International Conference on
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(ICTACSE, 2017)
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ICTACSE 2017

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FOREWORD

International Conference on Theoretical and Applied Computer Science and Engineering (ICTACSE) will take place from November 10-11, 2017 in Ankara, the capital city of Turkey at the heart of Anatolia which has been a melting pot of many civilizations and different people throughout the history.

The conference aims at bringing together researchers and academics for the presentation and discussion of novel theories and applications of computer science and engineering. The conference covers a broad spectrum of topics in the field. We hope that this first event is the beginning of a long lasting conference series to provide an environment that will strive for academic excellence in research.

ICTACSE provides an ideal academic platform for researchers and scientists to present the latest research findings in computer science and engineering. The conference aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about computer science and engineering studies.

We would like to thank to Promech for their invaluable supports in organizing this event. We would also like to thank to all contributors to conference, especially to plenary speakers who share their significant scientific knowledge with us, to organizing and scientific committee for their great effort on evaluating the manuscripts and participants for sharing their research experience and findings with us. We do believe and hope that each contributor will benefit from the conference.

We hope to see you in our second conference ICTACSE 2018, which will be announced in our conference website.

Yours Sincerely,



Asst. Prof. Dr. Gazi Erkan BOSTANCI
Chair of ICTACSE2017

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Dr. Sadia MURAWWAT

Conference Abstracts

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Recent Trends In Machine Learning and Computer Vision

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There is a tremendous acceleration in the Machine Learning researches in the last decade. A transformation took place from the utilization of simple human engineered features in linear algorithms to more structured and complex neural network architectures that we refer to as Deep Neural Networks. Although the mathematical models for neural networks exist since 60s, the real power of these models came to the light as a result of three main factors: (1) the improvements in the representative models, (2) massive increase in the computational power, (3) big data. We now observe the impact of deep learning in many areas of our everyday life such as computer vision, speech recognition, language understanding, recommendation systems, medical image analysis etc. In this talk, I will briefly present the important milestones in the computer vision research and how it is transformed with the deep learning methods; together with the recent research directions.

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Bridging the Gap between Human Expert and Machine Intelligence for Medical Diagnosis

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Machine learning is playing pivotal role in developing automatic diagnostic solutions. For which, the focus remained to assist human experts in standardizing diagnosis of various diseases. However, differences in diagnostic results presented in the literature reflect the importance of general process development and refinement to link diseases with corresponding manifestations. This is only possible if the patients' profile along with current symptoms becomes part of diagnostic process and contribute towards general rules development. This paper discusses the gaps between human experts and machine intelligence that need to be filled for a better development of self-learning medical consultant software. Furthermore, artificial intelligence based models can become virtual health worker at remote areas and can be used to collect enough data to predict unknown medical problems.

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Recognition of Technology Stress: Mobile Phones (MP)

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Mobile Technology is all around us. As per International Telecommunication Union, there are 4.92 billion global mobile phone subscribers at present. Mobile phones have become so ubiquitous in our culture that the realization of social aspects of this mobile communication is also imparted. Youth are at the fore front of this broadband adoption. Smart phones, PDAs and other similar devices facilitate the user in diversified ways to communicate and enjoy broadband services with a touch of finger. This talk aims at the recognition of technology growth and related stress element. No doubt, it has revolutionized our life by eliminating so many devices around us to a single platform. However, research shows that there is a high correlation among Mobile phone usage including (calls, short message, downloading multimedia applications, location identification and on/off screen patterns) and stress components like sleep disturbances, variation in mood, tiredness, general health, caffeinated beverage intake and electronics usage. The higher reported stress level was related to higher activity level as per correlation analysis.

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The Structure of Complex Networks

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We live in a world of connected units. All biological systems consist of connected units of various size, shape and complexity. Common examples of biological networks start with the biological brain, the very existence of all biological structures such as plants and all living creatures are examples of very complex structures of connected units. Roads, distribution of energy, hierarchical structures of social systems, internet, social networks are all seemingly different but mathematically similar structures. All such systems consist of simple connected units which through the connectivity behave as a large complex system. Such structures are very common and they are named as complex networks. Recently, similarities between such diverse structures became apparent and scientists from a wide variety of disciplines such as mathematicians, computer scientists, biologists, economists and physicists are interested on putting forward the mathematical structure of the complex systems. In this talk, the basic mathematical structure of complex networks will be discussed.

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Pedesterian Detection Studies Using Picture Telescope Approach

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The purpose of this work is monitoring of pedestrians, pedestrian detection and more optimally creation of pedestrian movements following the video with using image telescope methods based on difference analysis between video frames. In addition, a comparison was made with other studies used in pedestrian detection.

The study follows these steps respectively; The input video was first processed using the Euler approach, which is the image telescope approach. Euler approach first decomposes the input video sequences into different spatial frequency bands and then applies the same temporal filter to each band. Filtered spatial bands are then amplified according to the given α factor value. It was added to the back of the original signal and eventually shrunk to produce the output video. As a result of these operations magnified video is obtained. In the next step, the magnified video was converted from color tones to grayscale tones, the background was calculated on gray tones, then the subtracting video frame to background for each video frame and these results were normalized. Subsequently, the normalized results are translated binary data according to the kmeans algorithm. By eliminating those frames which have a smaller area and noisy than a certain area, the excesses on the picture frame have been eliminated and then doing morphologic operation for each videos frames. After performing all these steps over video frames, the regions with the pedestrians were detected. Finally, each frame of the input video was marked with the detected positions, the video was generated again from these frames and the pedestrian detection process was successfully performed on the input video.

In our study, pedestrian detection with the Euler approach, which is a picture telescope approach, showed a higher pedestrian detection success rate as opposed to other pedestrian detection studies, resulting in more efficient results in terms of pedestrian detection.

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Addressing and Analyzing an Implementation Issue in Binary Search

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Binary search is an efficient searching algorithm intended ordered lists. Investigating the implementation issues of binary search take the attention of the researchers in the literature because of its widespread practical applications.

In this study, it is described and analyzed an unaddressed issue in the implementation of the binary search. Despite, this issue does not effect on the correctness of the algorithm but decreases the performance. The described implementation issue makes the binary search runs in the maximum number of comparisons in each iteration. Additionally, it is presented an easy analyzing approach to describe the behavior of the binary search in term of comparisons number. With the help of this method, the complexity of the weak implementation is proved. Experimental results show that the weak implementation is slower than the correct implementation when large size searching key is used.

Keywords: Binary search, Binary Search Tree, implementation issues, searching ordered list.

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Industrial Control for Big Physics

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Industrial control system can be described as combination of different types of controller and instrumentation from physical systems. These type of applications require high reliability and guaranteed performance. Therefore industrial applications tend to use proven technologies such as PLC's or analog control. Big physics facilities like particle accelerators or telescopes have similar applications with industrial plants as well as additional computational power needs.

In this talk we will discuss the possibility to develop a PC based replacement for older technologies to satisfy same requirements. Being more commercially available PC's offer higher performance to price ratio but lack standardization and stability. Industrial grade reliability in PC based applications can only be guaranteed with sophistically designed integration tools like EPICS (Experimental Physics and Industrial Control Systems) which offers many advantages when used by an expert.

