the dictionary can be extended later without any initializations cost.

First of all, an English document (or set of documents) related to the spe-cific domain is given in order to initialize the process. This document is called reference document. The meaningful words representing the reference document are identified by term frequency–inverse document frequency (TF–IDF) values. The first dictionary words obtained from the reference document are called seed words. A repetitive web search, a query with the meaningful words obtained from the last iteration, is then applied using the Azure Web Cognitive Search Interface. The meaningful words found in each iteration are not added directly to the dictionary. Instead of this, the WordNet dictionary is used to evaluate the similarity of each meaningful word within the dictionary, so that adding meaningless words to the dictionary is prevent-ed. The meaningful words with higher similarity values above a certain threshold value (experimentally learned) are added to the dictionary until the desired number of words for the dictionary is reached. Although this tech-nique is applied to English words, it can be easily applicable to the all lan-guages dictionaries. In order to measure the performance of the dictionary, the Hash similarity value was calculated. In a dictionary up to 75.2% hash similarity was generated by tests executed on reference documents consisting of different subjects.

Keywords— Automatic Dictionary Creation, Big Data, Hash Similarity, WordNet.

Convolutional Autoencoder Model for Reproducing Fingerprint

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Fingerprint recognition is usually based on comparing the feature points in the fingerprint and their parameters. Therefore, it is important for fingerprint recognition systems to clean and improve the fingerprint image, to correctly identify the feature points and parameters to be used in fingerprint recognition systems, and to perform the comparison process correctly. Fingerprint technology was never foreseen to be used to unlock mobile phones and authenticate payments, or to arrest criminals. Autocoders are neural networks that usually obtain a lower dimensional representation of the data and try to produce the same data as output using this representation. With this feature, the training of self-coding, which is an example of demonstration learning, is realized through unattended learning. In this paper, convolutional auto en-coders are used to reconstruct latent or damaged fingerprints is proposed.

Keywords— Autoencoder, Convolutional Neural Networks, Fingerprint.

Ship Detection from Göktürk-2 Satellite Images using Convolutional neural network

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Ship detection from satellite images involves multiple steps of processing. Ship detection from satellite images is useful for controlling of ship traffic and deter-mining the ship when necessary. Ship detection also used in solving several problems such as marine field violations and illegal hunting. Nowadays, optical satellite images and remote sensing methods are being used for ship detection. This project constitutes a prototype model to provide data to the government, coast guard units, general maritime, ship traffic services centers, and national defense. The aim of this study is to utilize the existing Turkish satellite data to per-form ship detection. Göktürk-2 satellite images used in turkey for observation and were selected for the analysis. It is possible to distinguish between ships and all other objects in satellite images. Deep Convolution Neural Network (DCNN) model was proposed to obtain results. Some feature-based corrections have been made for satellite images. The shapes of the ships were detected in squares and their numbers were specified. This model has obtained a sufficient accuracy value by handling a pre-processed satellite image. Graphical results show that the proposed model provides an efficient detection process with an accuracy of 89.60%. The designed CNN model was preferred in a simple and easy to apply form, especially based on the Göktürk-2 satellite images.

Keywords— Deep convolutional neural networks, ship detection, remote sensing, satellite imagery.

Recognition of European Grapevine Moths in Pheromone Traps by Convolutional Neural Networks

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Grapes are one of the most important agricultural and export products to Turkey. Yet, some plant diseases and pests negatively affect the grape cultivation. "Lobesia botrana", known as the European grapevine moth, is the most common and main pest for the viticulture of many countries including Turkey. Various pesticides are available for fighting lobesia botrana. However, since it is very common and causes great losses, these chemicals can be used by farmers unconsciously and in excess. This poses a threat to human health and the environment. To reduce the unconscious use of pesticides, a system in which grapevine moths are automatically detected will be useful. For this purpose, sticky pheromone traps, which are widely used in greenhouses, research centers and agricultural lands, can be utilized. If moths on these traps can be automatically detected and counted from the photos, the population amount can be monitored periodically, and accordingly, the farmer can be given healthier information about when and how much pesticides he should use. Although there are various studies on the detection of plant pests on pheromone traps, a study for recognition of European grapevine moths has not been done, to the best of our knowledge. Therefore, the main purpose of this study is to develop a computer vision system that automatically detects and counts the European grapevine moths, which are an important threat to viticulture, on pheromone traps.

