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Amiza binti Azmi, M. H. Padzillah

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Title:
Facile preparation of polyaniline/graphene oxide composite towards electrode materials

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Abstract:
Polyaniline (PANi) reinforced with graphene oxide (GO) composites were synthesized via in-situ polymerization. The GO was synthesized from natural graphite flakes via the modified Hummer's method. The PANi/GO composites were characterized by Raman spectroscopy, X-ray diffraction, Fourier-transform infrared spectroscopy, scanning electron microscopy, and thermogravimetric analysis. The composites were used as supercapacitor electrodes and the performances were measured by the specific gravimetric capacitance (C_{sp}) from cyclic voltammetry and charge/discharge characteristics. The maximum value of (Formula presented.) was recorded as 36 F/g at a current density of 1 A/g for a loading of 50 wt.% of GO. However, the maximum energy density and power density were recorded as of 2.28 Wh kg^{-1} and 259.06 W kg^{-1}, respectively, for the loading of 10 wt.% of GO. Additionally, the PANi/GO exhibited the highest capacitance retention of about 76.96% after 5000 cycles at a current density of 1 A/g. The electrochemical performance of the PANi/GO composites was suitable to be used for energy storage devices application.

Title:
Strain Rate Effect on Mode I Debonding Characterization of Adhesively Bonded Aluminum Joints

Document Type:
Article

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85146803361&doi=10.3390%2fpr11010081&partnerID=40&md5=d42445023331859d6bb1652ca1d
81e94

Abstract:
In adhesive bonding, two different substrate materials are joined together, usually by forming chemical bonds. The adhesive can stick things together. The loading rate and deformation mode can easily change the mechanical properties of the adhesive material. Hence, a vital aim of the current study is to evaluate the strain rate effect on the damage response of adhesive joints for Mode I loading scenarios. The adherend material was aluminum AL6061-T6, and Araldite 2015 was the adherent material. This experiment for delamination had a prescribed adherend size of 200 mm × 25 mm × 3 mm and an adhesive thickness of 0.5 mm. In situations where the strain rate affects the failure mechanism, a displacement rate of 5, 50, or 500 mm/min is sufficient to attain the failure mechanism. A double cantilever beam (DCB) specimen was employed to construct the FE model geometry for simulation. A hybrid experimental–FE technique was utilized to extract the properties of the adhesive interface. FE simulation has proven to have an excellent correlation with the experimental findings.

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Title:
Drug-device systems based on biodegradable metals for bone applications: Potential, development and challenges

Journal:
Biocybernetics and Biomedical Engineering, Volume 43, Issue 1, 2023

Document Type:
Review

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Abstract:
Drug-device systems based on biodegradable metals have been of great interest in the last decade due to their local-release regime and the ability of the biodegradable metals to degrade in the physiological environment facilitating tissue growth and gradual load transfer. The biodegradability of the biodegradable metals provides a promising medium that might enable other materials – such as drugs, bioactive materials and therapeutic agents - to be incorporated into the degradable metals to act as a drug-device system that would locally release the drugs or therapeutic agents onto the healing tissue. In comparison to systemic drug delivery, the locally released drug-device system makes the dose control over a specific targeted tissue more efficient and reduces the side effects on non-targeted tissues. This review outlines the current state of development of the biodegradable metals-based drug-device system and focuses in-depth on the potential interactions between the drugs, degradable metallic surfaces, drug carriers, ions and proteins inside the body fluids, which can be a challenge to producing a highly efficient drug-device system.