Keywords: Industrial control, EPICS, particle accelerators

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Opportunities of Soft Computing in Automating Software Development

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This work is part of the domain engineering phase of an ongoing project on model-driven software development that is intended to employ soft computing methods for both providing guidance and taking autonomous decisions in an environment that ensures a controlled software development process. Soft computing methods target real world problems which are hard to be modelled by well-defined formal engineering methods. It involves employing unconventional and so-called soft methodologies such as fuzzy logic, neural networks, support vector machines, evolutionary computation and genetic algorithms.

This work starts with the definition of soft computing, with a special emphasis on clarifying the difference between soft and hard computing, and the expected advantages of soft computing approach in certain peculiar problems of software development. The place of soft computing in software engineering, is investigated throughout the literature with the aim of determining the soft computing technology that dominates each category of requirements.

Our current observations indicate that although each technology has its own strengths, fuzzy rule based systems have clear advantages over the other approaches especially in terms of transparency, flexibility and ease of use. Fuzzy logic also facilitates effective communication within the development team even though some members of the team may be domain experts with little or no programming skills.

Keywords: Software engineering, soft computing, intelligent techniques.

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Multi-biometric Watermarking Based on SVD and 3D Spiral Optimization

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This paper presents a multichannel watermarking approach for embedding three different gray level biometric images into RGB host image, based on SVD and 3D spiral optimization. There are two important specifications in watermarking process. First one is robustness which means that the watermark should be detected with extraction process even though there is an attack to the watermarked image. The second one is impercibility that a person couldn't detect watermark without extraction process.

In this work, while mixing host image and watermark image, a scale factor is used. Here the scale factor is the ratio of singular matrices between watermark image and host image. First, same scale factor is used for each channel during watermarking. It is seen that robustness is directly proportional with scale factor value, while impercibility is inversely proportional with scale factor value. This means that optimization of scale factor is important to achieve high performance for both robustness and impercibility. Therefore, 3D spiral optimization is used to get optimum scale factor for each channel. Spiral optimization was firstly proposed for 2-dimensional continuous optimization problems but then it is improved to n-dimensional problems too. It is such a heuristic algorithm to solve the multi-point search problem. It simulates the natural spiral phenomenon. The spiral model starts with initial state and converges to the spiral center. In this study Lenna 512x512 RGB image is used as host and 128x128 three biometrics (palm, iris and ear) are used as watermark. Furthermore, nine types of attacks are applied to watermarked image in order to experience robustness. These attacks are adding noises (Salt and Pepper, Gauss, Speckle), rotation, cropping, two different resizing and two different jpeg compression.

After applying these attacks to watermarked image, the correlation coefficients between original watermark and retrieved one are obtained as 0.9927 for noise attacks, 0.9997 for crop attack, 0.9992 for resizing and 0.9998 for JPEG compression. The PSNR values between original host image and watermarked image are as 29.3381 dB for R channel, 29.9055 dB for G channel and 26.7860 for B channel.

Keywords: Multi-channel watermarking, multi-biometrics, spiral optimization, singular value decomposition

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Neural Network Nonlinear PCA for Process Monitoring

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The aim of this paper is to present a Neural network Nonlinear Principal Component Analysis (NLPCA) model for process monitoring, this model consists of two cascade three-layer neural networks. The presented NLPCA model is applied to sensor fault detection and isolation of the Tennessee Eastman Process (TECP).

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An Analysis of Imperative Programming Languages from Data and Function Abstraction Perspective

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The first programming languages are designed in accordance with the physical structures of the computers. The programming languages that evolve with them are called imperative languages and are still influenced by computer architecture. The language of the imperative paradigm reflects the characteristics of the Von Neumann machine which stores data and programs in the same memory [1]. These languages are examples of compiled languages and provide high performance. However, they offer weak abstraction and security features. The first imperative programming language is Fortran [2]. Furthermore, Pascal and C have determined the paradigm's software architecture with functions / procedures.

C is one of the imperative paradigm's popular general purpose programming languages and its software architecture is based on header, development and application points [3]. In the header files, structs and unions are declared to provide data abstraction. In addition to this, function pointers are used to define function data types. The data abstraction and functions declared in header files are developed in implementation files. This software architecture is similar to the Object-Oriented programming architecture. However, Object-Oriented languages also offer encapsulation, inheritance, and polymorphism. In this study, we compare data and function abstraction of both software architecture.

Keywords: Data abstraction, Imperative programming languages, Encapsulation

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A Classification Problem in the Healthcare Data Sets

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With the growing use of computers there is a great amount of data being increased in databases day by day. The extraction of hidden rules from large databases and predicting the right decisions is a very important problem. Decision making has a critical role if the subject is about health care. Computer can help doctors to make decisions by training of the previous data and can ease doctor's workload by making right predictions. To achieve this, we need for a method that can classify health data as accurately as possible.

In this study we consider a classification problem for a health care data. Some data mining techniques can be used for this problem. We propose a new algorithm and compare it with two learning techniques such as perceptron learning algorithm and k-nearest neighbours algorithm. We test the results for the Wisconsin breast cancer database.

We choose training set randomly and use approximately %70 of data set for this purpose. The accuracy rate of the proposed algorithm changes between %90 and %98 according to the trained data set.

Keywords: Data mining, decision making, smart system, machine learning, breast cancer.

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Vision-Based Turkish Sign Language Recognition Using Convolutional Neural Networks

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People need to be able to negotiate mutually to communicate with each other. It is difficult to communicate for individuals with hearing problems. This work is an example of human-computer interaction applications. The main objective of this study is to facilitate the life of the hearing impaired individuals in social areas and to solve communication problems. In this study, it is aimed that the movements belonging to the alphabet of Turkish Sign Language can be correctly recognized with minimum cost.

By using deep learning method in this study; both the feature extraction and the classification process are performed in the deep learning method without applying any feature extraction method to the data. The generated dataset contains 29 letters and 522 pictures. In this work, the hand regions are extracted from the images in the dataset and the images obtained in binary are classified using Convolutional Neural Networks (CNN), which is a deep learning method. In this study, 12-layer Convolutional Neural Network (CNN) structure was developed for feature extraction, training and classification steps.

In this study, it is aimed to perform both feature extraction and classification in Convolutional Neural Networks (CNN) and to recognize the movements of the sign language alphabet with the least number of errors without applying any feature extraction method to the data. In this study, the rate of validation with all training data is 100%. Success rate with 3-fold cross validation method is 84.48%.

Keywords: Convolutional neural networks (CNN), deep learning, human-computer interaction, image processing, sign language recognition.

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TARLA (Turkish Accelerator and Radiation Laboratory in Ankara) Control System Architecture

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Being the first research oriented particle accelerator of the region, TARLA is a combination of different state of art technologies acting as subsystems. A central control system is essential to operate subsystems in harmony with each other in order to fulfill facility purpose where many of these are mission critical or hazardous. These conditions require the control system to be highly stable with calculated performance criteria despite being flexible enough to support wide range of interfaces, communication protocols and standards. Since machine development never ends, a suitable control system must also have the capability to comply with newly evolved subsystem requirements. Installation for majority of accelerator components are being held in step-by-step manner, where commissioning of each step demands a running control system. This condition requires the control system to be scalable within a predefined infrastructure. Under these conditions; the most suitable architecture for TARLA control system is a standalone distributed server/client model incorporated with a set of industrial grade TCP/IP networks, coupled with a combination of proven set of software tools and in-house developed applications.

