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Paper Title	A New Approach for Treating a Time Delay System: A State Space Approach
Authors	Mohamed T. Faheem Saidahmed and Mona Eissa Ibrahem Saidahmed
Conf. or Journal Name	Proceedings of the IEEE 14th International Conference on Computer Engineering (ICENCO), Faculty of Engineering, Ain Shams, University, Cairo, Egypt, 29-30 Dec. 2018.
Abstract	In this paper, a new state space design methodology is developed for systems with a single input lag. The main contribution is in converting a compensating transfer function with a single input lag to a fixed order with a finite dimensional state space system. This new methodology is mainly based on the spirit of the improved work introduced by Saidahmed in [11], where it is applied on a unity feedback closed loop delay system that ended up with a state space that has its delayed element be confined only in the control action. This new methodology resulted in an alternative unique and exact state space linear form with no delays in the state variables nor in the control action. Key ResultFinally, some examples are introduced to support our claim
Keywords	*Control Of Time Delay System (TDS), Exact State Space Model, Delay Compensation, Smith Predictor*

Paper Title	**Improved Duplicate Record Detection Using ASCII Code Q-gram Indexing Technique**
Authors	Mayada A. Elziky, Dina M. Ibrahim and Amany M. Sarhan
Conf. or Journal Name	Arabian Journal for Science and Engineering, vol. 43, no. 12, pp. 1-12, Dec. 2018.
Abstract	With the aim of reducing duplicate records in databases, duplicate record detection (DRD) ensures the integrity of data. Its role is to identify records signifying same entities either in the same or in different compared to database. A diversity of indexing techniques has been proposed to support DRD. Q-gram is one of the common techniques used to index databases. This paper introduces modification to the Q-gram indexing technique. Such modification participates in improving the performance of the duplicate detection process and in reducing the time and number of comparisons. In the proposed work, in order to make the back-end computations easier, Q-gram strings are alternatively converted into numeric values using their corresponding ASCII code. Based on these numeric values, the indexing will decrease the complexity of Q-gram comparisons and speed up the DRD process as a whole. Unlike the existing approaches, the proposed technique is easier in implementation and requires less memory space. Two other variations of the proposed technique are introduced in this paper to decrease the matching process time; the first uses a range for matching, while the second sorts words alphabetically inside blocks. According to experimental results, the three proposed techniques perform much faster and are almost as accurate as the current Q-gram technique, meaning that they can be used in large-sized databases DRD.
Keywords	*Duplicate record detection, Q-gram, Indexing technique, BKV, ASCII code.*

Paper Title	**Load-Balance Energy Aware Ad-Hoc On Demand Multipath Distance Vector (LBEA-AOMDV) for WSN**
Authors	Mahmoud M. Shawara, Amany M. Sarhan and Nawal A. Elfishawy
Conf. or Journal Name	International Journal of Wireless Networks and Broadband Technologies (IJWNBT), IGI publisher, vol. 7, no. 2, July 2018.
Abstract	Nowadays, WSNs have received great importance because they are the best solutions that can be used in harsh environments. The main limitation in WSNs is the node power because the sensor node is battery powered and charging or replacing this battery is not applicable. Moreover, in mission-critical applications, sensor nodes can sense important data and the packet carrying this data must be given higher priority from the routing protocol. Most of the current routing protocols consider the node power but do not consider different paths for different priority data which may cause them to be delayed. This article proposes a load-balance energy aware ad-hoc on demand multipath distance vector (LBEA-AOMDV) protocol for wireless sensor networks, which is a multipath routing protocol, based on the original AOMDV. The proposed protocol shows that the paths are alternatively discovered on basis of an energy metric and instead of using only one path in data transmission, the network load is distributed through different paths. LBEA-AOMDV also uses a priority-based technique in which packets are assigned different priority levels and guided to different paths. The overall simulation results show that LBEA-AOMDV gives better performance when compared with AOMDV in terms of average consumed energy, end-to-end delay, number of dropped packets, average throughput and normalized routing load.
Keywords	*Load-balance, AOMDV, WSN, Routing Protocols.*

Paper Title	**A Proposed Modified Proportional Fairness Scheduling (MPF-BCQI) Algorithm with Best CQI Consideration for LTE-A Networks**
Authors	Mai Ali Ibraheem, Nada ElShennawy, and Amany Mahmoud Sarhan
Conf. or Journal Name	Proceedings of IEEE 13th International Computer Engineering and Systems Conference (ICENCO), Faculty of Engineering, Ain Shams University, Cairo, pp. 360-368, Dec. 2018.
Abstract	Quality of Service (QoS) requirements, such as fairness, average throughput and spectral efficiency, are a set of the important parameters that assess the performance of scheduling algorithms. LTE-Advanced (LTE-A) is the most viable wireless broadband network that strongly supports QoS by using Admission Control (AC) and Packet Scheduling (PS). In LTE-A, Proportional Fair (PF) scheduling algorithm and its modified versions have proved to be the commonly used scheduling algorithms for their ability to provide fairness while Best Channel Quality Indicator (CQI) scheduling algorithm guarantees high throughput. In this paper, we propose a new scheduling algorithm by considering a tradeoff balance between throughput and fairness among users by combining Best CQI and PF schedulers' metrics. Moreover, we enhance the PF scheduler performance using new averaging methods namely; median, range and geometric mean for computing the average throughput which is further used to determine the scheduling priority. The performance evaluation is presented using Vienna system level simulator. The results reveal that the performance of the proposed scheduler, with the new averaging methods in PF, gives better performance than the compared to schedulers in terms of throughput, fairness and spectral efficiency.
Keywords	