The main challenge in this problem is that moths are very small in size and traps are dirty and dirt color is very similar to the color of the moths in general. In the proposed method, several image preprocessing methods including noise removal, thresholding, and morphological operations are applied on the trap images to detect and crop candidate object regions. These objects are labeled by experts in the field. Then, a convolutional neural network model is trained to classify the objects on sticky traps into two main classes as European grapevine moth and other. The model contains two convolutional layers followed by a fully-connected layer. Experimental results show an average prediction accuracy of 75

As future work, we are planning to test different machine learning algorithms and deep neural network architectures in order to improve the prediction accuracy. Then, we aim to create a machine prototype that performs periodic cleaning and application of adhesive on traps.

Keywords— European grapevine moth, Pheromone traps, Pest recognition, Convolutional Neural Network (CNN), Computer vision.

An Augmented Reality Based Approach for the Promotion of Our Historical Artifacts

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Anatolian lands, which have a very rich cultural heritage, contain historical artifacts from various civilizations. However, sufficient efforts are not made to introduce these historical artifacts to the world and to raise awareness of our people about these artifacts. Although today's technology has reached a level that enables tangible cultural heritage to be digitized and virtual museum / historical artifacts can be visited, there has not been enough work in this area for historical artifacts in our country. In this study, we demonstrate that 3D modeling and augmented reality techniques can be used to make virtual models of our tangible cultural heritage and promote them.

This study has two main objectives. First of all, it is aimed to create three-dimensional virtual models of our historical artifacts belonging to various periods in our country's territory and transfer them to the virtual environment. In this way, it will be easier to transfer our cultural heritage to future generations and to promote it to the world. In addition, an application that will make the introduction of our historical artifacts to children of primary school age more fun and memorable is proposed. Three-dimensional modelling through photogrammetry and augmented reality technologies are employed in this study. During the creation of 3D models of historical monuments, photographs of miniature models in various parks belonging to municipalities were taken from various angles and they were transformed into 3D models by structure from motion techniques. Several measurements and research have been conducted to improve

the quality of the 3D models obtained at this stage. Then, a booklet containing images and introductory information of these historical monuments was designed and an educational application was developed with AR technology, where users can view 3D versions of these monuments through the camera of their mobile devices. The contributions of this study can be summarized as follows:

3D models of our historical artifacts were created and transferred to digital media. Apart from our application, these models can be used as digital content in applica-tions of 3D game and cinema industry. Therefore, it is thought that our tangible cultural heritage will be introduced to the world.

An augmented reality-supported mobile application has been developed to promote learning with fun and to introduce our historical artifacts to especially children.

Keywords— Cultural heritage, Augmented reality (AR), 3D modelling, 3D reconstruction.

Session 1.2

Saloon 1 - 03.06.2020 (11:00-12:30)

Binary optimization using duelist optimization algorithm for One Max Problem 130

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This paper presents a binary duelist optimization algorithm (DOA) for binary optimization problems. Duelist optimization algorithm was presented for solving continuous optimization problems and it simulates a human fight between duelists. Since the original DOA is presented for continuous search space, it is adapted to the binary space for binary optimization problems and named as BDOA. Also, BDOA is improved to achieve robust individuals by using bitwise operations. In the BDOA, each duelist is a member of three different classes: winners, losers or champions. After the initializing set of the duelist, winners and losers are determined through duels. All duelists attend the duel except champions. Champions are a few duelists and robust individuals in the population. In each iteration, three processes are carried out which are learning, innovation and champions league. Losers learn from the champions to improve their capabilities. Winners aim to gain new skills by a mutation called innovation. The purpose of the champions league is to add new robust individuals to the population by using the experiences of champions in the population. After these steps, all duelists are updated by re-evaluation and some of the losers are eliminated. BDOA has three parameters to tune and these are learning probability, innovation probability and champion ratio. The effectiveness of the BDOA is evaluated on the different sizes of the One Max problem which is simple, easy to use and popular binary optimization problem. Also, BDOA is compared with the well-known optimization algorithms to show its performance and efficiency. Experimental results show that BDOA is very competitive on One Max problem in terms of solution quality and robustness. Applying BDOA for 0-1 knapsack problem which is the most popular binary optimization problem in the field, is scheduled as future work.