Keywords: TARLA, distributed server/client model, TCP/IP

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Process Provenance Portlet for METU PORTAL

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Business process analysts and process owners define their work with flows and activities. Different people with suitably defined roles complete these business activities. There is a standard notation for defining business processes in information systems, called Business Process Modeling Notation (BPMN). In BPMN diagrams, we can automate business processes with IT systems. Defining processes in models requires some level of abstraction, although actual processes contain manual or physical activities. This simplified definition helps owners improve business processes in time. Business changes in time so processes changes too to meet new requirements, regulations and activities.

A BPMN process creates a new instance every time a process is instantiated. These instances keep process data within and create instance unique data during the process instance lifetime. These data help keep track of the process for support and maintenance. Process improvements also rely on these data. However, there is a need for a background information about the data that created by process. This information needs a new concept of proving the data created by who, when, why and what is next. These "wh-"questions are the essence of provenance. Process Provenance allows one to answer questions about the earlier steps of a process at any stage in the process.

Most process modeling applications and process engines provide just business activity monitoring which only provides data that is created in design phase of the process. This is not enough for most of the users. Users need more information about their process, which is recorded during process instance lifetime.

Process provenance requires interaction, which provided by process engine specific tools. These tools only focus the process variables and flow conditions. Provenance data is not just list of business rules but also data from process instance that created during the process instance lifetime.

There is a need for provenance data of the process models alongside business activity monitoring.

Processes provenance is not about just showing collected or documented data; how you show these data is also important for user to understand. We propose the idea of layered provenance that helps to separate process specific data from process instance related data.

Information Layer (Detailed Documented Diagrams): Users do not need to be aware of the processes model, details of the process, interacting actors and their roles in the process. BPMN diagrams are used from process engines to run processes and helps users to understand how business processes works, how many steps there are, which conditions need to be satisfied to move to the next step.

Search through processes: Users should be able to search defined business processes to get better understanding of how business done in an institute, department or a company.

Interaction Layer (Interactive Diagrams): Users can start a process instance through GUI of the information system. System should be able to provide started process instance information in detail. Static BPMN image only shows the steps of the process but process instance specific information is the real data that is needed. Detailed process instance specific data supports the provenance of the specific process instance.

Self Service: Users usually want to know which state their business process in. Conventionally users interact with the help-desk personnel over telephone (hot line) or e-mail (support) to get information about current state of the started or ongoing process instance. Interactive BPMN diagram for a specific process instance provide provenance.

Clearance Layer (Role Based Level of Information): Business process instance keeps various important information. These information can be specific to certain people even can be secret. Information system keeps roles to differentiate people from each other. Processes and its tasks are assigned to users with the role information. Some roles are administrative; some roles have managerial responsibilities and privileges.

Information Sharing and Hiding (Process data Authorization): Authorization of the information that is shown is important. A business processes creates and keeps records of data, which may not be wanted to be shared. Flow condition results, comments and recorded explanatory sentences may be for the eyes of management only.

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Estimation of Stock Exchange Prices by Using Fuzzy and K-Means Decision Trees

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The estimation of stock exchange prices is a hard problem to solve. However, there are recent studies to estimate possible stock exchange prices like algorithmic trading. The relation between stock exchange prices and company balance sheets should be investigated to determine if there are any correlation between them by using decision trees. In this study some crucial ratios like profitability are taken into consideration to build decision trees. These values, which are the base input to build decision trees, are classified by using fuzzy methods and k-means algorithm to estimate possible future prices of stocks. Several decision trees are build based on these classifications to estimate possible stock prices.

It is discovered that decision trees are very useful to estimate a stock price. The main focus to keep profitability of investors in stock exchange by reducing their risk in the market. Decision trees estimates high ratio of profit and low interval of time in stock market. It is discovered that the risk can be significantly reduces by using them. Decision made by built trees provided 60% of success while then increase profitability. It is discovered that investors can buy during a bull market and sell before a bear market. Furthermore, their time during bear market is significantly short. This research work with the date between 2009 and 2015. Decision trees provided that investors buy stock only between 15% and 30% of the 6 years' period while they gain between 50% and 150% profit depending on the models.

Keywords: K-Means, Fuzzy Logic, Decision Trees, Stock Exchange Price, Estimation, Market Direction, Balance Sheet, Profitability, Sheet Value, Company Value, Entropy, Fuzzy Rules, Membership Functions

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The Selection DC-DC Converter's Components with Evolutionary Algorithms

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It is important that the designs of DC-DC converters can be made effectively in the field of power electronics in terms of making conversion at high success rate and providing minimum fluctuations in their outputs. These design steps also require many mathematical operations. In this study, the components of the specified DC-DC converters are selected under the desired criteria from the industrial series (E12 and E24) by using evolutionary algorithms (artificial bee colony, differential evolution, genetic and particle swarm optimization algorithms). The designs and analyses of DC-DC converters chosen according to the type and features (determining/selecting the components in accordance with the specified industrial series) can perform easily, fast and effectively through the software developed for this purpose.

Keywords: DC-DC converter, component selection, evolutionary algorithm.

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Backtracking Search Algorithm for Analog Filter Group Delay Optimization

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In this paper, backtracking search algorithm has been applied for optimizing of the analog filter group delay. The fifth-order Chebyshev low-pass filter is used as the test filter then the second, third and fourth order all-pass filter structures are connected to it in cascade form respectively. Afterwards, group delay of the filter is minimized for the each cascaded all-pass filter structure. The group delay responses and the optimal parameters of the optimized filters have been determined. A comparison has been made with other design techniques published in the literature, demonstrating that the proposed algorithm provides better or at least comparable results in terms of minimizing group delays.

Keywords: Filter design, group delay, evolutionary algorithms.

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The Calculation of Switching Angles of Inverter for Harmonic Control with Actual Evolutionary Algorithms

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In order to eliminate the harmonics occurred naturally at the inverter outputs, appropriate switching angles must be selected. This selection dependent on the number of harmonics to be eliminated can be implemented by solving complex equation systems with multiple variables. In this study, the software is developed to calculate switching angles according to harmonics to be eliminated by using the actual evolutionary algorithms (backtracking search, cuckoo search, harmony search, vortex search algorithms). The software, which can be used easily, fast and effectively, is able to calculate switching angles individually or comparatively according to the chosen algorithms; inverter input-output signals/waves, harmonics and related parameters can be observed both numerically and graphically.

Keywords: Inverter, harmonic control, switching angle, evolutionary algorithm.

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Geant4 Simulation for Proton Therapy

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This study reports conventional radiation therapy directs photons (x-rays) and electrons at tumours with the intent of eradicating the neoplastic tissue while preserving adjacent normal tissue. Radiation induced damage to healthy tissue and second malignancies are always a concern [1-2]. Proton beam therapy, one from of charged particle therapy, allows for excellent dose distributions, with the added benefit of no exit dose [1-2]. These characteristic make this form of radiotherapy an excellent choice for the treatment of tumours located next to critical structures. Although proton therapy is clearly capable of providing superior dose distributions as compared with photons, there are still some questions remain unanswered [1]. Current evidence provides a limited indication for proton beam therapy. Actual clinical studies are needed to validate the virtual clinical data. This review focuses specifically on the clinical outcomes and adverse events with charged particle radiation therapy compared with other treatments in patients with cancer [1,3].

Proton Therapy is a C++ software language, free and open source application developed using the Geant4 Monte Carlo libraries. The badic version of Hadron therapy (Atom number ≥1) is contained in the official Geant4 distribution (www.cern.ch/Geant4/download), inside the category of the advanced examples [3]. This version permits the simulation of a typical proton/ion transport beam line (Pencil Beam Proton Therapy (PBP)) and the calculation of dose, deposit dose (Edep), Linear Energy Transfer (LET) and show depth-dose profiles and Bragg peak [2-3].