Paper Title	**Design of a Backstepping Controller based on an Adaptive Elman Neural Network for a Two-Link Robot System**
Authors	Aliaa Mohamed Sadek, Wael Mohamed Elawady, and Amany Mahmoud Sarhan
Conf. or Journal Name	Proceedings of IEEE 13th International Computer Engineering and Systems Conference (ICENCO), Faculty of Engineering, Ain Shams University, Cairo, pp. 481-487, Dec. 2018.
Abstract	This paper presents a backstepping controller based on an adaptive Elman neural network (BSAENN) to solve the mismatched uncertainty problem of underactuated robotic systems to compensate for the perturbations of nonlinear system. First, the nonlinear dynamical equations of the robot system are transformed to a cascade form. Second, an adaptive backstepping controller has been established. This controller is adopted using the combination of the adaptive Elman neural network (AENN) and the traditional backstepping control (TBS) approach. The AENN is used to approximate the uncertainties and enhance the control behavior against uncertainties. The adaptation laws of the AENN are deduced using Lyapunove stability. Computer simulations, compared to traditional controllers (PID and TBS), show that the adopted control algorithm results in robustness for trajectory tracking performance under the occurrence of uncertainties.
Keywords	*Elman neural network, backstepping controller, uncertainty, robot, PID.*

Paper Title	**Multi-swarm multi-objective optimization based on a hybrid strategy**
Authors	Shery Sedarous, Sherin M.El-Gokhy, and Elsayed Sallam
Conf. or Journal Name	Alexandria Engineering Journal, Volume 57, Issue 3, pp. 1619-1629, September 2018.
Abstract	Multi-objective optimization is a very competitive issue that emerges naturally in most real world problems. It is concerned with the optimization of conflicting objectives in multi-objective problems. The multi-objective problem treats with tradeoff solutions in order to satisfy all objectives. An extensive variety of algorithms has been developed to solve multi-objective optimization problems. In this paper, we presents a multi-swarm multi-objective intelligence-based algorithm enhanced with a hybrid strategy between decomposition and dominance (**MSMO/2D**) to improve convergence and diversity by splitting the primary swarm into a number of sub-swarms. The proposed algorithm is applied to fourteen standard problems and compared with two of the most familiar multi-objective optimization algorithms MOEA/D and D2MOPSO. The experimental results give evidence that the multi-swarm armed by the hybrid strategy constitutes a better alternative for multi-objective optimization problems.
Keywords	*Multi-objective, Multi-swarm, Decomposition, Dominance.*

Paper Title	**Approaching Rutted Road-Segment Alert using Smartphone**
Authors	Asmaa AbdulQawy, Reem Elkhouly, and Elsayed Sallam
Conf. or Journal Name	Proceedings of the IEEE 13th International Conference on Computer Engineering and Systems (ICCES), Faculty of Engineering, Ain Shams, University, Cairo, Egypt, 18-19 Dec. 2018.
Abstract	Driving on unfamiliar poorly paved roads is risky even if the vehicle speed is kept under limits. A driver may lose control if his vehicle suddenly comes into road anomalies, especially at night. In developing countries, road anomalies are not only common, but also new ones usually exist without precautions. We present an alerting system that detects and localizes road ruts in order to release a prior-rut notification to the driver using no additional devices but his smartphone. Our system uses crowd-sourcing techniques to collect labeled data from smartphones built-in sensors that describe road ruts. We use this data to feed a machine learning engine to build models that can detect new ruts. Our system localizes identified ruts on the map via GPS coordinates and alerts drivers when they approach a rutted road. Our experiments show that the accuracy of the system can be raised from 59% up to 99% if the learning technique is carefully selected and the sensors data set size is increased to 100000 samples.
Keywords	*road anomalies, prior-rut notification, smartphone, crowd-sourcing techniques, unfamiliar poorly paved roads, vehicle speed, rutted road-segment alert, machine learning engine, GPS coordinates*

