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Title:
High-throughput and low-latency ASIC implementation of lightweight cryptography

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AIP Conference Proceedings, 2023

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Abstract:
This paper presents high throughput and low latency ASIC implementation of a lightweight cryptography. Most of the lightweight algorithms are round-based design, whereby the high-throughput is achieved via the pipeline of the round functions. However, the response time is not ideal as such algorithms were designed crucially on area based. The PRINCE cipher is developed to speed up the latency of the algorithm while managing a competitive area utilization. Therefore, it is a promising choice for low-resource devices that emphasize response time. In this work, the PRINCE cipher is designed and synthesized in a single-cycle, reduced multi cycle, and compared with the round-per-cycle implementation as a baseline. The synthesis results reveal that the single-cycle PRINCE cipher is achievable with an almost 40% reduction in encryption latency. Further analysis on optimization of RTL designs and data path constraints have also been carried out to improve the implementation in term of gate count, delay, and power consumption, which is based on a 32nm SAED Cell Library using Synopsys tools.

2

Title:
Free Convection of Viscoelastic Nanofluid Flow on a Horizontal Circular Cylinder with Constant Heat Flux

Journal:
Journal of Advanced Research in Applied Sciences and Engineering Technology, Volume 30, Issue 3, May 2023, Pages 1-8

Document Type:
Article

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Abstract:
The current research study is focusing on a mathematical model for free convection boundary flow on a horizontal circular cylinder in a viscoelastic nanofluid has been constructed in this paper with boundary conditions constant heat flux. The Tiwari and Das Nanofluid model have been chosen in this analysis to investigate more nanofluid effects. A dimensionless set of partial differential equations is formed by using suitable non-dimensional variables. The transformed boundary layer equations are solved numerically using a finite difference scheme namely the Keller-box method. The effects of a few chosen factors on flow and heat transmission are investigated. Numerical solutions were obtained for the reduced skin friction coefficient, Nusselt number and Sherwood number as well as the velocity and temperature profiles. The features of the flow and heat transfer characteristics for various values of the viscoelastic parameter and nanoparticles volume fraction were analysed and discussed.

3

Title:
Vehicles Speed Estimation Model from Video Streams for Automatic Traffic Flow Analysis Systems

Journal:
International Journal on Informatics Visualization, Volume 7, Issue 2, 2023, Pages 295-300

Document Type:
Article

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Abstract:
Image and video processing have been widely used to provide traffic parameters, which will be used to improve certain areas of traffic operations. This research aims to develop a model for estimating vehicle speed from video streams to support traffic flow analysis (TFA) systems. Subsequently, this paper proposes a vehicle speed estimation model with three main stages of achieving speed estimation: (1) pre-processing, (2) segmentation, and (3) speed detection. The model uses a bilateral filter in the pre-processing strategy to provide free-shadow image quality and sharpen the image. Gaussian filter and active contour are used to detect and track objects of interest in the image. The Pinhole model is used to assess the real distance of the item within the image sequence for speed estimation. Kalman filter and optical flow are used to flatten vehicle speed and acceleration uncertainties. This model is evaluated with a dataset that consists of video recordings of moving vehicles at traffic light junctions on the urban roadway. The average percentage for speed estimation error is 20.86%. The average percentage for accuracy obtained is 79.14%, and the overall average precision of 0.08.

4

Title:
Ameliorative effects of microencapsulated Spirulina platensis in beverage; physicochemical, simulated release, and organoleptic properties

Journal:
Nutrition and Food Science, Volume 53, Issue 8, 21 November 2023, Pages 1279-1292

Document Type:
Article

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Abstract:
Purpose: The use of Spirulina sp. in food is limited by its bitter flavour and low absorption in the gastrointestinal system. The purpose of this study is to develop encapsulated Spirulina-alginate beads and to determine the physicochemical properties, the release efficiency in the simulated gastrointestinal fluid and the sensory acceptance of the beads when added into a rose syrup beverage. Design/methodology/approach: Spirulina-alginate beads were prepared based on 3 × 3 factorial experiments consisting of three concentrations (1%, 2% and 3%) of plain sodium alginate and three concentrations (1, 3 and 5%) (w/v) of Spirulina. Encapsulated Spirulina-alginate beads were evaluated for their encapsulation effectiveness, size, texture, morphology, colour, in vitro release rate and sensory properties. Findings: Sample H (3% sodium alginate + 1% Spirulina) had higher encapsulation efficiency (82.3%) but less protein (38.2 ppm) than Sample J (3% sodium alginate + 5% Spirulina) which produced more protein (126.4 ppm) but had lower encapsulation efficiency (54.5%). Alginate was the primary factor affecting bead size, and the texture became harder at 3% sodium alginate but softer at 5% Spirulina. As the concentration of Spirulina increased, the intensity of the green colour diminished. The encapsulated samples released test was better than the control samples, and Sample B (1% sodium alginate + 1% Spirulina) was preferred by the panellists in the sensory study. Originality/value: This newly developed encapsulated Spirulina will improve the beverage acceptability, minimize the bitterness and increase the release percentage of Spirulina in simulated gastrointestinal.