Keywords— duelist optimization algorithm, binary optimization, one max problem.

Doc2vec Approach for Text Document Clustering 154

E. YELMEN[1], N. DURU[1]

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Manuel categorization of text documents according to their similarities are very difficult and take long time. Therefore, highly evolved means and methods are needed to deal with this challenge. Clustering is one of the major method using in many applications of business and data sciences. Document clustering sorts out text data into diverse groups where the documents in each group as indicated in closeness or similarity measure. To achieve a high success rate in document clustering assumes an essential role in helping its users to correctly explore, condense, and sort out the data. In this paper, we propose a word embedding approach to cluster question based text documents. In the proposed approach, doc2vec word embedding method gives the better result on gaussian mixture clustering algorithms instead of other word embedding and clustering methods.

Keywords— Document Clustering, Word Embedding, Doc2Vec, Gaussian Mixture.

Detection of Chronic Kidney Disease Stages by Data Mining Methods

E. KABULLAR[1], F. ATASOY[1]

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Data mining has created a new perspective in the use of health data, in addition to finding answers to problems related to large amounts of data and it has become a method that the usage prevalence continues to increase rapidly.Chronic kidney disease is an important public health problem in our country. If chronic kidney disease is detected early, it can be prevented or its progression can be prevented.In this study, a system has been developed using data mining to determine the stage of the disease of patients with kidney failure. The data in 2018 of Karabuk University Training and Research Hospital were used by obtaining the necessary ethics committee permissions as a data set.In practice, performance comparison was also made between these two algorithms using logistic regression and artificial neural networks. After the comparison, artificial neural networks were more successful in terms of model success criteria.

Keywords— Chronic kidney disease,Data Mining, Artificial Neural Network, Logistic Regression.

Self-Management Technology in Cellular Communication Systems

R. DHYAB[1], M. TALO[1]

[1]Firat University, Elazig, Turkey

The stations of the cellular networks distributed along the service areas are expose to adverse weather conditions. The risk of failure is high and services are likely to be out of service especially in rural areas due to unfavorable weather conditions. In this paper, we have used a self-healing mechanism to ensure the availability of the service during a failure. It is important to re-establish the network in a short time using the available resources. We have also taken care to keep a low volume data exchanged by the base stations to prevent network overload. If a cell or station fails, self-healing processes try to fill gaps as much as possible. The self-management of a network is a promising way to reduce cost and sophistication in a network infrastructure.

Keywords— Self-management, Operations and Maintenance, Operations Support Systems.

Investigation of Tower Grounding Resistance Effect for Lightning Overvoltage in 154 kV Transmission Line using ATP-EMTP

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Lightning overvoltage caused by atmospheric phenomena leads to significant damage and long-term outages in the electrical power systems. In this study, overvoltage occurring on the insulator as a result of lightning strikes on the pylon towers, which are commonly used in 154 kV power transmission lines, were investigated by using the Alternative Transient Program (ATP). In the analysis, the multistory transmission tower model was used to define the tower model. The lightning waveform was modeled as a Heidler function with a lightning impulse of 8/20 μs. The voltage levels on the insulators in the event of lightning strikes on the tower were evaluated based on various positions and lengths of the tower grounding electrode.

Keywords— Lightning overvoltage, Alternative Transient Program (ATP), Tower earth resistance, Pylon Tower.

Prediction of Solar Irradiance and Photovoltaic Generation Using Artificial Neural Network

126

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A prediction approach to predict the amount of solar irradiance that photovoltaic (PV) system is exposed to and its output power using Artificial Neural Network (ANN) is presented in this study. Levenberg-Marquardt Backpropagation algo-rithm was chosen as the training algorithm in the ANN model. The real-time winter dataset served as an open dataset by IEEE PES for Petrolina FV1/Enerq/USP system (Southeast of Brazil) for the period of 1-10 June 2014 was used as PV generation data in the analysis. The results of Feed Forward MultiLayer Percep-tion (FFMLP) ANN topology revealed that the ANN model could be used effec-tively to predict solar irradiance and PV power output by considering the panel and ambient temperature, wind speed data, and time series together.