Paper Title	**An Improved Energy-Efficient Directed Diffusion Routing Protocol for Wireless Sensor Network**
Authors	S. G. El-Esawy, N. M. Elshennawy, N. A. Elfishawy
Conf. or Journal Name	14th International Computer Engineering Conference (ICENCO), pp. 64-67, Dec. 2018.
Abstract	Energy Efficiency and prolonging the network lifetime is an important research issue in Wireless Sensor Network (WSN). Because of the huge number of nodes in such networks, it is too difficult to assign ID's for sensor nodes, instead the focus is to be on data, so data centric routing protocols is essential for use. In this paper we introduce a modification on Directed Diffusion protocol to make it more energy efficient than the original one, through applying a specified rule for reinforcement messages, the proposed protocol is compared with the original protocol and the results shows that the proposed one exceeds the original protocol in energy saving greatly and prolonging the network lifetime.
Keywords	*WSN, Data Centric Routing Protocols, Directed Diffusion, Network Lifetime*

Paper Title	**An Lstm-Based Descriptor For Human Activities Recognition Using Imu Sensors**
Authors	S Ashry, R Elbasiony, and W Gomaa
Conf. or Journal Name	15th International Conference on Informatics in Control, Automation and Robotics (ICINCO 2018), vol. 1, pp. 494-501, July 2018.
Abstract	In this article, we present a public human activity dataset called 'HAD-AW'. It consists of four types of 3D sensory signals: acceleration, angular velocity, rotation displacement, and gravity for 31 activities of daily living ADL measured by a wearable smart watch. It is created as a benchmark for algorithms comparison. We succinctly survey some existing datasets and compare them to 'HAD-AW'. The goal is to make the dataset usable and extendible by others. We introduce a framework of ADL recognition by making various pre-processing steps based on statistical and physical features which we call AMED. These features are then classified using an LSTM recurrent network. The proposed approach is compared to a random-forest algorithm. Finally, our experiments show that the joint use of all four sensors has achieved the best prediction accuracy reaching 95.3% for all activities. It also achieves savings from 88% to 98% in the training and testing time; compared to the random forest classifi er. To show the effectiveness of the proposed method, it is evaluated on other four public datasets: CMU-MMAC, USC-HAD, REALDISP, and Gomaa datasets.
Keywords	*Human Activity Recognition, Auto Correlation, Median, Entropy, LSTM, Smart Watch, IMU Sensors.*

Paper Title	**Deep 3D Pose Dictionary: 3D Human Pose Estimation from Single RGB Image Using Deep Convolutional Neural Network**
Authors	R Elbasiony, W Gomaa, and T Ogata
Conf. or Journal Name	International Conference on Artificial Neural Networks, pp. 310-320,Oct 2018.
Abstract	In this work, we propose a new approach for 3D human pose estimation from a single monocular RGB image based on a deep convolutional neural network (CNN). The proposed method depends on reducing the huge search space of the continuous-valued 3D human poses by discretizing and approximating these continuous poses into many discrete key-poses. These key-poses constitute more restricted search space and then can be considered as multiple-class candidates of 3D human poses. Thus, a suitable classification technique is trained using a set of 3D key-poses and their corresponding RGB images to build a model to predict the 3D pose class of an input monocular RGB image. We use deep CNN as a suitable classifier because it is proven to be the most accurate technique for RGB image classification. Our approach is proven to achieve good accuracy which is comparable to the state-of-the-art methods.
Keywords	*3D pose estimation, CNN, Deep learning, Human3.6m.*

Paper Title	**Human Action Recognition Based on Integrating Body Pose, Part Shape, and Motion**
Authors	Hany A. El-Ghaish, Mohamed E. Hussein, Amin Shoukry, and Rikio Onai
Conf. or Journal Name	IEEE Access, vol. 6, pp. 49040-49055, 2018.
Abstract	Human action recognition is a challenging problem, especially in the presence of multiple actors in the scene and/or viewpoint variations. In this paper, three modalities, namely, 3-D skeletons, body part images, and motion history image (MHI), are integrated into a hybrid deep learning architecture for human action recognition. The three modalities capture the main aspects of an action: body pose, part shape, and body motion. Although the 3-D skeleton modality captures the actor's pose, it lacks information about the shape of the body parts as well as the shape of manipulated objects. This is the reason for including both the body-part images and the MHI as additional modalities. The deployed architecture combines convolution neural networks (CNNs), long short-term memory (LSTM), and a fine-tuned pre-trained architecture into a hybrid one. It is called MCLP: multi-modal CNN + LSTM + VGG16 pre-trained on ImageNet. The MCLP consists of three sub-models: CL1D (for CNN1D + LSTM), CL2D (for CNN2D + LSTM), and CMHI (CNN2D for MHI), which simultaneously extract the spatial and temporal patterns in the three modalities. The decisions of these three sub-models are fused by a late multiply fusion module, which proved to yield better accuracy than averaging or maximizing fusion methods. The proposed combined model and its submodels have been evaluated both individually and collectively on four public data sets: UTkinect Action3D, SBU Interaction, Florence3-D Action, and NTU RGB+D. Our recognition rates outperform the state-ofthe-art rates on all the evaluated data sets.
Keywords	*Human action recognition, spatial and temporal features, convolution neural networks (CNN), long short-term memory (LSTM), CNN-LSTM, motion history images (MHI).*