5

Title:
Footprint biometric authentication using SqueezeNet

Journal:
Indonesian Journal of Electrical Engineering and Computer Science, Volume 31, Issue 2, August 2023, Pages 893-901

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Article

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Abstract:
Biometric authentication is a process of identity verification once an identity is claimed by an individual. It uses unique features on the human body. Footprints are a new biometric feature that has sparked interest among researchers, as this feature is universal, easy to extract and has not changed throughout time. The focus of researchers in this field is to improve the recognition rate. Various techniques have been developed for this purpose, but the accuracy percentage is at 98% with an equal error rate (EER) of 6.1%. This paper proposes the use of a new technique called SqueezeNet in classifying footprint images. SqueezeNet belongs to the convolutional neural network (CNN) family. In this study, 300 footprint images were used from 15 individuals. The 70% of these images were used to train the proposed SqueezeNet network, while the rest were used for testing. At the end of this simulation, SqueezeNet has achieved an accuracy of 98.67% with an EER of 2.1%.

6

Title:
The Impact of Work from Home on Productivity among Manufacturing Industry Workers During MCO

Journal:
Journal of Optimization in Industrial Engineering, Volume 16, Issue 1, June 2023, Pages 219-223.

Document Type:
Article

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Abstract:
Thousands of people had significant health problems as the COVID-19 virus swept over the country which is increasing the fatality rate. The only way to stop the epidemic from spreading was for affected countries to halt all civil and economic operations for an extended period. As a result, some governments have imposed a global lockdown, which is still in effect. In this scenario, all business activity in all industries is halted. For numerous industries, the shutdown has a variety of ramifications. The aviation, hospitality, restaurant, and manufacturing industries, for example, have all shut down and will take years to recover. To tackle the current scenario, businesses are attempting to manage offices and administrative jobs using the "Work from Home" (WFH) paradigm. Businesses are attempting to withstand the storm. Furthermore, the factors that affects the productivity of work from home had been identified. Productivity has been largely determined by occupant self-reports. These are more subjective in nature and more prone to bias than satisfaction ratings, as respondents are asked to make an estimate based on their own emotions.

7

Title:
Types of Welding Process and Relationship with Defective Rate in Structural Fabrication for Oil & Gas Project

Journal:
Journal of Optimization in Industrial Engineering, Volume 16, Issue 1, June 2023, Pages 249-254.

Document Type:
Article

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Abstract:
This research sought to identify the best welding processes with the lowest defective rate. It is important to select the most appropriate welding process for a certain condition, such as welding, taking into consideration technical and economic viability. This study will help the key person in the organization make the right decision on the selection welding process. The existence of many welding processes on the market, each with their own sets of advantages and disadvantages, makes determining the optimal welding process for a given situation challenging. As a result, selecting which welding process would provide the best welding quality at the lowest cost is critical to the success of any company's market strategy. There are three (3) variables that will be further investigated, which are: welding process (WP), defective rate (DR), and types of welding defect (WD). This study will analyze welder data from the welding department in MMHE, Pasir Gudang, Johor. The software that is going to be used is Minitab and SPSS. The research methodology starts with data collection, data screening, description analysis, inferential statistical analysis, independent sample t-test, correlation analysis, and regression analysis. The result of the analysis shows that there is a correlation between WP versus DR and WP versus WD, but it is a weak correlation. The results also show that SAW is the best welding process and contributes almost no defects. The SAW process is the right choice for fabricators to use in the structural fabrication industry. However, due to time constraints, probably the cost factor of SAW process is slightly higher than other welding processes not discussed in this study.

8

Title:
Critical Success Factors for Implementation of Quality Improvement Initiative

Journal:
Journal of Optimization in Industrial Engineering, Volume 16, Issue 1, June 2023, Pages 211-218.