We focused on the PBP scanning delivery technique, which allows for intensity modulated proton therapy applications. The most relevant options and parameters (range cut, step size, data base binning) for the simulation that influence the dose deposition and LET were investigated, in order to determine a robust, accurate and transverse profiles ant different depths and energies between 40 and 130 MeV have been assessed against reference measurements in water and brain.

Keywords: Geant4, Proton Therapy, Pencil Beam Proton Therapy, LET. Deposit dose.

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Hardware-In-the-Loop Validation of Vehicle Control Loops

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Automobiles have already transitioned from a mechanical beast to an electrical/electronic beast. On the other hand, what has also already happened, but most people are not aware of, is the fact that they have transitioned to a software beast as well. Automobiles contain several CPUs, each one with a different purpose, running really complex programs. Validation of these programs, and of the systems they form, is very critical, as a bug in one of them may result in material and human loss [1,2]. This paper addresses the problem of verifying one of these softwares, i.e., the one running on the Engine Control Unit (ECU).

The control algorithms running on the ECU (which supervises energy and torque management) cannot be tested on the vehicle until it is mature enough, because problems in the algorithm may cause great material loss (if not human loss). It is also not easy to create all required test scenarios with the vehicle involved. That is why a real-time computer called Hardware-In-the-Loop (HIL) [3] is used to emulate the vehicle, while the actual ECU is used to run the control algorithms.

This work serves both as a crash course on HIL/ECU emulations and a case study. It is based on a Plug-in Electric Vehicle (PEV) [4]. We first implemented the controller (a basic PID algorithm) and the vehicle models in MATLAB/Simulink. Then, we ported the controller to OpenECU (which is also the controller of choice in the actual vehicle) and then ported the vehicle models to two different HILs, namely, OpalRT and ETAS. We compared and contrasted the two HIL implementations, and hence, allow our audience to see what the main idea is in HIL based validation and what is specific to a particular HIL platform.

Keywords: Automotive Software Validation, HIL, ECU, PEV.

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A Case Study on Identification of Electrical Devices in Small Offices Using Nearest Neighbor Methods for Smart Grid Applications

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This work aims a smart grid use case that spans a collection of small offices and/or homes. The assumption is that all smart grid enabled electrical devices are plugged in through their individual smart plugs. That is, what the works in the literature call Intrusive Load Monitoring (ILM) [1], while Non-Intrusive Load Monitoring (NILM) monitors the aggregate power consumption [2]. The purpose is to identify what electrical device is plugged in. This is done by monitoring the power consumption for a few minutes. Identification allows servers in the cloud to reduce overall power consumption during peak hours. Based on service level agreements, subscribers allow the electric utility company to shut down or delay certain devices through their smart plugs. There is also the goal of collecting "big data" on the consumers so that the companies involved can offer them enhanced products and services.

When the server senses that a smart plug is supplying current again, it tries to identify if it is one of the devices that have been previously plugged in. If it turns out that the power consumption profile of the device does not resemble any of the previous ones, a new device profile is created and the user is prompted so that he/she can enter information on the new device. A smart plug can also be associated with a single device such as a refrigerator or a washer.

The process of identifying if a device just plugged in is one of the already profiled ones (if so, which one) and if it is a new one is a machine learning problem [3]. In this work, however, we show that even basic "nearest neighbor methods" work well in a small office environment. We collected "training data" (power and current consumption) from 5 laptops, 5 monitors, and 5 phone chargers (total of 15 data sets) for 10-15 minutes each time. We extracted a feature vector, namely, minimum, maximum, mean, median power consumption as well as its standard deviation from each data set. We then collected same amount of data from 5 other laptops, 5 other monitors, and 5 other chargers for testing purposes. In this work, we show that basic "nearest neighbor methods" work fine in identifying which device is which type of device (laptop or monitor or charger). We have experimented with 6 different distance metrics.

Keywords: Smart grid, Smart plug, Intrusive load monitoring, Identification of electrical devices, Nearest neighbor.

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TRANSFORM INTO INDUSTRY 4.0 USING SYSTEMS ENGINEERING APPROACH

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Nowadays, a major change in production is said to be Industry 4.0. This is also called the new industrial revolution. This concept, which aims to enable managers to control the production line remotely, is thought to increase productivity and speed in production. Industry 4.0 which aims to leave the place of human activities in production to intelligent robots (e.g. communication between robots, smart transport systems) has started to attract attentions in Turkey as well. There are many ways of realizing this transformation and digitization process in production. This transformation encompasses many areas that will affect from product design to production, transportation and even payment processes. It seems very difficult to introduce a solution for the transformation without identifying all the works to do as a whole. In this paper, system engineering capabilities have been proposed to be used to transform into Industry 4.0. For this purpose, system engineering approaches and tools will be explained. The system engineering is a holistic approach. It evaluates all technical specifications to provide a quality product. In the process of transition into industry 4.0, the existing system should be well recognized and analyzed in all respects. User requirements should be identified for the establishment with the help of work breakdown structures like Structured Systems Analysis and Design Method, SSADM. Starting from the user requirements, all other requirements should be identified at functional, departmental and company-wide levels. Cost breakdown structure and its requirements of digitalization should also be identified in the same way. A non-parametric analysis could be used for identifications. At the end of all identifications, a companywide readiness level for the Industry_4.0 can be uttered. This paper also proposes a practical guide for further implementations. It could then be applied to different establishments as well as industrial sites on the way of transformation into the Industry_4.0.

Keywords: Manufacturing, Systems Engineering, SSADM, Industry 4.0 , Production, Economics

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An Improved Active Contour without Edges Model

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Active contour without edges (ACWE) model is one of the most extensive region-based image segmentation models. However, it has the problem of easily getting stuck in local optima which causes the unsatisfied segmentation results. The ACWE model is based on curve evolvement and the level set method.

To address the getting stuck issue in the ACWE model, an improved model is proposed. The improved model utilizes the Gravitational Search Algorithm (GSA) in order to fit the energy term. It was tested on a variety of images, from Weizmann dataset to proper medical images prone to local optima.

The experimental results show that the improved ACWE has a better performance than the conventional ACWE with %75 less number of iterations in order to converge to the curve.

Keywords: Active contour without edges, image segmentation, contour initialization, gravitational search algorithm.

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Facility Location Selection Problem in System Engineering Perspective: An Application

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The decision of facility selection is a problem which involves plenty number of criteria in the evaluation process. Since the abundance of criteria and the requirement of compatibility with each other, the problem of facility selection is handled as very complicated problems through the history. In order to solve these complicated problems, very specific decision making methods have been developed as multi criteria decision making. System engineering has a perspective of looking at problem as a whole and evaluate all the criteria that have seen. In this study, AHP method is used by considering qualitative factors in ÖSYM and also system engineering perspective is used. Analytic Hierarchy Process method will be used in order to determine optimum number of exam center and selecting their locations in provinces of Turkey by looking at various factors in respect to both economical and societal issues in this study. By determining the optimum location, 4 different main criteria will be compared (transportation, features of building, physical condition of the exam salon, environment of the building) according to the survey data from 69 institutions of the ÖSYM. As a result of this study, it was aimed to determine the optimal examination centers which will be opened by calculating different criterial weights.

Keywords: Analytic hierarchy process, location decision, decision making, system engineering.