Paper Title	**CovP3DJ: Skeleton-parts-based-covariance Descriptor for Human Action Recognition**
Authors	Hany A. El-Ghaish, Amin Shoukry, Mohamed E. Hussein
Conf. or Journal Name	13th International Conference on Computer Vision Theory and Applications, Madeira, Portugal (VISIGRAPP), pp. 343-350, 2018.
Abstract	A highly discriminative and computationally efficient descriptor is needed in many computer vision applications involving human action recognition. This paper proposes a hand-crafted skeleton-based descriptor for human action recognition. It is constructed from five fixed size covariance matrices calculated using strongly related joints coordinates over five body parts (spine, left/ right arms, and left/ right legs). Since covariance matrices are symmetric, the lower/ upper triangular parts of these matrices are concatenated to generate an efficient descriptor. It achieves a saving from 78.26 % to 80.35 % in storage space and from 75 % to 90 % in processing time (depending on the dataset) relative to techniques adopting a covariance descriptor based on all the skeleton joints. To show the effectiveness of the proposed method, its performance is evaluated on five public datasets: MSR-Action3D, MSRC-12 Kinect Gesture, UTKinect-Action, Florence3D-Action, and NTU RGB+D. The obtained recognition rates on all datasets outperform many existing methods and compete with the current state of the art techniques.
Keywords	*Hand-crafted Features, Covariance Descriptor, Skeleton-based Human Action Recognition*

Paper Title	**A Proposed Formation Control Algorithm for Robot Swarm based on Adaptive Fuzzy Potential Field Method**
Authors	B. G. Elkilany, A. A. Abouelsoud, A. M. R. Fathelbab, and H. Ishii
Conf. or Journal Name	44th Annual Conference of the IEEE Industrial Electronics Society (IECON 2018), pp. 2189-2194, Oct. 2018.
Abstract	The main goal of robot swarm is to maintain formation among their members while avoiding obstacles and tracking a target in the surrounding environment. One popular approach for achieving this goal is the Potential Field Method (PFM). Thus, in this paper, we propose a formation control algorithm based on the PFM and Fuzzy Inference System (FIS). The Proposed PFM is intended to maintain formation, avoid obstacles and track a moving target as well. We add an interaction potential force to maintain formation beside the attractive and repulsive potential forces. Also, we use the FIS to adapt the change of the relative distances among robots in the swam and other entities int he environment. To test the scalability and reliability of the proposed formation control algorithm, simulations of robot swarms using MATLAB software with a different number of robots following different target trajectories in different environment setups are recorded. Results confirm the efficiency and the applicability the proposed formation control algorithm in achieving the three tasks of the robot swarm.
Keywords	*Robot Swarm, Formation Control, Potential Field Method, Fuzzy Inference System.*

Paper Title	**JustWalk: A Crowdsourcing Approach for the Automatic Construction of Indoor Floorplans**
Authors	MM Elhamshary, MF Alzantot, and M Youssef
Conf. or Journal Name	IEEE Transactions on Mobile Computing, vol. ١, Oct. 2018.
Abstract	Mapping and navigation applications are now considered popular services for mobile phones users. However, despite the fact that people spend most of their time indoors, these applications are still limited to indoor spaces due to the lack of large-scale indoor floorplan databases. In this paper, we present JustWalk: a crowd intelligence-based system for the automatic construction of buildings floorplans. JustWalk employs a participatory sensing approach using smartphones that are ubiquitously available with users who visit a building to automatically and transparently construct accurate motion traces. These accurate traces are generated by reducing the errors in the inertial motion traces by using the points of interest in the indoor environment (e.g., elevators and stairs, etc.) for error resetting. The collected traces are then processed by means of different mathematical and image processing techniques to detect the overall floorplan shape as well as higher level semantics such as detecting rooms and corridors shapes along with a variety of points of interest in the environment. In comparison to other approaches, our system depends only on the users walking patterns and motion traces. It does not require any explicit inputs or obtrusive actions (e.g., taking photos). Experimental evaluation of JustWalk using different android phones in three testbeds shows that it achieves high accuracy for the point of interest detection (0.6 percent false positive and 1 percent false negative rates). In addition, the proposed error resetting technique leads to more than 12 times enhancement in the median distance error compared to the state-of-the-art. Moreover, the detailed floorplan can be accurately estimated with a relatively small number of traces. This number is amortized over the number of users visiting the building. Finally, we show that JustWalk has a small energy footprint on cell-phones, and could be generalized to other buildings; highlighting its promise as a ubiquitous indoor mapping service.
Keywords	*Indoor Mapping, Automatic Floorplan Construction, Location-Based Services*

