Publications Template

#	Research Title	Field	Abstract	Year of Publication Publishing	Publishing Link "URL"
1	**A Hybrid Approach Based on Building Physics and Machine Learning for Thermal Comfort Prediction in Smart Buildings**	Physics Artificial Intelligence IoT Machine Learning	One of the most important challenges facing the world is the application of modern technology in order to create smart buildings that achieve sustainable development goals (SDGs). Thermal comfort and reduction of energy consumption in buildings are considered important factors which, in turn, are reflected in creating a healthy environment and improving human productivity. Internet of Things (IoT) provides an ideal solution for collecting real-time data on the factors affecting indoor thermal comfort and energy consumption. However, comfort level is subjective and depends on many factors, which may not be learned by conventional models, an integrated model depending on thermal comfort factors is needed. In this work, a hybrid physics-based model incorporated with machine learning techniques is used for the prediction of thermal comfort inside buildings. A calculated dataset was extracted from the physics-based model gathered with the environmental variables data such as humidity, moisture, temperature, and air velocity collected from IoT devices. Support Vector Machine (SVM), Artificial Neural Network (ANN), and Ensemble Learning, followed by Tree-Based	Accepted for Publishing 2022	Accepted for Publishing 2022

			model and Logistic Regression method (LoR) are used due to their abilities to handle complex problems. The results show an improvement in the prediction of the thermal comfort approach as compared with the conventional models. The hybrid model can exhibit an effective solution for eliminating deficiencies of traditional models and can be used when designing smart buildings, simulating and evaluating the designed buildings, controlling energy consumption, and achieving thermal comfort.		
2	**Artificial Intelligence with Physics-Based Forecasting for Real-Time Energy Management in Smart Cities**	Physics Artificial Intelligence Machine Learning	Artificial Intelligence (AI) plays a crucial role in predicting energy consumption in buildings. This give rises to increases in the possibilities for the reduction of energy dissipation as part of the digital transformation of the built environment. Physics-based forecasting incorporation of AI is an efficient tool for real-time monitoring of energy consumption in buildings. It gives the potential to reshape the way that building energy systems operate. In this work, the integration of the real time data given from the IoT analytics system, battery charging/discharging system, and PV solar panel system is simulated in order to monitor and control energy consumption during peak and off-peak hours inside the buildings. Also, AI with Physics-based model including peak demand forecasting data was used to reach energy efficiency. The result shows a fully integrated state-of-the-science forecasting system for renewable energy in smart	Accepted for Publishing 2022	Accepted for Publishing 2022

			cities. The model outperforms the with an accuracy of more than 95.21%		
3	**Transition to a Resilient and Sustainable Energy System Beyond 2030**	Physics Artificial Intelligence Machine Learning	The expansion of the economy and population in Egypt requires new strategies for sustainable energy development. The long-standing influences of the COVID-19 pandemic on sustainable developments in human well-being and the environment as well as the energy division are still undefined. It needs speeded-up efforts to achieve sustainable development goals (SDGs) and generate new strategies for post-COVID-19 recovery. A renovation of the recent energy system in a sustainable energy supply direction is needed to restrict its devastating environmental and health effects. Energy storage technology has a significant role in enhancing energy consumption capacities, ensuring the stable and economic operation of power systems, and promoting the widespread application of renewable energy technologies. The integration of energy supply, demand, and renewable sources into the power grid will be controlled autonomously by smart methods that optimize decision-making and operations. This study investigates how solar power techniques, incorporating Artificial Intelligence (AI) and Machine learning (ML) to provide integrated solutions outperform traditional models in energy efficiency optimization, predictive maintenance control, and computational efficiency. The results show that the use of AI with solar power offers, affordable and reliable energy infrastructure, greater	2021	International Conference for Nature and Natural Resources Conservation Egypt , August 2021