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Application of Supervised Machine Learning in BGP Anomaly Detection

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The application of machine learning is on the rise and aimed at recognition and early detection of anomalies, both in the research community and in the industry. Since the Internet is not a centralized system and is made up of a multitude of autonomous systems, its proper functioning ie the connection of its parts, is based on the proper functioning of the BGP (*Border Gateway Protocol*) on the border gateway routers. The BGP protocol is the standard routing protocol on the Internet and is based on a trust model. As such it is targeted for attacks and harmful effects of anomalies.

One of the techniques of machine learning for anomaly detection is classification, which belongs to supervised learning and deals with classifying of data into a definite, finite number of classes. Machine learning models for detection of anomalies in BGP protocol are considered in this study: an anomaly either exists or does not exist. Support Vector Machines (SVM), Naïve Bayes (NB), decision tree, neural networks, ensemble methods were used to develop different models based on machine learning algorithms for better anomaly prediction.

We used various machine learning algorithms to improve BGP detection models performance measures. Specific scenarios of different types of anomalies affecting the BGP protocol are considered. We concluded that performance of the models used for classification depends on anomaly datasets used hence no single model performs the best on all considered datasets. Preprocessing of the datasets was beneficial in terms of improving performance measures as well as creating complex models such as filter and wrapper models.

Keywords: Machine learning, anomaly detection, BGP, supervised learning, classification

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A Survey of Learning Programing in Turkish

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Choosing the first programming language to be taught in high school and university curriculum is an important task as it directly affects the efficiency and success of a programmer's education and training. Considering the fact that the grammar and the keywords of commonly used languages invariably reflect those of English, it is natural to assume that teaching the key programming concepts in the students' native language can be useful for easing the learning process. This survey is carried out as a part of the requirement analysis work for a project that involves designing and developing a new programming language with a suitable Turkish-based syntax for teaching programming concepts to beginners.

In this work several Turkish-based programming environments and languages are studied in terms of aims, features, syntax, keywords, constructs, data types, built-in functions and supported paradigms. Similarities and differences of the languages are compared in terms of learnability.

Results of this study indicate that there are various environments and languages aimed at divergent target audiences. Examples span a large area including pseudocode, general purpose languages, and those for developing visual forms, game based programming and visual programming using blocks. This study is expected to help understanding the deficiencies in current offerings and improving upon them or developing new solutions to ease the teaching of programming.

Keywords: programming languages, Turkish, first language, native language.

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Recovering the incomplete sampling values in GPR data with interpolation techniques

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Ground Penetrating Radar (GPR) is a widely used method to investigate the underground archaeological and geological structures [1]. The use of GPR in researches and applications has recently been increasing, because it can detect the underground structures quickly and accurately.

There are two main factors that affect the success of GPR research and applications. These are data collection parameters and search area properties. Data collection parameters such as antenna frequency, sampling and profile range, etc. are under the control of users, and the values of these parameters can be selected according to the search area properties. On the other hand, the search area properties such as uneven surface, the archaeological and other obstacles, technical failures during data collecting, etc. are outside the control of users. As a result, the data collected from the search area become incomplete and inadequate. Due to the incomplete and inadequate data, an accuracy of 2D/3D visualization of the underground structures decreases [2]. This study proposes Mean interpolation techniques to produce incomplete sampling values to increase an accuracy of 2D/3D visualization.

GPR data consist of parallel profiles, profile consists of traces and trace consists of sampling values. In proposed study, first, the intermediate sampling values are extracted from the traces. Second, the new sampling values are produced instead of the extracted ones by applying different interpolation techniques using the remaining sampling values. Finally, the average is calculated by taking into account the amount of increase/decrease between neighboring values which used for production of sampling value. If more than two neighboring values are used to produce the incomplete sampling value, the distance is included in the calculation process.

The proposed Mean and standard Cubic, Cubic Spline, Linear, Median and Mean interpolation techniques were tested on real GPR data [3-5]. In order to determine the best interpolation method, the produced incomplete sampling value is compared with the original sampling value extracted from the trace. The method that gives the closest result to the original sampling value is determined as best one. The obtained results show that the proposed interpolation method gave best accuracy of 94-99%.

Keywords: GPR, profile, trace, sampling value, interpolation

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3D visualization of GPR data

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Ground Penetrating Radar (GPR) is a geophysical technique which is widely used to acquire the data from near-surface part of underground [2]. Acquired GPR data allow users to detect, analyze, visualize and interpret the underground structures.

In general, in GPR research and applications, the search area is squared and scanned to acquire the raw data. The acquired raw data are preprocessed for interpreting the underground structures. One of the most important problems GPR research and applications is 3 dimensional (3D) visualization of hidden structures (anomalies) in GPR data [1]. This study proposes a method for contributing the mentioned problem. The proposed method consists of four steps. These are the collection of the raw data from the search area, the completion of the missing data by interpolation, the extraction of the anomalies from the GPR data and the display of the extracted region in 3-dimension.

In this study, the method is proposed to 3D visualization of underground structure with high accuracy. In the first step of proposed method, raw data is obtained from search area. This collected raw data were previously processed using standard data processing techniques (trace editing, spectral analysis and band-pass filtering, highpass filtering, background removal, gain and migration etc.). In the second step, interpolation techniques are used to recover the missing data in the GPR profiles [3-5]. After completing the missing data, filter is applied without disturbing the resolution of the profiles to remove meaningless spots or the noises caused by electromagnetic waves. In the third step, the underground structures are extracted from GPR data and placed in a 3D cube. The anomalies are extracted from the profiles by using sampling value feature. The sampling value in GPR data very close to each other without anomalies, otherwise, these values are quite different. In the final step, the extracted part of underground structure (anomaly) are visualized in 3D environment by adding volume obtained 2D model. The 3D model of underground structures viewed from different angles.

Keywords: GPR, sampling value, interpolation, 3D model, visualization

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An Efficient Privacy Preserving Petition System

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In a privacy preserving petition, the petitioner aims at convincing an organization that a certain number of people have a consensus on one issue, and it is desired that the identity of each participant remains hidden. We introduce a new primitive called “graded signatures" which achieves an efficient privacy preserving petition system. Graded signatures enable a user to consolidate a set of signatures on a message m originating from l different signers. The resulting consolidated signature object on m reveals nothing more than l and the validity of the original signatures without leaking the identity of the signers. We call the value , the grade of the consolidated signature.

We provide two main constructions for graded signatures in a PKI setting using bilinear maps. Our first construction assumes what we call the “trusted signer" setting and generalizes the signature schemes of Boneh, Lyn, Shacham inheriting their short signature size even for consolidated signatures which are of constant (and in fact very short) length. Our second construction is in the more general setting where signers may be adversarial and our construction relies on Groth-Sahai proofs and efficient arguments for showing that an integer belongs to a specified range. We achieve a linear in the grade signature size in this setting.

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Sentiment Analysis Using a Random Forest Classifier on Turkish Web Comments

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Sentiment analysis is an active research topic that has emerged since early 2000s as a field of text classification. Most of the studies in this field focus on the analysis using the English language, where the Turkish and the other languages have fall behind. The purpose of this research is to contribute to the text analysis in Turkish language using the contents that we access through web sites. In particular, we deduce the sentiment behind noisy product reviews and comments in a highly popular commercial web page. In this context, we generate a unique dataset that includes 6000 product review samples for training our classification model. There are different word representation methods that are utilized in sentiment analysis, such as bag-of-words and n-gram models. In this work, we generated our word models using the word2vec algorithm. In this model, each word in the vocabulary is represented as a vector of 300 dimension. We utilized %70 of our dataset in the training of a Random Forest Model for sentiment analysis. We make a binary classification of sentiments as being positive or negative, utilizing the ratings of the user for the product as classification labels. In the highly noisy and unfiltered comments, we achieved an accuracy of %82.64.