Paper Title	**CAAD 2018: Generating Transferable Adversarial Examples**
Authors	Y Sharma, TD Le and M Alzantot
Conf. or Journal Name	Cornell University, arXiv preprint arXiv:1810.01268, ٢, 2018.
Abstract	Deep neural networks (DNNs) are vulnerable to adversarial examples, perturbations carefully crafted to fool the targeted DNN, in both the non-targeted and targeted case. In the non-targeted case, the attacker simply aims to induce misclassification. In the targeted case, the attacker aims to induce classification to a specified target class. In addition, it has been observed that strong adversarial examples can transfer to unknown models, yielding a serious security concern. The NIPS 2017 competition was organized to accelerate research in adversarial attacks and defenses, taking place in the realistic setting where submitted adversarial attacks attempt to transfer to submitted defenses. The CAAD 2018 competition took place with nearly identical rules to the NIPS 2017 one. Given the requirement that the NIPS 2017 submissions were to be open-sourced, participants in the CAAD 2018 competition were able to directly build upon previous solutions, and thus improve the state-of-the-art in this setting. Our team participated in the CAAD 2018 competition, and won 1st place in both attack subtracks, non-targeted and targeted adversarial attacks, and 3rd place in defense. We outline our solutions and development results in this article. We hope our results can inform researchers in both generating and defending against adversarial examples.
Keywords	

Paper Title	**Learning and reasoning in complex coalition information environments: a critical analysis**
Authors	Federico Cerutti, Moustafa Alzantot, Tianwei Xing, Daniel Harborne, Jonathan Z Bakdash, Dave Braines, Supriyo Chakraborty, Lance Kaplan, Angelika Kimmig, Alun Preece, Ramya Raghavendra, Murat Şensoy, and Mani Srivastava
Conf. or Journal Name	21st International Conference on Information Fusion (FUSION), pp. 1-8, ٣, July 2018
Abstract	In this paper we provide a critical analysis with metrics that will inform guidelines for designing distributed systems for Collective Situational Understanding (CSU). CSU requires both collective insight-i.e., accurate and deep understanding of a situation derived from uncertain and often sparse data and collective foresight-i.e., the ability to predict what will happen in the future. When it comes to complex scenarios, the need for a distributed CSU naturally emerges, as a single monolithic approach not only is unfeasible: it is also undesirable. We therefore propose a principled, critical analysis of AI techniques that can support specific tasks for CSU to derive guidelines for designing distributed systems for CSU.
Keywords	*Collective Situational Understanding; Artificial Intelligence for Situational Under*

Paper Title	**A QoS framework for SDN-based networks**
Authors	H Ghalwash and CH Huang
Conf. or Journal Name	IEEE 4th International Conference on Collaboration and Internet Computing (CIC), pp. 98-105, Oct. 2018.
Abstract	Nowadays, traditional networks are suffering from lack of information, easy management, and hard QoS guarantee. Recently, SDNs overcome these limitations. They provide network agility, programmability, and centralized network control. These features facilitate solving many of the security, performance, management and QoS issues. In this paper, we propose an SDN framework that leverages programmability and centralized control to provide a level of QoS. Knowing the state of the whole network helps optimizing the decision towards enhancing the network efficiency. The presented framework basically contains modules that provide monitoring, route determination, rule preparation, and configuration functionalities. The monitoring module analyzes ports utilization and probs the links delay. The route determination module relies on the shortest path algorithm, with or without QoS guarantee. Two QoS parameters, namely, port utilization and delay are considered in the monitoring and the route determination. The proposed framework is tested in a fat-tree topology with an OpenDayLight (ODL) controller. Experiments are conducted to prove the efficiency of the presented framework over the traditional standalone controller with the built-in features. Results showed that using the presented framework, with or without QoS reduces the overall average delay by 57%, jitter by 25% and packet loss by 67%. Moreover, the monitored port utilization was reduced by 30% on average.
Keywords	*SDN, framework, Fat-Tree, OpenDaylight, QoS*

Paper Title	**A Generic Framework for Semantic Annotation of Images**
Authors	T Helmy
Conf. or Journal Name	International Journal of Image and Graphics, vol. 18, no. 3, July 2018.
Abstract	Advanced digital capturing technologies have led to the explosive growth of images on the Web. To retrieve the desired image from a huge amount of images, textual query is handier to represent the user's interest than providing a visually similar image as a query. Semantic annotation of images' has been identified as an important step towards more efficient manipulation and retrieval of images. The aim of the semantic annotation of images is to annotate the existing images on the Web so that the images are more easily interpreted by searching programs. To annotate the images effectively, extensive image interpretation techniques have been developed to explore the semantic concept of images. But, due to the complexity and variety of backgrounds, effective image annotation is still a very challenging and open problem. Semantic annotation of Web contents manually is not feasible or scalable too, due to the huge amount and rate of emerging Web content. In this paper, we have surveyed the existing image annotation models and developed a hierarchical classification-based image annotation framework for image categorization, description and annotation. Empirical evaluation of the proposed framework with respect to its annotation accuracy shows high precision and recall compared with other annotation models with significant time and cost. An important feature of the proposed framework is that its specific annotation techniques, suitable for a particular image category, can be easily integrated and developed for other image categories.
Keywords	*Image feature extraction, semantic annotation, image annotation.*