4

Title:
Assessing Foundation Students' Acceptance in Using Video Conferencing Technologies (VCTs) as Online Learning Platforms during the Pandemic

Document Type:
Article

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Abstract:
The COVID-19 pandemic has significantly affected Higher Education Institutions (HEIs) in Malaysian education system. Due to this, the HEIs have implemented online learning to be replaced with physical classrooms to ensure that all students able to reach their learning potentials. As such, video conferencing technologies (VCTs) have been employed nationwide for effective learning activities. Previous research have shown that teaching and learning using VCTs are beneficial for online learning, however, not many studies focused on the student's acceptance of VCTs during unforeseen situations. This study intends to overcome this research gap by investigating the factors influencing the foundation students' acceptance of VCTs during the outbreak. Therefore, the facilitating conditions and computer self-efficacy factors are integrated into the Technology Acceptance Model (TAM) for analysis. For this purpose, the PLS-SEM was used to analyze the data collected from 231 participants of selected higher education institutions in Malaysia. The finding revealed that 'attitude towards use' and 'intention to use' VCTS have a positive relationship with the actual use of VCTs. Furthermore, the result indicated that facilitating condition has significantly impacted the 'perceived ease of use' of the VCTs. However, 'computer self-efficacy' has no significant impact on the 'perceived usefulness' of the VCTs. It is also learned that using VCTs is acceptable for remote and online learning mode, particularly amid the current COVID-19 pandemic. The outcomes of this study are able to improve the existing knowledge on the student's acceptance of VCTs and provide useful insights into the curriculum designated for the HEIs. Hence, it can be concluded that our findings validated the model used in this study and offered valuable guidelines in developing online learning approaches that promote learning through varied platforms.

5

Title:
Effect of Black Seed Fiber, on the Physical, Thermal, Mechanical, Morphological, and Biodegradation Properties of Cornstarch-Based Biocomposites

Document Type:
Article

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Abstract:
This work aims to investigate the effect of black seed fiber as a reinforcing material for the fabrication of cornstarch-based biocomposite. The casting procedure was applied to fabricate the biocomposite at different concentrations of black seed fiber (3%, 6%, and 9%) and plasticizer mixture of fructose and glycerol set at a proportion of 30% (1:1) for total weight. The biocomposite films were tested in terms of casting procedure physical, tensile, thermal, and morphological properties. Increasing the black seed fiber concentration from 3% to 9% decreased the density and moisture content of the films by 15.67% and 29.04%, respectively, and soil burial tests showed that the films became less resistant to biodegradation. On the other hand, an increase in tensile strength (40%), Young's modulus (26%), and crystallinity index (64%) were observed when 9% of black seed fiber was added, reflected in a consistent structure and outstanding matrix-reinforcement compatibility. It was also found that reinforced biocomposite exhibited better thermal stability and more intermolecular hydrogen bonding compared to the control film. Overall, the addition of black seed fiber as promising reinforcing material significantly improved the performance of the films, which may contribute to the development of the biopolymers industry in response to both community needs and environmental issues.

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Title:
An Approach to Automatic Garbage Detection Framework Designing using CNN

Authors:
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Abstract:
This paper proposes a system for automatic detection of litter and garbage dumps in CCTV feeds with the help of deep learning implementations. The designed system named Greenlock scans and identifies entities that resemble an accumulation of garbage or a garbage dump in real time and alerts the respective authorities to deal with the issue by locating the point of origin. The entity is labelled as garbage if it passes a certain similarity threshold. ResNet-50 has been used for the training purpose alongside TensorFlow for mathematical operations for the neural network. Combined with a pre-existing CCTV surveillance system, this system has the capability to hugely minimize garbage management costs via the prevention of formation of big dumps. The automatic detection also saves the manpower required in manual surveillance and contributes towards healthy neighborhoods and cleaner cities. This article is also showing the comparison between applied various algorithms such as standard TensorFlow, inception algo and faster-r CNN and Resnet-50, and it has been observed that Resnet-50 performed with better accuracy. The study performed here proved to be a stress reliever in terms of the garbage identification and dumping for any country. At the end of the article the comparison chart has been shown.

Title:
Comparative analysis of hybrid models for prediction of tourist arrivals

Journal:
AIP Conference Proceedings, Volume 2500, 2022.