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Discovering Future Trends Over Social Media Using SVM Classifier

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Data mining is a prominent and state of art field in computer science. The huge amount of data stream around social media tools. Twitter is one of the important scoial media tools and it is good experiment place to make data mining, predictions of future trends. The popularity of twitter comes from sharing hot concept, not being have to be a friend of one for being able to tweet to any topic. Computer engineering technologies involving data mining, natural language processing (NLP), text mining and machine learning are recently utilized for social media analysis. A detailed analysis of social web can discover the trends of the public on any field. In this study the one of the efficient technique; suport vector machine (SVM) algorithm is applied to the trend hashtags corpus and a sentiment analysis is made. Another key point in this study for making deimentionality redcution principle component analysis (PCA) is used for being able to have more efficiency and performance. The results demonstrates that SVM and PCA both work very well for sentiment anaysis.

Keywords: Social web mining, tweeter analysis, machine learning, text mining, natural language processing.

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GEANT based Simulation of Gamma Knife Applications

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The Monte Carlo simulation with Geant4 has been used to simulate the Leksell Gamma Knife and to verify its treatment planning system Leksell GammaPlan (LGP). This radio surgical technique, intracranial lesions can be treated in a single session with high accuracy and critical brain structures can be protected. Radiation from 201 ^{60}Co sources comes through a collimation system to the target area, focusing on the isocenter, where the maximum dose is released. Geant4 simulation was employed to calculate the dose distribution in a spherical water phantom and heterogeneous brain phantom. In order to simplify the code, we simulated only one single source, rotating the phantom at 201 angular positions. the same of the sources in the device. for all the available collimators (4, 8, 14, 18 mm). This study primarily focuses on the differences the effects of inhomogeneity. Comparisons between spherical water phantom and heterogeneous brain phantom were performed. The outcomes show that, as the collimator diameter increases, the differences appear to increase, making it more likely that the healthy tissues exposure more doses. As a result Gamma Knife planning should consider the inhomogeneity effect in dose calculation.

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A Modification of Dragonfly Algorithm by means of Exploration Behaviour for Single Object Problems

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Heuristic algorithms try to find the optimal value of the function in the solution space by searching randomly with the help of heuristic information in problems with very large search spaces. Heuristic optimization algorithms aim to find solutions that are close to the best when the solution area is very large and mathematical methods can not find the optimum solution. The biggest disadvantage of heuristic optimization algorithms is that they try to find the best local value while getting the best global solutions. A variety of methods have been developed to prevent the local best solution. The Dragonfly Algorithm (DA) is a fairly new heuristic approach. This algorithm refers to the unique and rare intelligent behavior of dragonflies in hunting characteristics. Dragonflies swarming in small groups moves back and forth to hunt. They travel in large groups while migrating. According to DA , the behaviour of swarms follows three primitive principles: Separation; which refers to the static collision avoidance of the individuals from other individuals in the neighbourhood. Alignment; which indicates velocity matching of individuals to that of other individuals in neighbourhood. Cohesion; which refers to the tendency of individuals towards the centre of the mass of the neighbourhood. The main aim of any crawler is to be able to survive. Therefore, the group members must be directed towards food sources. In addition, with this main action, they can be disturbed by their enemies from the outside. If these two behaviors are added, five main factors are used in the location update process. Each of these behaviors is mathematically refined and modeled and applied to the algorithm.[1]

In this study by using DA, flies' escape and nutritional approach behaviors were rearranged according to neighborhood numbers and group behaviors.

The following Unimodal Benchmark functions; Sphere (F1) , Schwefel's 2.22(F2) , Schwefel's 1.20(F3) , Schwefel's 2.21(F4), Rosenbrock(F5) , Step(F6) , Quartic Noise(F7) are tested before and after appliying the modified DA. According to the results, the following performance improvements are obtained ; for F1 function %92 , for F2 function %31 for F3 function %51, for F4 function %40 , for F5 function %99 , for F6 function %83 , for F7 function %75.

Keywords: dragonfly algorithm, optimization, single object problems

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An Assessment of Use of Data Mining Techniques on Social Media Content For Crime Prediction

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In recent year, data mining had been used as powerful data analysis techniques in various domains to find pattern and predict huge data set. To analyze crime data to find pattern and trend of crime was very successful done using data mining in many researches. However the pattern of crime is not static, it always change and growth. Rapidly growth of social media usage; hidden potential information can provide valuable insight for crime prediction when data mining techniques applied to user's post and tag.

Hence, this paper presents as systematic literature review in crime prediction using social media content. We identified 154 papers from recognized digital library such as IEEE Xplorer, Web of Science, Sciencedirect, Springer Linked, EBSCOhost, Emerald, CAM digital library and Google Scholar, published between time span 2010-2017 that provided data on crime prediction on social media. After multiple stages selection process, 9 papers were selected for detailed study.

The contribution of this review is the consequently that of supplying researchers with a summary of all existing information about crime prediction using social content; types of social media content and data mining techniques that are commonly applied for crime prediction. The obtained findings, including the state of art and shortcomings found in this systematic literature review, provide strong evidence to encourage further research in the development of a new approach in crime prediction.

Keywords: Crime prediction, data mining, social media, sentiment analysis, text mining, systematic review

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Tracking in Small Hodgkin-Huxley Neuron Clusters

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Networks with spiking neurons play an important role in many applications of pattern recognition and computational neuroscience. The modeling and algorithming of neurocomputational processes demands the ability to track a chosen set of cells in the cluster, i.e. to produce in them the arbitrary desired regime of spiking or bursting via controlling a minimum number of other network elements.

Recently we demonstrated the efficiency of feedback tracking algorithms in the single Hodgkin-Huxley (HH) dynamical system [1]. Here we develop two alternative suboptimal approaches, Fradkov's speed gradient [2] and Kolesnikov's 'synergetic' target attractor feedback [3], to track the sequences of spikes and bursts in the small clusters of HH neurons with stochastic elements considering the fluctuation of the extracellular environment. The control is performed via driving the action potential of one or just few neurons, while the tracking goal is defined for other cells chosen arbitrary in the cluster.

The comparison of two algorithms demonstrates that both are successful for tracking in small HH neuron clusters. The choice of the certain approach depends on the constrain of control: if the main factor is the minimization of the tracking error, the target attractor is preferable, while if we consider performing the control by the minimum possible energy, the speed gradient has the priority. Both algorithms provide the robustness, they do not depend sufficiently on the initial conditions and are stable under the relatively small external perturbations.

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Keywords: Neuroinformatics, Hodgkin-Huxley neuron, feedback tracking.

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Feedback Control of Hodgkin-Huxley Neuron Collective Bursting

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Modern neuroscience demonstrates a great progress in study of the collective chaotic regimes of biological neurons, but its mathematical modeling still needs a sufficient improvement [1]. Hodgkin-Huxley's system [2] covers some possible scenarios of the appearance of the collective bursting: ion channel mutations and fluctuations in concentration gradient of ions from inside to outside the axon [3].

