المشاريـع المقبولة ضمن برنامج الوحدات البحثية بكلية الهندسة وعلوم الحاسب

م	الباحث الرئيس	التخصص	عنوان الورقة العلمية	أسم الدورية العلمية	تصنيف الدورية العلمية	معلومات التواصل
1	د. موسى محمد خبراني	علوم الحاسب	**Blockchain-Based Microgrid for Safe and Reliable Power Generation and Distribution: A Case Study of Saudi Arabia** **Abstract:** Energy demand is increasing rapidly due to rapid growth and industrialization. It is becoming more and more complex to manage generation and distribution due to the diversification of energy sources to minimize carbon emissions. Smart grids manage reliable power generation and distribution efficiently and cater to a large geographical area and population, but their centralized structure makes them vulnerable. Cybersecurity threats have become a significant concern with these systems' increasing complexity and connectivity. Further transmission losses and its vulnerability to the single point of failure (SPOF) are also major concerns. Microgrids are becoming an alternative to large, centralized smart grids that can be managed locally with fewer user bases and are safe from SPOF. Microgrids cater to small geographical areas and populations that can be easily managed at the local level and utilized for different sources of energy, like renewable energy. A small group of consumers and producers are involved, but microgrids can also be	Energies (MDPI)	Q1	+966 505380967 mmkhubrani@jazanu.edu.sa

			connected with smart grids if required to exchange the excess energy. Still, these are also vulnerable to cybersecurity threats, as in the case of smart grids, and lack trust due to their decentralized nature without any trusted third party. Blockchain (BC) technology can address the trust and cybersecurity challenges in the energy sector. This article proposes a framework for implementing a BC-based microgrid system for managing all the aspects of a microgrid system, including peer-to-peer (P2P) energy trading, Renewable Energy Certificate (REC), and decentralized energy trading, that can be utilized in the case of Saudi Arabia. It can integrate cybersecurity standards and protocols, as well as the utilization of smart contracts, for more secure and reliable energy generation and distribution with transparency.			
+966 548993344 Yalqahtani@jazanu.edu.sa	Q1	Expert Systems with Applications	**An improved deep learning approach for localization and recognition of plant leaf diseases** **Abstract:** A nation's economic progress is significantly influenced by its percentage of crop yields. However, the major barrier to the quantity and quality of yield is crop disease. For quick and reliable recognition of various plant illnesses, it is mandatory to design a computer-aided system. Timely and accurate recognition of numerous crop leaf infections is a complicated job because of the presence of vast sample distortions like the prevalence of clutter, blur, texture, and luminance changes in samples. Moreover, the extreme resemblance		د. يحيى محمد آل عطيف	2

			between the normal and infected parts of visual samples also extends the difficulty of the identification procedure. Further, the massive differences in the size, structure, and orientation of crop leaves and infected areas also hinder the accurate recognition of various crop diseases. To deal with the listed issues, we have proposed an improved and effective deep-learning strategy namely the PlantRefineDet. Our approach comprises three steps. First, the sample annotations are created for defining the target object. Next, an improved RefineDet approach is presented that employs the ResNet-50 as its base network for extracting a set of deep features. Lastly, the one-step detector RefineDet is utilized to localize and classify numerous crop disorders. The PlantRefineDet approach improves the plant disease localization and categorization results because of its improved feature calculation ability which facilitates the reemployment of features from the previous layers and increases the recall power of the system. Also, the PlantRefineDet approach adopts an additional phase to eliminate the irrelevant anchors and better adjust the bounding box orientation to exactly locate the infected regions of plant leaves which result to improve the recognition performance of the introduced model. We have confirmed the effectiveness of our approach through extensive evaluation on a challenging PlantVillage data sample and obtained a remarkable accuracy of 99.994%.			
+966 563840324 ajabbari@jazanu.edu.sa	Q2	Frontiers in Sustainable Cities	**Prioritizing the Factors for the Adoption of IoT-based Smart Irrigation in Saudi Arabia: A Comparative GRA/AHP Approach**		د. عبده محمد جباري	3

			Abstract: The irrigation sector in the Kingdom of Saudi Arabia (KSA) confronts a range of obstacles, such as scarce water resources, the elevated salinity and alkalinity of irrigation water, inefficient irrigation practices, and inter-sectorial competition for water resources. These challenges have led to diminishing agricultural yields and abandonment of arable lands. Internet of Things (IoT)-based irrigation systems present a promising remedy for these issues. By curbing water wastage and ensuring precise water delivery to crops, IoT-based irrigation systems offer a viable solution to the challenges entrenched in traditional irrigation methodologies in KSA. However, the widespread implementation of an IoT-based Smart Irrigation System (I-SIMS) poses a multifaceted and intricate challenge in KSA. This study is focused on the identification of the factors and challenges through a systematic review and ranking of the challenges/factors that exert a significant influence on the adoption of I-SIMS. Ranking aids in determining the importance of various alternatives. It enables locating the best options that support the required objectives in complex decision situations. The study employs both Grey Relational Analysis (GRA) and Analytical Hierarchical Process (AHP) methodologies to prioritize these factors.			
+966 533003611 aoalbakri@jazanu.edu.sa	Q2	Applied Sciences	**Fully Homomorphic Encryption with Optimal Key Generation Secure Group Communication in Internet of Things Environment** **Abstract:** The Internet of Things or “IoT” determines the highly interconnected network of heterogeneous devices where each type of communication seems to be possible,		د. أشواق البكري	4