Document Type:
Conference Paper

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Abstract:
Accurate information on future tourist arrivals is a fundamental key for tourism planning and management. Traditionally, single models have been introduced to predict the future value of tourist arrivals. However, single models may not be suitable to capture the nonlinear and non-stationary nature of the data. In this study, combination method based on Empirical Mode Decomposition (EMD), wavelet and Support Vector Machine (SVM) model, referred to as EMD-WSVM is introduced. This study also presents comparison between the proposed model of EMD-WSVM with hybrid Empirical Mode Decomposition and seasonal autoregressive integrated moving average (EMD-SARIMA) and wavelet with support vector machine (WSVM) model proposed by previous researchers. These models are ranked based on three statistical measures namely Mean Absolute Error (MAE), Root Mean Square Error (RMSE), Mean Absolute Percentage Error (MAPE) and correlation value. The results show that EMD-WSVM ranked first based on measures for Cambodia tourist arrivals. The study concludes by recommending the application of an EMD-based combined model particularly with wavelet method reduction approach for tourist arrivals forecasting due to better prediction results.

Title:
Effect of headlights during daytime, dusk, and night-time on drivers' visual perception

Journal:
AIP Conference Proceedings, Volume 2565.

Document Type:
Conference Paper

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Abstract:
The effect of headlight based on human have been traditionally focused on visual perception for perceiving vehicles. This effect of visual perception by the driver is a major contributory factor to accidents. An experiment was conducted to explore the driver's accuracy to see the approaching vehicles at junction with headlights on or off and to identify the interaction between headlights, types of vehicles, and times of the day (daytime, dusk, and night-time) for the driver visual perception. Behavioral visual experiment was conducted on 20 subjects using the images stimuli of vehicles at a junction in different time of days based on the real-life driving situation. The results suggested that car and motorcycle are perceived differently with the presence of headlights. Vehicles were also found to be comparatively limited perceiving during dusk, but with certain difference characteristics between car and motorcycles, indicating the importance of headlights in the said situation. The study would help to improve understanding the important of visual perception in road safety in preventing any incident from occur and provide useful information for driving education and training programs.

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Title:
Moisture Absorption and Tensile Behaviour of Hybrid Carbon/Flax Composites

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Abstract:
Due to environmental concerns, natural fibres are getting their importance as reinforcement in polymer composites. Nevertheless, their hydrophilic nature makes natural fibre composites susceptible to moisture attack. In this regard, one possible solution is to utilise hybrid synthetic/natural fibre composites. This paper aims to characterise the moisture absorption behaviour of carbon, flax, and hybrid carbon/flax composites. The composites were submerged in distilled water at 60 °C until saturation. Subsequently, tensile tests were conducted on dry and wet specimens. Results revealed that the moisture absorption with flax as the outer layers had attained a maximum moisture content of at least 470% higher than carbon as the outer layers. In addition, moisture absorption significantly influences the flax fibre composite, where only 27% of the specific tensile modulus was retained while the specific failure strain was doubled. The modified Halpin–Tsai equation also suggests that carbon fibre has a minimum of 5- and 3-fold larger stress transfer efficiency over the flax fibre with respect to the specific tensile modulus and strength, respectively. Through the modified Chokshi-Chaudhary-Gohil equation, the interphase volume fraction was estimated to be 8–11% for the hybrid composites. The results from this study suggest that it is better to place carbon fibre as the outer layer for hybrid carbon/flax composites to be used in outdoor applications.