Document Type:
Article

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Abstract:
As time evolves, the demand of the markets becomes much more dynamic and for meeting client's expectations and have the edge over others, changes in existent processes are compulsory. Thus, Improvement Initiative (IMI) provides guidelines in achieving organizational goals which is to optimize profit and enhance the productivity. However, several cases have been reported with low rate of success of the IMI's practice in which they have failed to achieve the intended improvement result and one of the factors is lack of awareness of the IMI's Critical Success Factors (CSF). The process to identify the CSFs of an IMI is significant as it allows organizations to focus their effort to make sure they are ready and qualified when implementing the respective IMI and prevent improvement failures in the future. In addition, lack of reference regarding the reference model of comprehensive CSFs for an IMI from existing literatures allow a new study to bridge this research gap. Therefore, this paper sets out the findings of reviewing and gathering latest critical success factors and thus developing a reference model that incorporate lists of CSFs for each IMI with their attributes. This study incorporated Positivism as the research perspective and adopted quantitative research method to meet the objectives. Via extensive systematic literature review (SLR) procedures, a total of 72 publications were used to extract information needed which later enable the conceptual model development for IMI selection of comprehensive critical success factors as a reference support for decision makers. To ensure generalization of the model, the quantitative research method was adopted with a total of 137 respondents' feedback of survey were gathered from various organizations. The reflective-formative hierarchical model was then developed and analyzed using structural equation modelling (SEM) via Smart PLS software to test the model of CSFs for IMI. As the final result, six out of nine CSFs with 39 attributes were considered as critical factors when

9

Title:
The Barriers and Critical Success Factor for Implementing Lean Manufacturing at SMEs

Journal:
Journal of Optimization in Industrial Engineering, Volume 16, Issue 1, June 2023, Pages 225-229.

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Article

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Abstract:
Small Medium Enterprise (SME) gives a big pressure on the management of their assets. Lack of expertise and awareness will become the major obstacles in achieving a better business strategy. Lean principles are applied in manufacturing and service industries extensively, but its success application in industry has been poor. The main objective of this study is to identify the Barrier for implementation of Lean Manufacturing (LM) at SMEs and to determine the Critical Success Factors (CSFs) for Implementation of Lean Manufacturing (LM) at SMEs. The data was collected using questionnaire and all the data was analyzed by using SPSS. There are 208 respondents involved in this study and the questionnaire is accepted with Cronbach"s Alpha more than 0.7. From the new conceptual model created after KMO and Bartlett"s Test, the researchers show there is one construct eliminated for both CSFs and Barriers. This study found that the construct for the Barrier for implementation of Lean Manufacturing at SMEs were related to resources, management, knowledge and financial. The construct for the CSFs for Implementation of Lean Manufacturing at SMEs were related to responsibility & leadership, supplier, people management and resource. The proposed model from this study will only be suitable for SMEs in Pasir Gudang Industrial area.

10

Title:
Comparison of SqueezeNet and DarkNet-53 based YOLO-V3 Performance for Beehive Intelligent Monitoring System

Journal:
13th IEEE Symposium on Computer Applications and Industrial Electronics, ISCAIE 2023, 2023, Pages 62-65

Document Type:
Conference Paper

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Abstract:
This paper discusses the development of a prototype to detect the activeness of stingless beehives using 'You Only Look Once -Version 3' (YOLO-V3) technology. A graphical user interface (GUI) was developed using MATLAB to detect, count and display the total number of bees in real-time. The developed system provides a notification alarm in the form of indicator lights and buzzers for beekeepers when the number of bees detected per frame is lower than the threshold value. The system GUI developed can operate in two modes, namely real-time and offline video modes. This paper also compares two types of deep learning architecture used with YOLO-V3, namely SqueezeNet and DarkNet-53. SqueezeNet is a CNN-based deep learning architecture with a depth of 18 layers. DarkNet-53 has a depth of 53 layers. 150 images taken from 5 beehives were used to train and test this system. The comparative performance of these two architectures is done using the precision-recall curve (PR Curve). Two performance parameters from the PR curve, namely the average precision and the area under the PR curve, are used as the selection criteria for comparison. Simulation results show that SqueezeNet can be trained in a shorter period than DarkNet-53, with 20% better performance.

11

Title:
Mobile-Based Applications: The Legal Challenges on Data Privacy

Journal:
International journal of online and biomedical engineering, Volume 19, Issue 9, 2023, Pages 4-14

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Article

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Abstract:
The mobile-based apps used is getting popular and continued to increased. Mobile user often downloaded the apps from various sources that provided from numerous of categorization of the application included health apps. Some of apps is optional to choose, but nevertheless, there are several apps is compulsory or must-action by citizens as instructed by the government or their agency. As for that, some issues of legal challenges on data privacy kin to data security have occurred. The issues on legal challenges is more intricate for non-legal educated users with non-awareness citizens while there are government involvements. Hence, in this paper, the issues and the legal challenges on the data privacy for mobile-based application are reviewed to give awareness for both side, the users (citizens) and apps provider (government or developer). Together with that, the idea of action, such as recommendation and option to react with the issues and challenges are also presented. Several Acts (legislation) are also proposed according to the legal issues and challenges that occurred, as showed the Personal Data Protection Act (PDPA) 2010 is became as the famous act used to confront with the existing privacy legislation in mobile-based application. The suggestions and recommendations might assist citizens to keep stand with their rights on data privacy issues in mobile apps, and to the other-side, it might provide some idea be more precise when create and develop the mobile apps.