Here the Kolesnikov target attractor feedback [4] is applied to control the collective bursting in the small clusters of Hodgkin-Huxley neurons via the driving action potentials in the neural axons. The algorithm allows tracking, i.e. detecting the chaotic regimes in the cluster, making a transfer between a regular and chaotic phases and stimulating or suppressing the collective chaotic bursting.

The proposed algorithm can be used efficiently for studying, detecting and suppressing the epileptiform behaviour [3] of spiking and bursting in the models for biological neuronal networks.

This work has been supported by the TÜBİTAK project 116F049 "Controlling Spiking and Bursting Dynamics in Hodgkin-Huxley Neurons".

Keywords: Neuroinformatics, Hodgkin-Huxley neuron, target attractor feedback, collective bursting control.

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Speed Gradient Control of Quantum Logical Gates with Dynamical Properties

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Quantum bits (qubits) serve as basic elements for quantum computation, and they are driven by quantum logical operators (quantum gates) [1]. In standard approach the properties of the logical operator are fixed in time. Here we propose an alternative paradigm, where the gate is dynamical and controlled itself, and it can be converted in time from one to other operators, depending on computational needs. In this case the sequence of logical operators acting on qubits during the computation can be replaced by the dynamical transformation just of few quantum gates.

Speed gradient (SG) feedback algorithm [2] has been successfully applied to two-level quantum system (with or without a distinct dissipation) driven by external classical field , by the combination of quantum coherent and incoherent control [3,4]. Here we invent the SG control to model the external control fields (serving as logical operators) and to design efficiently such dynamical gates with the target properties versus time.

We demonstrate the efficiency of our approach in designing the dynamical transformation for the basic set of gates used in quantum computations: phase shift, CNOT, Pauli set, Hadamard, SWAP, Fredkin, Toffoli.

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Keywords: quantum computations, quantum gates, speed gradient feedback.

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Comparison of Genetic Algorithm and PSO Method for Optimization of Potential Fields Parameters

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Potential Fields method is one of the most popular local navigation algorithm mainly used in mobile robot navigation. This method, in essence, allows a mobile robot to perform motion planning and obstacle avoidance behaviours simultaneously. Despite its simplicity, it has many advantages over similar local navigation algorithms. However, parameter estimation is a critical problem for local navigation algorithms, determining the safety of the navigation process and the smoothness of the travelled path.

Two metaheuristics approaches are employed to optimize parameters of potential field method, namely Particularly Swarm Optimization (PSO) method and Genetic Algorithms. These two methods are adapted into the estimation of Potential Fields parameters for different scenarios.

Designed algorithms are implemented in ROS platform and visualized in 2-D Stage simulator. In order to compare and validate both approaches, several different scenarios have been designed with incremental level of difficulty. Both approaches allow robots to complete their task in a safe manner. However, results prove that the Genetic Algorithm approach has superiority over the PSO in terms of computational complexity and smoother navigation.

Keywords: Potential Fields Method, Optimization, PSO, Genetic Algorithms.

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Semantic Web and Cloud Computing for Higher Education

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The purpose of this study is to evaluate the innovations brought by cloud computing and semantic web along with various aspects. In the context of these assessments, the applications of higher education explained and the advantages of using in higher education discussed.

As cloud technology has recently become popular, applications in the field of education are increasing. Higher education institutions use web-based virtual server technology to provide cloud computing platform and software services. A web-based virtual server may occasionally become a problem when used for creating cloud systems for additional external data sources. It is difficult to regenerate the whole application in a short time. This problem solved by the creation of semantic web and private cloud taxonomy. The biggest challenge in the development of the world data system is the creation of common data space for data analysis, processing and exchange. The cloud computing model provides semantic interoperability and modularity features when used with semantic web approaches. The semantic web provides a general framework in which the use of cloud services can easily controlled.

Cloud computing technologies that use the power of semantic web technologies enable to semantic interoperability and modularity in all kinds of areas where information systems are used for web services in the web environment.

Keywords: Cloud computing, semantic web, ontology, education, models of cloud computing.

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The Impact of Dataset Characteristics on Collaborative Filtering

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Recommendation systems are used to give suggestions to users about various items. There are several methods that have been developed to create better recommendations. Collaborative filtering is one of these approaches. The main idea is that the users who agree on item preferences in the past will also be agree on the future. The accuracy of the collaborative filtering method may depend on the different characteristics of individual users or items. The rating distribution of the datasets may affect the success of the method. In this study, the different characteristics of users or items namely the number of ratings per user, the number of ratings per item, the average rating value per user and the average rating value per item are computed on a benchmark train dataset. The test dataset is sorted based on those computed values. The neighborhood based collaborative filtering is applied on those datasets. The mean absolute error values are calculated on sorted test datasets. These datasets are divided into several chunks. The error values of different chunks are compared to find the effect of dataset characteristics on the predictions. The results show that the average rating value per user or average rating value per item increases as the mean absolute error values decrease on neighborhood based collaborative filtering.

Keywords: collaborative filtering, dataset characteristics, ratings.

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Best Function Analysis in Epilepsy Diagnosis by SMO-based-SVM Method

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Epileptic seizure (or crisis) is a clinical event occurring abnormal electrical changes resulting in the nerve cells of the brain. EEG signals are mainly used in epilepsy diagnosis. Electroencephalography (EEG) signals are mainly used in epilepsy diagnosis. Therefore, analysis of EEG signals is very important in epilepsy diagnosis. Since the frequency content of epileptic EEG signals differ in before and after the seizure, Discrete Wavelet Transform (DWT) method, which analyzes in the frequency domain, has a very important place. This method is used as an ideal bandpass filter for seizure detection and classification [1]. DWT is also used to extract the features and characteristics of epileptic EEG signals at different scales and resolutions [2]. The dataset [3] used in this study consists of five (A-E) different sets with each 100 single-channel EEG segments of 23.6-sec duration. While set A and B were recorded from 5 healthy volunteers, set C, D, and E were recordtaken from 5 patients. Set C and Set D contain activities measured from the non-attack interval, while set E only includes activities with epileptic attacks. In this study, a 3-class system was designed using data sets A, C and E.

In this study, SMO-based-SVM method was used for diagnosis of epilepsy. Also, which of the functions of this method was investigated to have better performance. EEG data of patients (set-C and set-E) and healthy (set-A) were used for this. Low (CA) and high (CD) frequency coefficients are obtained by applying second order DWT to these data. From the CA and CD coefficients, 6 different features are extracted in the time domain and these features was given to the classifier in which the SMO-SVM method (normalizedpolykernel, polykernel, puk ve RBFkernel functions) is used.

The results showed that the puk function of SMO-SVM classifier in diagnosing epilepsy using the extracted features from both the CA (92% success rate) and CD (89.66% success rate) coefficients was more successful than the other functions.

Keywords: EEG, Epilepsy, SMO-SVM.

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Pre-estimation of Sleep Apnea Using Sleep ECG Signals

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Sleep apnea is one of the most important diseases caused by snoring and can be expressed as a respiratory arrest in sleep [1]. This disturbance can be repeated many times during the night. People with symptoms of sleep apnea can experience many serious problems during the day. Sudden death in sleep, stroke, heart attack and heart failure, respiratory failure in lung patients, and uncontrolled diabetes are examples of these adverse events [2, 3]. For these reasons, diagnosis and treatment of sleep apnea is very important.