Title:
PLC-BASED PID CONTROLLER FOR REAL-TIME pH NEUTRALIZATION PROCESS USING PALM OIL MILL EFFLUENT

Document Type:
Article

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Abstract:
The pH neutralization process is a highly non-linear process and time delay system that is difficult to control and to accurately model mathematically. Therefore, the empirical method, which needs reliable experimental data to represent the process dynamics, is often used. In this paper, the performance of the PLC-based PID controller was studied using a different adjustment of the acid dosing pump stroke rate in the pH neutralization process. The pH neutralization process is a single-input, single-output system where the manipulated variable is the alkali dosing pump stroke rate, the controlled variable is pH, and the acid dosing pump stroke rate is set as a constant. The acid dosing pump stroke rate was adjusted to 10%, 15% and 25%. The results showed that the best performance of the PID controller was based on setpoint tracking when the setting of the acid dosing pump stroke rate was set at 10%, which could be used as experimental data in the empirical method. In addition, the real-time control system was integrated between PLC and MATLAB using National Instruments OPC server to access the experimental data in real-time, conduct simulation, and to develop the advanced control in the future.

Title:
Practical Consideration in using Pre-Trained Convolutional Neural Network (CNN) for Finger Vein Biometric

Document Type:
Article

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Abstract:
Using a pre-trained Convolutional Neural Network (CNN) model for a practical biometric authentication system requires specific procedures for training and performance evaluation. There are two criteria for a practical biometric system studied in this paper. First, the system's ability to handle identity theft or impersonation attacks. Second, the ability of the system to generate high authentication performance with minimal enrollment period. We propose the use of the Multiple Clip Contrast Limited Adaptive Histogram Equalization (MC-CLAHE) technique to process finger images before being trained by CNN. A pre-trained CNN model called AlexNet is used to extract features as well as classify the MC-CLAHE images. The authentication performance of the pre-trained AlexNet model has increased by a maximum of 30% when using this technique. To ensure that the pre-trained AlexNet model is evaluated based on its ability to prevent impersonation attacks, a procedure to generate the Receiver Operating Characteristics (ROC) curve is proposed. An offline procedure for training the pre-trained AlexNet model is also proposed in this paper. The purpose is to minimize the user enrollment period without compromising the authentication performance. In this paper, this procedure successfully reduces the enrollment time by up to 95% compared to using on-line training

Title:
Preliminary validation of the tactile detection response task (TDRT) for measuring the time-delay effects of cognitive load during actual driving

Journal:
AIP Conference Proceedings, Volume 2562.

Document Type:
Conference Paper

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Abstract:
The tactile detection response task (TDRT) has been used to evaluate the cognitive workload of a driver. Its sensitivity has been assessed to changes in cognitive workload. The objective of this study was to test the cognitive abilities of subjects while performing time-delay TDRT tasks in actual driving situation. The behavioral experiment was designed with a driving and non-driving task to represent difficulty levels. Result shows significant different between those two tasks. This study also showed longer seconds of time interval in TDRT is significantly associated with higher response time, providing preliminary validation that time delay in TDRT might has the potential effect to detect variations in cognitive effort.

Title:
Secondary flow structure characteristics of an automotive mixed flow turbocharger turbine volute at different aspect ratios

Document Type:
Article

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Abstract:
This paper presents an experimentally validated numerical analysis of the influence of volute aspect ratio (VAR) on the fluid flow characteristics of a volute in a mixed flow turbine. The geometry of the volute subjects the flow to centrifugal forces that affect the vertical motion of the fluid, commonly known as secondary flow, which is fundamentally opposed in straight channels commonly associated with the primary flow. The flow characteristics were analysed for four-volute designs with constant volute area-to-centroid radius ratio (A/r) but with different VARs ranging from 0.5 to 2.0 at selected circumferential positions under steady state at different operating conditions. Secondary flow structure characteristics were identified based on pressure contours, velocity contours and streamlines. The internal volute flow structure was found to be dependent on the VAR. The results show corner and counter-rotating Dean effect-type vortices at higher volute aspect ratios. In addition, the results also show that as the pressure ratio increases, the deflection of primary flow increases and at certain positions, flow separation occurred. The resulting secondary flow structures that exist in the volute are strongly influenced by the VAR at different operating conditions, thus affecting turbine performance.