12

Title:
Investigating the thermostability, activation energy, and In vitro delivery of palm kernel cake enriched with synbiotic containing immobilized Lactiplantibacillus plantarum ATCC 8014

Journal:
Biocatalysis and Agricultural Biotechnology, Volume 51, August 2023, Article number 102806

Document Type:
Article

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Abstract:
Feed additives play an important role in providing health benefits towards ruminant's production. The selection of probiotic encapsulation in pellet form gives limitation as probiotics are sensitive towards heat and delivery condition in a ruminant's stomach. Synbiotic encapsulation involves encapsulating probiotics with prebiotic ingredients to boost their viability. In this study, we investigated the best formulation of alginate (Alg) (3%, 4%, and 5%) and palm kernel cake (PKC) coating ratios (1:0, 1:1, and 1:1.5) for Lactiplantibacillus plantarum ATCC 8014 microencapsulation, through extrusion method. The optimum formulation was selected based on thermostability, physicochemical, morphological, and in vitro release properties. The unencapsulated probiotic (initial concentration of approximately 9.30 log CFU/mL) was the control sample in this study. The average microencapsulation efficiency for all samples was greater than 97%. The encapsulated probiotics (4% Alg-supplemented with 4% PKC) had the highest survival rates after heat exposure (99.33%) and in vitro release analysis (94.67%). The addition of alginate enhanced the roughness average significantly as well as increased the size. The activation energy showed that the sample without and with PKC utilized energy ranging from 254 to 200 kJ/kmol. K and 363–400 kJ/kmol. K, respectively. Thus, an optimized formulation of 4% Alg and a coating ratio of 1:1 may be able to prevent probiotic loss in industrial feed additives.

13

Title:
Implementation of a Smart Shaded Plant House with Arduino Microcontroller and IoT for Optimal Plant Growth using Fuzzy Logic Control

Journal:
ACM International Conference Proceeding Series, 21 July 2023, Pages 30-36

Document Type:
Conference Paper

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Abstract:
Greenhouse horticulture's main purpose is to produce a comfortable indoor environment that encourages plant development. As a result, it promotes off-season crop farming and cultivation in areas where the natural environment is unsuitable for some types of flora. The proposed project in this study focuses on tomato cultivation where there is still minimal cultivation since the process is difficult to control and requires low temperatures, such as in some upland areas, to allow high quality and fast growth. Several essential characteristics that determine the quality of plant development and production, including as temperature, humidity, soil moisture, and the amount of sunlight that penetrates the plant house, will be monitored, and managed automatically in this project. The temperature and humidity sensor (DHT11), soil moisture sensors (YL-69), ultraviolet (UV) sensor, 12 V water pump, 12 V Peltier module with heatsink, 26 W LED plant grow strip lights, and switchable glass that blocks 98% of UV rays are some of the most important components used in this study. According to the findings of the experiments, tomato plants cultivated with this prototype develop faster and healthier, even in high-Temperature agricultural locations. Furthermore, this project can use IoT to control and safeguard tomato crops from being exposed to excessive ultraviolet radiation and pests by using applications installed on smart phones. Experimental results show that tomatoes grown in the suggested greenhouse system, the Smart Shaded Plant House, grow more quickly than tomatoes grown using traditional methods. By constantly monitoring these environmental variables, farmers can learn more about how each aspect affects growth and how to manage maximum crop productivity while growing certain vegetables and fruits in hot agricultural areas.

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Title:
Knee Cartilage Segmentation using Improved U-Net

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Abstract:
Patello-femoral joint stability is a complex problem and requires detailed anatomic parametric study for knowing the associated breakdowns of knee cartilage. Osteoarthritis is one of the main disorders, which disrupt the normal bio-mechanics and stability of the patello-femoral joint and for diagnosing osteoarthritis radiologists needs a lot of time to diagnose it. An improved network called PSU-Net is proposed for the automatic segmentation of femoral, tibia, and patella cartilage in knee MR images. The model utilizes a Squeeze and Excitation block with residual connection for effective feature learning that helps in learning imbalance anatomical structure between background, bone areas and cartilage. The severity of knee cartilage is measured through the Kellgren and Lawrence (KL) grading system by radiologists. Also, updated weighted loss function is used during training to optimize the model and improve cartilage segmentation. Results demonstrate that PSU-Net can accurately and quickly identify cartilages compared to the traditional procedures, aiding in the treatment planning in a very short amount of time. Future work will involve the use of augmentation methods and also use this architecture as a generator model for generative adversarial network to improve performance further. The utility of this work will help in analyzing the anatomy of the human knee by the radiologists in short amount of time that may prove helpful to standardize and automate patello-femoral measurements in diverse patient populations.