Paper Title	**Fault-tolerant control for a class of quantised networked control of nonlinear systems with unknown time-varying sensor faults**
Authors	A. H. Tahoun
Conf. or Journal Name	International Journal of Control, pp. 1-10, 2018.
Abstract	In this paper, fault-tolerant control problems in quantised networked control of nonlinear systems (NCSs) with sensor uncertainties are considered. The measured output equation of the given NCS system has unknown external time-varying uncertainties that may be unbounded in addition to the effects of network-induced constraints; network-induced delays, network-induced data packet losses and network quantisation errors. A simultaneous observer-controller is constructed to stabilise the overall NCS. A flexible-joint robot link example is simulated to illustrate the significant improvement on system tracking performance.
Keywords	*Fault Tolerant, Networked System, Quantisation, Descriptor System, Observer, Sensor Faults.*

Paper Title	**Analysis and Diagnosis of Erythemato-Squamous Diseases Using CHAID Decision Trees**
Authors	AM Elsayad, M Al-Dhaifallah, and AM Nassef
Conf. or Journal Name	15th International Multi-Conference on Systems, Signals & Devices (SSD 2018), March 2018.
Abstract	Erythemato-squamous diseases (ESDs) are common skin diseases. They consist of six different categories: psoriasis, seboreic dermatitis, lichen planus, pityriasis rosea, chronic dermatitis and pityriasis rubra pilaris. They all share the clinical features of erythema and scaling with very little differences. Their automatic detection is a challenging problem as they have overlapping signs and symptoms. This study evaluates the performance of CHAID decision trees (DTs) for the analysis and diagnosis of ESDs. DTs are nonparametric methods with no priori assumptions about the space distribution with the ability to generate understandable classification rules. This property makes them very efficient tools for physicians and medical specialists to understand the data and inspect the knowledge behind. The Chi-Squared Automatic Interaction Detection (CHAID) decision tree model is a very fast model with the ability to build wider decision trees and to handle all kinds of input variables (features). The CHAID model has many successful achievements especially when used as an interpreter rather than a classifier. Due to the small number of samples, this study uses Chi-square test with the Likelihood Ratio (LR) to get robust results. Ensembles of bagged and boosted CHAIDs were introduced to improve the stability and the accuracy of the model, but on the expense of interpretability. This paper presents the experimental results of the application of CHAID decision trees and their bagged and boosted ensembles for the deferential diagnosis of ESD using both clinical and histopathological features. The prediction accuracies of these models are benchmarked against the Artificial Neural Network (ANN) in terms of statistical accuracy, specificity, sensitivity, precision, true positive rate, true negative rate and F-score. Experimental results showed that bagged ensemble outperforms other modeling algorithms.
Keywords	*Erythemato-Squamous Diseases, Automatic Differential Diagnosis, Decision Tree, Bagging, Boosting, Chaid, Artificial Neural Network, Multi-Class Classification.*

Paper Title	**Optimal parameter design of fractional order control based INC-MPPT for PV system**
Authors	M Al-Dhaifallah, AM Nassef, H Rezk, and KS Nisar
Conf. or Journal Name	Solar Energy 159, 650-664, 2018.
Abstract	A comprehensive and straightforward methodology for optimal parameter design of Fractional Order control based Incremental Conductance (FOINC)-Maximum Power Point Tracking (MPPT) is developed in this paper. The main objective is to develop a more efficient, robust MPPT algorithm based on the integration between the fractional-order control and Incremental Conductance (INC) method. The integration between INC robustness and the accuracy of fractional-order can enhance the overall tracking performance in comparison to the conventional tracking techniques. Such integration ensures fast dynamics and high tracking accuracy for the Maximum Power Point (MPP) under tremendous climate variations. A small signal model for the whole system has been built to design the most appropriate order and gain of the fractional integrator for variable step size FOINC-MPPT. The ultimate gain (upper limit) of the controller has been specified properly via root locus plot before starting the optimization process to avoid falling in instability region. Radial Movement Optimization, as an optimization tool, is used for obtaining the optimal parameters of the fractional controller. The feasibility and effectiveness of the proposed FOINC-MPPT algorithm are validated under different climate conditions with slow and rapid changes in solar irradiance. Simulation results show that the proposed FOINC-MPPT algorithm is able to track the MPP accurately and rapidly in comparison with the conventional INC-based tracker.
Keywords	*Fractional calculus, MPPT, PV system, Energy efficiency, Optimization.*