			even unauthorized. Consequently, the security requirement for these networks became crucial, while conventional Internet security protocol was identified as unusable in these types of networks, especially because of some classes of IoT devices with constrained resources. Secure group communication (SGC) in the IoT environment is vital to ensure the confidentiality, integrity, and availability (CIA) of data swapped within a collection of IoT devices. Typically, IoT devices were resource-constrained with limited memory, processing, energy, and power, which makes SGC a difficult task. This article designs a Fully Homomorphic Encryption with Optimal Key Generation Secure Group Communication (FHEOKG-SGC) technique in the IoT environment. The presented FHEOKG-SGC technique mainly focuses on the encryption and routing of data securely in the IoT environment via group communication. To accomplish this, the presented FHEOKG-SGC technique initially designs an FHE-based encryption technique to secure the data in the IoT environment. Next, the keys in the FHE technique are chosen optimally using the sine cosine algorithm (SCA). At the same time, the plum tree algorithm (PTA) is applied for the identification of the routes in the IoT network. Finally, the FHEOKG-SGC technique employs a trust model to improve the secure communication process, and the key management center is used for optimal handling of the keys. The simulation analysis of the FHEOKG-SGC technique is tested using a series of experiments, and the outcomes are studied under various measures. An extensive comparative study			

			highlighted the improvement of the FHEOKG-SGC algorithm over other recent approaches.			
+966 594405616 sdeep@jazanu.edu.sa	Q2	Journal of the ACM	**Stacking Ensemble Deep Learning And Intelligent Feature Extraction Model For The Heart Disease Prediction And Monitoring Model For Healthcare** **Abstract:** The recent progress made in field of IoT and sensing technologies can find application in online healthcare services. The humongous amount of information getting generated through the IoT devices in the medical sector have been exploited for managing the enormous volume of data. The existing method introduces the automatic decision system for augmenting cardiovascular disease prognosis. But, the accuracy achieved with the existing model was lesser compared to naive Bayes owing to less and unnecessary features. In this research work, applying stacking ensemble deep learning methods, a smart healthcare system is developed for the prediction of cardiac disease. Initially the data is pre-processed, which is inclusive of tasks like searching for the missing values in the dataset and getting them replaced, either with the user defined value or mean value based on the kind of attribute, ensuring that the performance of machine learning classifiers is improved. Second, introduced an optimized feature selection approach using Modified bat algorithm (MBA). Through the elimination of pointless and repetitious characteristics and the selection of the important ones, the computational complexity is decreased, and system efficiency is enhanced. Finally, a deep learning stacking		د. سحر عبد العظيم	5

			ensemble model is developed to predict heart disease. The PTBXL database is utilized in this study to create an efficient model for cardiac illness. Based on the simulated findings, it can be said that the suggested stacking ensemble classifiers perform better in terms of a number of criteria, including recollection, correctness, and specificity.			

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1	د. ادريس صميلي	الهندسة	**Smart Solar Energy System: Application for Traffic in Saudi Arabia**	International Research Journal of Engineering and Technology	Q1	+966 500077307 ihsmaili@jazanu.edu.sa
	The purpose of this study is to encourage the usage of solar Energy in Saudi's remote, off-grid rural areas to power traffic light installations. It takes a photovoltaic system to continually consume this energy. In the study, the components, methodology, design investigations, and findings are presented. The primary power source for the system's operation is provided by solar cells, which absorb light and produce electricity. To provide electricity to the system when there is no sunlight, lead-acid batteries are adopted as the PV system's electric energy storage. To charge the storage battery, a charger circuit was constructed.					
2	د. ادريس صميلي		**Internet of Things (IoT) Based Effective Home Automation Using a Nod Microcontroller Unit (MCU)**	International Research Journal of Engineering and Technology	Q1	+966 500077307 ihsmaili@jazanu.edu.sa
	Home automation is a topic that is gaining prominence due to its numerous advantages. Simply connecting home appliances and electrical devices to the internet or cloud storage enables home automation. In recent times, the demand for network-enabled home automation has skyrocketed due to its simplicity and comparable affordability. Using user-friendly, custom-defined portals, cloud-computing-based platforms make it possible to easily access anything and everything at any time and place, regardless of the user’s physical location. Consequently, the cloud serves as an entry point for IoT. A motion sensor (PIR sensor) and an alarm bell were used to detect motion around the house. Gas leakage and fire can be detected by implementing an MQ2 gas sensor and a fire sensor. The designed system sends warnings when acceptable deviation exceeds the thresholds. The user can receive notifications on the					