In this study, Variational Mode Decomposition (VMD) method [4] was applied to raw electrocardiography (ECG) signals. Using the obtained intrinsic mode functions (IMF) components, it is estimated that sleep apnea may occur in the patient before apnea occurs. Data of three patients from the PhysioNet ECG database [5] were used for this. Using the records of the patients, the VMD method was applied on the 4 epochs (each epoch is 30-seconds-lenght) before the apnea epoch and the first 4 IMF components were obtained. From the 4 IMF components obtained, 5 different features were extracted in the time domain and given to the Random Forest (RF) classifier.

As a result, apnea was estimated with a 73.86% success rate before this apnea occurred by using 3rd IMF component. The results have shown that apnea can be predicted before apnea occured in the person by using the VMD method, successfully.

Keywords: ECG, Random Forest, sleep apnea, VMD

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Diagnosis of Obstructive Sleep Apnea with Size-Modified ECG Signals Using the SVD Method

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The obstructive sleep apnea (OSA) is the most common sleeping disorder. OSA has been described as 'breathles or stop breathing' due to too much reduction or complete stoppage of the breath in short periods during sleep [1]. The most common complaints of people with this condition are excessive fatigue and sleepiness during the day. Due to OSA, many problems arise such as low performance in daily activities, increased risk of traffic accidents, work accidents, psychological distress and decrease in memory activities [2, 3]. The prevalence of this disease depends on its ability to lead to death and to sneak. The quality of life of a patient with a sleep apnea deteriorates. For this reason diagnosis and treatment of this disease is very important.

In this study, Electrocardiogram (ECG) signals belonging to 6 patients taken from PhysioNet ECG database [4] were used. Firstly, these signals were filtered and then divided into 30-seconds-length named as epoch. The Singular Value Decomposition (SVD) method was applied in the feature extraction phase. After applying the SVD method to ECG signals, sleep apnea diagnosis was realized using the new reduced-size signal. The new signal with 6, 10, 15 and 30 singular values obtained after the SVD method was given to the Random Forest (RF) classifier and the results were interpreted with Kappa coefficient and Average Accuracy Rate (AAR) statistical measures.

The results showed that SVD method with 6 singular values (AAR=84.82%) was able to better express this signal by reducing the size of the signal and proved to be successful in diagnosing sleep apnea. The Kappa coefficient is also calculated as 0.4134 for 6 singular value groups.

Keywords: ECG, Random Forest, sleep apnea, SVD

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Using Various Local Binary Pattern Features to Automatic Metastaz Detection in Histopathology Image

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Metastatic presence in lymph nodes is one of the most important prognostic variables of breast cancer. Currently, whole slide images of histopathology lymph nodes are carefully examined by pathologist to detect metastasis. This process getting long time also it is subjective. The automatic metastaz detection method will reduce the time-consuming and help to find metastasis regions which are hidden from human visual cortex.

In this paper, we present a method for automatic metastaz detection. Firstly, for stain normalization we use linear mapping of a source image to a target image using colour deconvolution method. Colour deconvolution is a method to obtain stain concentration values when the standard stain matrix is given. Secondly, for feature choice we using various local binary patterns are presented by Wan and his friends [2]. Finally, we apply neuron network classifier for classification.

The experimental results show that classification accuracy using combination of various local binary pattern features get higher value than using normal local binary pattern features. After all, new features get %81 classification accuracy while normal features get %67 classification accuracy.

Keywords: Image Processing, local binary pattern, histopatholgy-image, neural network, while-slide image.

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An Approach to Group Written Documents by Vector Space Model Methodology

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In today's web environment, there are too much news, electronic information, blog pages, scientific papers and similar written documents encountered, and this fact leads a considerable improvement on the methods employed to retrieve the needed information from the written documents, and made this process an attractive scientific studying subject. Written documents have to understood, groped and used one way or another. For these reasons, in this study, grouping of large quantities of written text information is handled. As a real world application, a system is developed that provides grouping of the education/profession codes of liable subjected to distribution as fast as possible, as a part of Distribution and Classification Application developed by TÜRKTRUST Inc. R&D Department. It is aimed to identificate whether each new coming information belongs to an existing group or forms a new group title in our study.

A framework which will be employed on .net platform is developed to be used on applications developed by TÜRKTRUST Inc. R&D Department, in context of this study. Vocabulary is formed by the employment of the information existing in the databases, via using the Vector Space Model as an information retrieval methodology, and by this means a vector is produced for each group. In the proposed approach, function of a new coming information which is not existing in the databases is produced via Vector Space Model, and similarity relations to the other groups are determined by Cosine Similarity method. As a result, new information are assigned to the most related groups or new groups are formed by them. Furthermore, vector functions are optimized by user feedback, in our proposed approach.

Developed framework is tested with a data set of 100 entities gathered from 10 different groups, and the results showed that proposed system is assigned 93 of the 100 codes to their groups correctly.

Providing storage of the group information in a database to shorten the process length, and optimization of vector function which is learned when new information comes, can be considered as further subjects.

Keywords: Information retrieval, Vector space model, Term frequency, Inverse document frequency, Cosine similarity

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Compare And Evaluate Web Sites based on Human Computer Interaction Design Bases

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In the globalizing world use of the internet, has taken its place in all aspects of human both in business life and daily needs. Approximately 28.7% of the world's population is using the internet. There is a 444.8% growth in the internet use between 2000 and 2010 all over the word.

With the widespread use of the internet, importance of web sites for companies is increasing every day. The statistics on Internet use in 2009 month of December, it is estimated that 234 million registered on the internet web site hosted. With the help of web sites of graphical interface, companies prove clients to reach the required process within a very short time.

In this study, we aimed to compare and evaluate the web site of TÜRKTRUST A.Ş. Company "http://www.turktrust.com.tr" with web sites which are providing similar services such as qualified electronic certificate and time stamp etc. within the scope of human computer interaction. In the study, web sites were evaluated according to "Visual Design Criteria" and "Services Provided to Users" as design bases. Greater emphasis should be placed on visual design criteria, which is an important factor in design of web sites.

Use of line, direction, dimensioning of visual elements, continuity of the relationship and visual balance, emphasis, contrasting elements, resolution, alignment and usage of colors are used as design elements for "Visual Design Criteria".

Within the scope of "Services Provided to Users", site name, site information, search service, announcements, membership, user interaction, site response time, site security information, payment methods, return and cancellation policy, delivery-related information, and online help policy are used as design elements.

At the end of the study, results showed that analysis and detailed examinations of the target audience expectations are very important in designing web sites. While designing web sites should be benefited of people who are experts on the subject and if needed experts in different disciplines should work together as a team. A sales specialist for the product to be marketing, a graphic artist for designing and a web developer need to work together. As a result combination works of different disciplined experts as a team, important features of the site will not be missed.

Keywords: Human Computer Interaction, Visual Design Criteria, Services Provided to Users, Designing Web Sites

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Comparative study of muscle fatigue by different processing techniques

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This paper aims to investigate problem of muscle fatigue through the application of a comparative study by different processing techniques to see the effect of physical exercise on electromyography characteristics. Indeed electromyography is the best physiological examination to study muscle activity and it is translated by an electromyogram (EMG).

The analysis of the biomedical signal "EMG" before and after physical exercise allowed us to quantify the physical effort and give some diagnostic elements that can help the practitioner.

We applied some signal processing techniques to quantify the physical effort and therefore we were able to identify and detect muscle fatigue.

Keywords: Muscle fatigue , EMG, FFT, Wavelet.

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