Paper Title	**EoT-driven hybrid ambient assisted living framework with naïve Bayes–firefly algorithm**
Authors	Mohammed K Hassan, Ali I El Desouky, Mahmoud M Badawy, Amany M Sarhan, Mohamed Elhoseny, and M Gunasekaran
Conf. or Journal Name	Neural Computing and Applications, Springer Publisher, pp. 1-26, 2018.
Abstract	In the current decade, ambient assisted living is attracting widespread interest due to the rapidly aging global population. The cloud-based Internet of things (IoT) healthcare systems are facing many barriers to handle the big healthcare data that IoT generates. Edge of things computing is one of the promising solutions. Accordingly, this paper proposes a hybrid ambient assisted living framework with naïve Bayes–firefly algorithm (HAAL-NBFA) for monitoring elderly patients suffering from chronic diseases. This architecture exploits the current advances in the IoT by using ambient and biomedical sensors to collect the data of the elderly patient and then fuse it into context states to predict the health status of the patient in real time using context-awareness techniques. The proposed HAAL-NBFA framework proposes a five-phase classification technique to handle big imbalanced datasets resulting from long-term monitoring of elderly patients. In this paper, the firefly algorithm (FA) has been used to optimize naïve Bayes classifier (NB) which selects the minimum features that give the highest accuracy. The proposed NB-FA acts as a safe-fail module that decides when to stop the system and when to permit its continuation in case of sensor's failure. The experimental results proved that the proposed HAAL-NBFA had achieved high accuracy and sensitivity in predicting the health status of patients suffering from blood pressure (BP) disorders. Furthermore, the importance of NB-FA in accelerating classifications and maintaining the continuity of HAAL-NBFA's operation has been proved by experimental results.
Keywords	*Ambient assisted living (AAL), Edge computing, Internet of things (IoT), Firefly algorithm (FA).*

Paper Title	**Intelligent hybrid remote patient-monitoring model with cloud-based framework for knowledge discovery**
Authors	Mohammed K Hassan, Ali I El Desouky, Sally M Elghamrawy, and Amany M Sarhan
Conf. or Journal Name	Computers & Electrical Engineering, Elsevier publisher, vol. 70, pp. 1034-1048, 2018.
Abstract	This paper proposes an intelligent hybrid context-aware model for patients under supervision at home that adopts a hybrid architecture with both local and cloud-based components. The cloud-based portion of the model facilitates storing and processing the big data generated by ambient assisted living systems that are used to monitor patients suffering from chronic diseases in their homes, particularly the elderly. The local portion of the model monitors patients in the event of internet disconnections or any other failure in the cloud system. The proposed model utilises context-aware techniques by monitoring physiological signals, ambient conditions, and patient activities simultaneously to derive the real-time health status of the patient. Experimental results demonstrate the effectiveness of our proposed model for monitoring patients and accurately detecting emergencies in imbalanced datasets through a case study on patients suffering from blood-pressure disorders.
Keywords	*Ambient assisted living (AAL), Continuous remote monitoring, Context awareness, Internet of things (IoT), Machine learning, Imbalanced datasets, Big data, Cloud computing.*

Paper Title	**ILFCS: an intelligent learning fuzzy-based channel selection framework for cognitive radio networks**
Authors	Reham Arnous, Ali I El-Desouky, Amany Sarhan, Mahmoud Badawy
Conf. or Journal Name	EURASIP Journal on Wireless Communications and Networking, Springer International Publishing, vol. 2018, no. 1, Dec. 2018.
Abstract	Cognitive radio networks (CRNs) have been introduced as a promising solution to optimize the use of available radio-frequency spectrum. The key idea in CRNs is the proper selection of available sensed channels. In this paper, an intelligent distributed channel selection strategy is proposed for cognitive radio ad-hoc networks aiming to assist them in selecting the best channel for transmission. The proposed strategy classifies the available channels based on the primary users'(PUs) utilization, the number of cognitive radio neighbors using the channels, and the capacity of available channels. The Fuzzy Logic technique is used to determine a channel's weight value by combining these parameters. The channels with the highest weight value are selected for transmission. The proposed strategy takes into account false alarm (FA) and miss detection (MD) metrics to classify the sensed channels into four categories (FA, MD, ON and OFF) based on *K*-means learner. This classification helps the strategy to avoid accessing occupied channels. Simulation results based on NS2 simulation approved that the proposed strategy is effective compared to other strategies concerning selecting the best channel and achieving higher channel utilization.
Keywords	*Channel selection, Cognitive radio networks, Fuzzy logic, Spectrum characterization, Spectrum Decision.*

Paper Title	**A Query Optimization Strategy for Autonomous Distributed Database Systems**
Authors	Dina K. Badawy, Dina M. Ibrahim, Alsayed A. Sallam
Conf. or Journal Name	World Academy of Science, Engineering and Technology International Journal of Computer and Information Engineering Vol:12, No:3, pp. 101-108, 2018.
Abstract	Distributed database is a collection of logically related databases that cooperate in a transparent manner. Query processing uses a communication network for transmitting data between sites. It refers to one of the challenges in the database world. The development of sophisticated query optimization technology is the reason for the commercial success of database systems, which complexity and cost increase with increasing number of relations in the query. Mariposa, query trading and query trading with processing task-trading strategies developed for autonomous distributed database systems, but they cause high optimization cost because of involvement of all nodes in generating an optimal plan. In this paper, we proposed a modification on the autonomous strategy K-QTPT that make the seller's nodes with the lowest cost have gradually high priorities to reduce the optimization time. We implement our proposed strategy and present the results and analysis based on those results. Keywords—Autonomous strategies, distributed database systems, high priority, query optimization.
Keywords	*Autonomous strategies, distributed database systems, high priority, query optimization.*