Keywords— Solar Irradiance, Photovoltaic generation, Artificial Neural Network (ANN).

Session 2.1

Vessel Segmentation using Shallow Water Equations

148

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[2]Middle East Technical University, Ankara, Turkey

In this study, we propose a new segmentation approach for vessel structures based on fluid flow. Vessels are medium for transportation of blood which makes segmentation using fluid flow physically plausible. So, streaming fluid regions can capture smooth and thin structures. It also provides robustness to radiofrequency field inhomogeneity and noise in images. More importantly, it can also segment disconnected areas as the fluid flow can pass through gaps. Thus, fluid flow can form a powerful vessel segmentation algorithm. In this study, we used linearized form of shallow water equations since they provide computational efficiency compared to original Navier-Stokes equations. We validated our method on a synthetic data set formed with BrainWeb database, and a clinical Magnetic Resonance Angiography (MRA) datasets. Experiments presented the accuracy of the vessel segmentation method we proposed.

Keywords— Vascular system, Shallow water equations, Vessel segmentation.

Internet of Things Based Intelligent Facial Expression Monitoring using EMG Signals

118

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Facial expressions are important aspects of human behaviors used to develop automated tools to assess anger, smile, fear, or surprise. These tools are effective to replace self-reporting methods, suitable for patients who are incapable to report their health status, especially patients in the intensive care unit (ICU) and minors. In the present study, we propose a wearable device with a biosensing mask to monitor the intensity of the human status of a patient using facial surface electromyography (sEMG). Wearable devices are the wireless sensor nodes, integrated into the Internet of Things (IoT) systems for remote monitoring of patients. At 1000 Hz, approximately nine sEMG channels are sampled for transmission to the cloud server and cover the entire frequency range through the gateway. We also consider low energy consumption wearing devices in the design process to carry out long-term monitoring. We develop a mobile web application to transmit large amounts of real-time sEMG data. We also perform digital signal processing, visualization, and interpretation to explain real-time sick situations such as angry, fear surprise or smile data to caregivers. The cloud platform is a bridge between the web browser and sensor nodes. It helps to manage the wireless intercommunication between the web application and server. This study proposes a real-time scalable IoT system biopotential monitoring, a wearable solution for automatic sick situation assessment using classification and facial expressions to assess fear, surprise, anger, or smile.

Keywords— Biopotentials, SEMG, IoT, Facial Expression Recognition, Internet of Things.

Extreme Gradient Boosting for Multivariate Wind Speed Prediction

133

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Nowadays, one of the most important renewable energy sources is wind energy that is remarkable importance among the low-carbon energy technologies. The primary aim of wind energy production is to reduce dependence on fossil fuels that affect environment adversely. Therefore, wind energy is analyzed to develop new energy resources. The main issue related to evaluation of the wind energy potential is wind speed prediction. Due to the high volatility and irregularity, wind speed prediction is difficult. To cope with complex data structure, this study presents the development of extreme gradient boosting (XGBoost) within Grid Search parameter optimization for daily average wind speed prediction. Also results are compared with artificial neural network (ANN). The results showed that XGBoost exhibits superior CPU time performance than that of ANN.

Keywords— Extreme Gradient Boosting, Artificial Neural Network, Wind Speed Prediction.