			independence from imported carbon-based fuels, and reduction of greenhouse gas emissions and local air pollution contributes to the achievement of the sustainable development goals. AI and ML can play a key role in the application of the 2030 strategies and beyond. It is very effective in assisting energy efficiency which led to better performance for producing affordable and clean energy.		
4	**Structural and Magnetic Properties of Nickel Nanoparticles Prepared by Arc Discharge Method Using an Ultrasonic Nebulizer**	Physics and Materials Informatics	Synthesis of nanoparticles with unique properties has attracted a lot of interest of scientists and researchers these days. A key aspect of being able to manipulate the properties of the nanomaterials is the nanoscale architecture and engineering by various processing techniques. A synthetic strategy was developed to control the preparation of nickel nanoparticles Ni-NPs produced using an arc discharge technique with an ultrasonic nebulizer. The sample was characterized for its structural and magnetic properties using X-ray diffraction, ultraviolet–visible (UV–Vis) spectrophotometer, zeta potential, high resolution transmission electron microscope, scanning electron microscope, vibrating sample magnetometer. The resulted sample unveiled small, spherical and homogeneous Ni nanoparticles with an average size 15 nm lower than the critical size which indicates a superparamagnetic behavior. The zeta potential measurements shows + 49.01 ± 3.2 mV which confirms the synthesis of stable Ni nanoparticles. A UV–Vis spectrum of the nanosized Ni sample shows a sharp	2018	https://link.springer.com/article/10.1007/s10876-018-1451-x https://doi.org/10.1007/s10876-018-1451-x

			absorption peak between 362 and 380 nm. The magnetic properties shows no hysteresis and zero results for coercivity force and remanence that indicates superparamagnetic behavior of the Ni nanoparticles.		
5	**Synthesis and Characterization of Cobalt Nanoparticles Prepared by Arc Discharge Method Using an Ultrasonic Nebulizer**	Physics and Materials Informatics	Magnetic cobalt nanostructured was synthesized by a two-stage method. First, a solution of cobalt precursor droplets was prepared by an ultrasonic nebulizer. Second, the arc discharge method between two electrodes in an inert gas at atmospheric pressure is used to obtain the nanostructured cobalt powder. The sample obtained was characterized by X-ray diffraction (XRD). Scanning electron microscope (SEM), High Resolution Transmission Electron Microscope (HR-TEM), UV-Vis Spectrophotometry, zeta potential (ZP) and vibrating sample magnetometer (VSM). The dielectric constant, and AC conductivity of the prepared sample was determined in the frequency range of 4 Hz to 8 MHz. The investigations showed that the Co nanoparticles prepared in this way have smaller and homogeneous nanoparticles with spherical shape morphology with good stability and unique magnetic properties as compared with the bulky one. The dielectric properties analysis shows an enhancement in the dielectric constant and the AC conductivity of the Co nanoparticles.	2018	https://www.scientific.net/JNanoR.52.88 **https://doi.org/10.4028/www.scientific.net/JNanoR.52.88**
6	**Effects of 50-Hz Magnetic Field on Some Biophysical Properties of Albino Rat's Blood**	Physics Bioinformatics	The effects of 50Hz magnetic field exposure on rat red blood cells (RBCs) structural properties were studied. Fifty male albino rats were equally divided into five main groups, namely groups A, B, C, D and E. Group A (10 animals) was used as the control group not subject to any	2016	http://www.usa-journals.com/archives/volume-46/

			treatment. Groups B, C, D and E (10 animals per group) were each continuously exposed to magnetic fields of (0.1, 0.2, 0.3 and 0.4±0.01 mT-50Hz) respectively, for a period of 10 days. After which, all groups were immediately sacrificed and blood samples collected from each animal. The osmofragility and viscosity of RBCs were investigated for each collected blood sample. Results indicated obvious abnormality in the RBCs mechanical and rheological properties for the animals of groups B, C, D and E as compared to the control group A. It was concluded that further investigations are necessary, performed in cooperation with medical researchers, concerning regular medical examination of individuals exposed to such fields. Consequently, it becomes mandatory to revise dose limits recommended by the different commissions for exposure to such extremely low frequency magnetic fields below 0.5 mT.		