Paper Title	**Comparative Study of Different Approaches for Modeling and Analysis of Activities of Daily Living**
Authors	W Gomaa, and R Elbasiony
Conf. or Journal Name	Proceedings of the 11th International Conference on Informatics & Systems (INFOS 2018).
Abstract	In recent years, automatic human activity recognition has drawn much attention. On one hand, this is due to the rapid proliferation and cost degradation of a wide variety of sensing hardware, which resulted in the tremendous explosion of activity data. On the other hand there are urgent growing and pressing demands from many application areas such as: in-home health monitoring especially for the elderly, smart cities, safe driving by monitoring and predicting driver's behavior, healthcare applications, entertainment, assessment of therapy, performance evaluation in sports, etc. In this paper we focus on activities of daily living (ADL), which are routine activities that people tend to do every day without needing assistance. We have used a public dataset of acceleration data collected with a wrist-worn accelerometer for 14 different ADL activities. Our objective is to perform an extensive comparative study of the predictive power of several paradigms to model and classify ADL activities. To the best of our knowledge, almost all techniques for activity recognition are based on methods from the machine learning literature (particularly, supervised learning). Our comparative study widens the scope of techniques that can be used for automatic analysis of human activities and provides a valuation of the relative effectiveness and efficiency of a potentially myriad pool of techniques.
Keywords	***Automatic Human Activity Recognition, Predicting Driver's Behavior, ADL.***

Paper Title	**Did you hear that? adversarial examples against automatic speech recognition**
Authors	M Alzantot, B Balaji, and M Srivastava
Conf. or Journal Name	Cornell University archives, Computation and Language, 2018.
Abstract	Speech is a common and effective way of communication between humans, and modern consumer devices such as smartphones and home hubs are equipped with deep learning based accurate automatic speech recognition to enable natural interaction between humans and machines. Recently, researchers have demonstrated powerful attacks against machine learning models that can fool them to produceincorrect results. However, nearly all previous research in adversarial attacks has focused on image recognition and object detection models. In this short paper, we present a first of its kind demonstration of adversarial attacks against speech classification model. Our algorithm performs targeted attacks with 87% success by adding small background noise without having to know the underlying model parameter and architecture. Our attack only changes the least significant bits of a subset of audio clip samples, and the noise does not change 89% the human listener's perception of the audio clip as evaluated in our human study.
Keywords	

Paper Title	**Generating natural language adversarial examples**
Authors	M Alzantot, Y Sharma, A Elgohary, BJ Ho, M Srivastava, and KW Chang
Conf. or Journal Name	Cornell University archives, Computation and Language, 2018. EMNLP 2018 (Conference on Empirical Methods in Natural Language Processing).
Abstract	Deep neural networks (DNNs) are vulnerable to adversarial examples, perturbations to correctly classified examples which can cause the model to misclassify. In the image domain, these perturbations are often virtually indistinguishable to human perception, causing humans and state-of-the-art models to disagree. However, in the natural language domain, small perturbations are clearly perceptible, and the replacement of a single word can drastically alter the semantics of the document. Given these challenges, we use a black-box population-based optimization algorithm to generate semantically and syntactically similar adversarial examples that fool well-trained sentiment analysis and textual entailment models with success rates of 97% and 70%, respectively. We additionally demonstrate that 92.3% of the successful sentiment analysis adversarial examples are classified to their original label by 20 human annotators, and that the examples are perceptibly quite similar. Finally, we discuss an attempt to use adversarial training as a defense, but fail to yield improvement, demonstrating the strength and diversity of our adversarial examples. We hope our findings encourage researchers to pursue improving the robustness of DNNs in the natural language domain.
Keywords	

Paper Title	**Semantic Annotation of Arabic Web Documents using Deep Learning**
Authors	S Albukhitan, A Alnazer, and T Helmy
Conf. or Journal Name	Procedia computer science 130, pp., 589-596, 2018.
Abstract	The vision of Semantic Web is to have a Web of things instead of Web of documents in a form that can be processed by machines. This vision could be achieved on the existing Web using semantic annotation based on common and public ontologies. Due to exponential growth and the huge size of the Web sources, there is a need to have fast and automatic semantic annotation of Web documents. Arabic language received less attention in semantic Web research as compared to Latin languages especially in the field of semantic annotation. The aim of this paper is to investigate the feasibility of using word embeddings from deep learning algorithms for semantic annotation of Arabic Web documents. To evaluate the performance of the proposed framework, food, nutrition, and health ontologies were used to annotate some related Web documents. For a given set of Arabic documents and ontologies, the framework produces annotations of these documents using different output formats. The initial results show a promising performance which will support the research in the Semantic Web with respect to Arabic language. The proposed framework could be used for building semantic Web application and semantic search engines for Arabic Language.
Keywords	*Deep Learning, Semantic Annotation, Arabic Language, Ontology.*