A Proposed Speaker Recognition Model Using Optimized Feed Forward Neural Network And Hybrid Time-Mel Speech Features

131

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Speaker Recognition Process is susceptible to a several challenges which are critical to speaker modeling. The main obstacle in speaker identification is the nature of voice signals. Such signals are termed by their randomness nature which can be caused by the time-varying nature of speech electric properties. The spectral information of speech varies overtime; therefore, it is difficult to rely only on the spectral domain in order to model a system for speakers recognition. In text-independent speaker recognition; frequency component analysis used to recognize the speakers. As voice signals are time-variant signal, the frequency spectrum information is changing by time. In this paper, Mel Frequency Cepstral Coefficient (MFCC) alongside Fundamental Frequency are implemented to propose text-independent speaker recognition system approximation. In addition, Feed Forward Neural Network (FFNN) used for speaker prediction. To further improve the performance, particle Swarm optimization algorithm was integrated by Freezing-FFNN. The simulation has shown that newly proposed technique, namely PSO-FFNN has achieved accuracy by 83.4 and reduced the Mean Square Error significantly.

Keywords— Prediction, FFNN, Neural, Features, Speaker.

Effects of Image Sentiment, Image Content and Image Characteristics on Social Media Post Interaction Rates

139

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A number of variables affect the interaction rate of social media posts. This paper focuses on the effects of image-related variables. These features are image sentiment scores, object types that images contain and image characteristics such as brightness, pixel count and standard deviation of pixels. A large Instagram post dataset was used in the study, which contains 125.784 images. These images were crawled specifically for this study by using crawling tools. 17 variables were composed, and state-of-the-art methods and tools were used to form these variables. As interaction rate, the proportion of like count to follower count was used. Regression methods were used to calculate the correlation between variables and the post interaction rate. In conclusion, a 0,717 rank-order correlation was obtained using Spearman's Rank Correlation between the variables and the post interaction rate. Moreover, performing prediction of posts interaction rates by using image-related variables resulted in with 0,039 Mean Absolute Error and 0,072 RMSE (Root Mean Square Error) where interaction rate values start from 0 and mostly goes up to 1 (it can exceed 1 as a small number of posts can be interacted more than the number of followers).

Keywords— Social Media, Post Interaction, Post Popularity, Image Sentiment, Image Characteristics.

Designing a New Data Encryption Algorithm Using Genetic Code Method

149

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The importance of data security has also increased in the face of today's developing technology. Many encryption algorithms have been developed for secure data transfer. In this study, we developed a new Genetic Encryption Algorithm (GEA) inspired by the structure of DNA. We compared the performance of Encryption Algorithm with DES (Standard Encryption Algorithm), AES (Advanced Encryption Algorithm) and RSA encryption algorithm. The results are shown in tables and graphs, and a short assessment is made.

Keywords— Genetics, Encryption, Algorithm, Performance.

Software Reliability Assessment Using Polynomial Regression Approach

150

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Software Reliability is a method of measuring the quality of software that predicts the number of faults in the software. Different models were proposed from time to time to estimate the number of software failures. This paper proposed a new model depend on polynomial regression to predict the number of software faults for a particular duration of time in a specific environment. The mean squire error (MSE) was used for measuring the performance of the proposed model and the results show that the proposed model outperforms the other models in predicting the faults of the systems when compared with previous work, the results also show that the model has the best performance when calculating the MSE.

Keywords— Software Reliability, Polynomial Regression, Least Square Method.

Session 2.2

Realization of Electronically Tunable Square-Root-Domain Trans-admittance Filter 147

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Square Root Domain (SRD) electronically adjustable trans-admittance lowpass filter proposes in this paper. The filter circuit input is voltage and output responses of filter is current. The design is based on the state-space synthesis method. State-space synthesis method is one of the methods used to systematically design filters. State variables of the filter are obtained by state space synthesis method. The circuit of the filter is realized from the obtained equations. One of the important types of filters using the state-space synthesis method are the square-root and log-domain filters where the sign is compressed and expanded. The transfer admittance parameter g_0, the quality factor Q and the natural frequency f_0 of the transadmittance filter can be electronically controlled by external DC currents. Using PSPICE simulations program are verified the theory and to show the performance of filter circuits' responses. The proposed trans-admittance filter is simulated by using TSMC 0.35 μm Level 3 CMOS process parameters.

Keywords— Square-root-domain filters, Companding systems, Electronically tunable.