	mobile device by modifying the phone's application, i.e., Blynk. In addition, the user has full remote control over house facilities such as lighting, air conditioning, doors, security system activation, and system alarms.				
+966 593555579 nizouli@jazanu.edu	Q1	Desalination	**Design of Solar Power-Based Hybrid Desalination Predictive Method Using Optimized Neural Network**	د. ناصر زولي	3
	A hybrid solar-powered desalination system is one of the potential energy-intensive solutions that can be utilized to meet the increasing demand for freshwater. Modern desalination methods rely heavily on using artificial intelligence (AI) methodologies. This paper proposes a novel and optimal approach using neural networks to predict the effectiveness of a hybrid solar-powered desalination system. The experimental design furnishes the requisite data for conducting the analysis. The appropriate features are then retrieved and chosen using the VGG- 16 approach. Therefore, it is suggested to use the reptile search optimization with radial basis long short-term memory (RSO-RBLSTM) approach to forecast how well the hybrid solar-powered desalination process would work. Using the RSO method, the hyper parameters of the suggested algorithm are tuned. This study's implementation makes use of the MATLAB programming language. The simulation results are verified using many traditional techniques using various metrics, including RMSE, MAE, MSE, R2, and AARD. The proposed approach has attained 0.05 RMSE, 0.023 MSE, 0.06 MAE, and 4.5 % AARD for the training set. The proposed method has achieved 0.056 RMSE, 0.01 MSE, 0.025 MAE, and 4.2 % AARD for the testing set. The metrics value displays the hybrid desalination system's effective performance when powered by the solar system.				

+966 509673035 alneamy@jazanu.edu.sa	Q1	International Journal of Mechanical Sciences	**Inertia Mass Bio-Sensors Based On Snap-Through Phenomena In Electrostatic MEMS Shallow Arch Resonators**		د. ايمن النعمي	4
	This research examines on a new class of MEMS inertia mass sensors that are simple, sensitive, and selective in possibly detecting tiny objects. The sensor consists of two beams attached by an end-plate and is mounted on an electrostatically actuated shallow micro-arch. The presence of the end-plate overcomes the shortcoming of building inertia mass sensors using in-plane beam resonators. It gives more room to deposit detector material and, therefore, controls and mobilizes the quantity of the detector toward sensing a target. The design exploits the bistable behavior, resulting from the combination of the snap-through instability and the nonlinear force to move from one stable equilibrium to another. The transition can be controlled statically or dynamically depending on an operational mode. The eigenvalue problem assessment shows a considerable reduction in the first and third symmetrical resonant frequencies under DC voltage when a few picograms of the object substance are introduced. It is also corroborating that placing the added mass at the center of the end-plate and operating the sensor at vibration mode shape that dominated by the platform are more effective for mass detection through measuring the change in its frequency and bifurcation points. We found that superimposing the excitation signal to a small AC harmonic load, linear dynamic responses show a shift in the neighborhood of the first resonant frequency. On the other hand, increasing the actuation signal, dynamic responses show nonlinear trends offering possibilities to use the proposed design as a bifurcation-based type inertia sensor. This added mass leads to significant shifts at the locations of the bifurcation points compared to those in the absence of the object.			
+966 565500809 thahban@jazanu.edu.sa	Q1	Journal of Material	**An Investigation of Wear, Mechanical, And Water Sorption/Solubility Behaviors of A**		د. سلطان الشهراني	5

		Research and Technology	**Commercial Restorative Composite Containing Nano-Additives**			
	The main objective of the present work was to numerically study the effect of loading conditions on the progressive damage of initial defects in steel pipelines. The adhesively bonded composite sleeve repair technique was utilized to extend the lifetime of such cracked pipelines with different inclination angles (q) under combined loads (i.e., internal and axial pressure) with different values. Three different glass fiber-reinforced polymer sleeves (GFRPs; [0 o] 8s, [90 o]8s, and [0 o/90 o]4s) were simulated to study the effect of fiber orientation on the efficiency of composite sleeves in reducing the crack driving force. A three-dimensional (3D) elastic-plastic finite element method was utilized in the present study. The numerical results showed that the loading sequence has a great effect on the development of the crack-tip plastic zone size when the internal pressure is applied first. In the following two cases, if the internal pressure and the tensile stress were applied simultaneously or the tensile stress was applied in the first step followed by internal pressure, the loading sequence has little effect. In the case of the presence of internal pressure, the crack path is mainly dependent on it, and axial pressure has a marginal effect on its value. In such cases, applying [0 o]8s sleeves is the best way to arrest cracks in steel pipelines. However, in the absence of pressure within the pipelines, [90 o]8s sleeves are the appropriate ones to use to arrest the cracks due to axial pressure. Therefore, [0 o/90 o]4s sleeves may be recommended for repairing cracked steel pipelines to prevent crack growth in both situations.					