MIMO ANN to Daylight Harvested Hybrid Lighting Control for an Office Building 124

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Meteorological weather conditions may show sudden changes (cloud movements, dust) regionally, regardless of the seasons. In this study, control outputs are produced as a result of comparing both perceived sensors and national meteorological data so that temporary (sudden regional change) sky movements do not cause rapid changes in the system. The artificial intelligence supported design to control the light pipe (LP) & LED hybrid lighting system real-time application is modeled. The difference of this study from the others is the use of all natural light inputs. A system is developed to use artificial lighting armatures with the multi-input, multi-output artificial neural network (MİMO ANN) structure, which provides the required level of illumination in the environment by the amount of natural light entering through light pipes and windows. The whole space is partitioned according to natural light entrances and information from the light sensors which are placed in these areas is compared with the National Meteorological Centre (MGM) regional data, according to the office lighting strategy. MİMO ANN produces separate outputs for each area and dynamically illuminates the whole space. According to these results, the designed system is energy-efficient and sustainable with this designed control algorithm. Matlab Simulink circuit analysis performed using MGM regional data; it is calculated that the use of artificial lighting in the whole place decreased by 43.78% on a sunny day, by 32.17% on a cloudy day and by 24.36% in the overcast day.

Keywords— Daylight harvesting; Hybrid lighting; MIMO ANN, Sustainable lighting.

PLC Fuzzy PID Controller of MPPT of Solar Energy Converter

135

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Development of the maximum power point tracking (MPPT) scheme for solar mounts and rectifiers remains interesting. We design of high-sensitive fuzzy (HSF) proportional integral derivative (PIDC) controller using Matlab and programmable logic controllers (PLCs) for a set point of the MPPT scheme. This proposal is founded on a synergistic mixture of the radial-basis function-neural network (RBF-NN), genetic algorithm (GA), and Sugeno fuzzy logic (SFL) systems. The finest limits of MPPT and PIDC are strong-minded through optimization, wherever RBF-NN is adjusted by means of GA to reach the best key. Also, RBF-NN is rummage-sale to improve the PID limits (got from GA) for scheming HSFL-PIDC of the MPPT scheme. The HSFL-PIDC controller is further designed to transfer in PLCs (STEP 75.5) for implementing the photovoltaic (PV) system. The entire scheme is further tuned by solar parameters under numerous operating conditions to advance the solar performance in terms of accusing and correcting. The performance of the projected analog-implemented MPPT controller is assessed by interfacing it with a hardware prototype of dual photovoltaic (PV) system. The hybrid controller configures the control signal based on interaction and thereby reduces the voltage error and the oscillation in the terminal voltage control process.The achieved system is demonstrated to be efficient and robust in improving solar charging and rectifying capacity.

Keywords— GA, HSF, HSFL-PIDC, MPPT , PIDC ,PLC, RBF-NN, SFL.

Improved Features of Intelligent PLC-Fuzzy Generator parameters Controller

129

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The quality of an intelligent control system with certain degree of autonomy is prerequisite for effective functioning. We design a fuzzy proportional integral derivative (PID) controller using Matlab and programmable logic controllers (PLCs) for a set point voltage and frequency. The proposed controller aims to maintain the terminal voltage and frequency continually under any loads and operational conditions which can be attained to the desired range via the regulation of the Generation Governor (GG) system. The main voltage control system uses PLCs to implement the AVR action. The existing algorithm being based on controllers including the radial basis function neural networks (RBF-NN), real-valued genetic algorithm (RGA), and Sugeno fuzzy logic (SFL) requires optimal tuning for thematic factory operation of the GG system. The newly developed controller combines the RGA, RBF-NN , generator parameters (Kg and tg) and fuzzy logic control (FLC) to determine the optimal PID controller in the AVR system. Combination of the Generator Parameters (Kg and tg) , Fuzzy PID (GPFPID) controller and industrial governor speed controller (KS 92) is used as hybrid full control system for the voltage and frequency. Optimal PID gains obtained by a combined RGA and RBF for various operating conditions are utilized to develop the rule base of the Sugeno fuzzy system. The GPFPID controller is further designed to transfer in PLCs (STEP 75.5) for implementing the AVR system with improved system response. The hybrid controller configures the control signal based on interaction and thereby reduces the voltage error and the oscillation in the terminal voltage and frequency control process. An excellent voltage and frequency control performance is achieved when the proposed hybrid controller is impremented on a practical AVR and governor system in synchronous generator to improve the transient response. The suitability of the hybrid controller is demonstrated via experiment.

Keywords— GG, AVR, GPFPID, RBF, SFL, FLC.

Single Sign On (SSO) for Information Management over WEB

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It is not untypical in a large organization to have various programs for different needs. This is not because the company planned and designed the software needs as is, but rather software evolved over time as various needs arouse and the development of software programs became a mandate. Since each program may have different dependencies such as specific version of the operating system, database, and/or file server, this often creates a management nightmare for the IT departments. Therefore, in software industry many software projects are just the rewrites of existing software with only few new features. Meantime, software programs are increasingly web based and serve over various computers that are physically distributed. No matter what strategy is adapted to stay up-to-date on changing software infrastructure, being able to login using single user name and password is always desired by the organization for any new software. At Akdeniz University users also desired to have a single page to login. Once they login, they wanted to stay authentication for any new web application they select to run. Architecting a new campus wide software that covers all the current and past needs was not an option. This is because of the reasons that were discussed earlier. Consequently, we decided to implement a single sign on (SSO) web application. Once users are logged in, they are taken to a desktop like panel. Depending on their authorization, links to various web applications are provided. Unlike single web application, it is assumed that the web applications provided may be distributed and hosted on remote machines. Now the challenge was, once the user selects an application from the list of applications on the desktop how the user can be authenticated without requiring a new login in a secure way. To achieve this objective we implemented the following strategy: as soon as the click action is performed; (i) generate a new UUID token on the server side and store it in the database along with the user information and time of action for that request. (ii) forward UUID token to the client where it gets appended to the request. (iii) once the request arrives on the remote server, the server checks if the forwarded UUID came from the SSO IP and found in database, did not expire, and not used by another request before. If conditions mentioned are satisfied, the user granted access else denied. By using the proposed approach, we were able to securely and seamlessly authenticate users and allow them to use distinct web applications.

Keywords— single sign on, software, authentication, web application, UUID token, and information management.

Data Bus for Computer Based Assessment via Micro Services

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In this study, we introduce a secure data bus for test management, test delivery, and assessment in computer based system. The developed RESTful web services software program includes the base settings, controllers, and views with a large number of APIs regarding the core business logic and relevant data retrieval (selection) queries. However, to keep data consistency no data manipulation (insert, update, and delete) action is done via this program while the current data is checked and/or verified before and after making manipulation on it when needed. During our implementations and experiments, we encountered with very good developer/tester and end-user experiences in both managing and applying tests with the following benefits: (i) separating the common back-end issues from the test management and test delivery web applications. (ii) dividing the information services into many small services in which each service is responsible for its own with the separation of concerns on entity/model level. (iii) providing RESTful APIs over HTTPs that were created based on the micro services architecture with developer independence, isolation, low complexity, and simple integration. (iv) testing APIs easily without requiring the use of any other application while maintaining scalability. (v) redirecting the data bus to either test or production database.

Keywords— data bus, information services, RESTful web services, API, computer based assessment, and micro services.

Design and Implementation of an Agent Based Automated Auction Environment 119

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In this study, an execution environment is designed and implemented in which users can purchase and sell products using different types of auction methods manually or automatically according to the parameters and strategies to be entered beforehand. The environment has an entirely agent-based design where the main components of the environment are represented by agents. There are four types of agents: server, gui, bidder, and auctioneer. Different types of agents communicate among each other and constitute the main architecture of the system. The system supports English and Dutch Auctions and offers different strategies to the buyer and seller side for each auction type. In the experiments, it was observed that the system meets the requests of the users within two types of auctions with the options offered by the system, and it can participate in auc-tions with the strategies and parameters chosen by buyers and sellers according to their budgets, their desire to buy or sell the product. The presented strategies have been compared and it has been observed that different strategies come to the fore in different situations and have a large impact on the outcome of the auction.

Keywords— Agent Based Programming, Jade, Multi Agent Systems, English Auction, Dutch Auction.

Author Index