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10TH INTERNATIONAL CONFERENCE ON
RECENT CHALLENGES IN ENGINEERING AND TECHNOLOGY

22ND - 23RD JUNE 2022 **BALI, INDONESIA**

Organized By
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10th International Conference on Recent Challenges in Engineering and Technology

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22nd-23rd June, 2022

Bali, Indonesia

Organized by

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Co-Host by

Udayana University, Indonesia

Mercu Buana University, Indonesia

Lloyd Institute of Engineering & Technology, India

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Editorial

We cordially invite you to attend the **10th International Conference on Recent Challenges in Engineering and Technology (ICRCET-22)** which will be held in **Bali, Indonesia** on **22nd-23rd June, 2022**. The main objective of this conference is to provide a platform for researchers, students, academicians as well as industrial professionals from all over the world to present their research results and development activities in relevant fields of Engineering and Technology. This conference will provide opportunities for the delegates to exchange new ideas and experience face to face, to establish business or research relationship and to find global partners for future collaboration.

These proceedings collect the up-to-date, comprehensive and worldwide state-of-art knowledge on cutting edge development of academia as well as industries. All accepted papers were subjected to strict peer-reviewing by a panel of expert referees. The papers have been selected for these proceedings because of their quality and the relevance to the conference. We hope these proceedings will not only provide the readers a broad overview of the latest research results but also will provide the readers a valuable summary and reference in these fields.

The conference is supported by many universities, research institutes and colleges. Many professors played an important role in the successful holding of the conference, so we would like to take this opportunity to express our sincere gratitude and highest respects to them. They have worked very hard in reviewing papers and making valuable suggestions for the authors to improve their work. We also would like to express our gratitude to the external reviewers, for providing extra help in the review process, and to the authors for contributing their research result to the conference.

Since March 2022, the Organizing Committees have received more than 120 manuscript papers, and the papers cover all the aspects in Engineering and Technology. Finally, after review, about 59 papers were included to the proceedings of **ICRCET-22**.

We would like to extend our appreciation to all participants in the conference for their great contribution to the success of **ICRCET-22.** We would like to thank the keynote and individual speakers and all participating authors for their hard work and time. We also sincerely appreciate the work by the technical program committee and all reviewers, whose contributions made this conference possible. We would like to extend our thanks to all the referees for their constructive comments on all papers; especially, we would like to thank to organizing committee for their hard work.

Acknowledgement

Er. R. B. Satpathy
Chief Executive Officer (CEO)
Institute for Engineering Research and Publication (IFERP)

IFERP is hosting the **10th International Conference on Recent Challenges in Engineering and Technology (ICRCET-22)** this year in month of June. The main objective of ICRCET-22 is to grant the amazing opportunity to learn about groundbreaking developments in modern industry, talk through difficult workplace scenarios with peers who experience the same pain points, and experience enormous growth and development as a professional. There will be no shortage of continuous networking opportunities and informational sessions. The sessions serve as an excellent opportunity to soak up information from widely respected experts. Connecting with fellow professionals and sharing the success stories of your firm is an excellent way to build relations and become known as a thought leader.

I express my hearty gratitude to all my Colleagues, staffs, Professors, reviewers and members of organizing committee for their hearty and dedicated support to make this conference successful. I am also thankful to all our delegates for their pain staking effort to make this conference successful.

Er. R. B. Satpathy

Welcome Message

Mr. Abdy Taminsyah
CEO and Founder, MonsoonSIM,
Perth, Western Australia, Australia

Honourable Guests, Ladies and Gentlemen

It is my great pleasure to welcome you to the 10th International Conference on Recent Challenges in Engineering and Technology

To me, one of the challenges in Technology is to bring quality, affordable education to every corner of the world. Good education should be accessible for everyone and not just limited for the privileged few. In this seminar, I look forward to sharing how we can transform education through technology-driven experiential learning. Through technology, we can bring level-playing field for education institutions all over the world.

I look forward seeing you on June 22nd.

Hope this suits your purpose.

Keynote Speakers

Dr. Eng. Deni Shidqi Khaerudini

Research Center for Advanced Materials,
National Research and Innovation Agency
(BRIN), Indonesia

Dr. Kiran Nair

Strategic Industry Collaboration and MBA,
Administrator, Associate Professor,
Abu Dhabi School of Management (ADSM), UAE

Dr. Shri Ajai Garg

Senior Director,
Ministry of Electronics & Information Technology,
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Dr. Christopher Abraham Ph.D, FCIM

CEO & Head Dubai Campus,
Sr.VP at S P Jain School of Global Management,
TEDx & International Conference Keynote
Speaker

Dr. Anwar Ahmad

Professor, University of Nizwa,
Civil and Environmental Engineering
Department, Nizwa, Oman

Dr. Rajeev Agrawal

Senior Director
Lloyd Institute of Engineering & Technology,
India

Guest Speaker

Dr. Alice Maldonado-Lacorte,

Dean of the College of Computing and Information Technology,
First Asia Institute of Technology and Humanities,
Tanauan City, Philippines

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Index

Index

Index

Index

10th International Conference on
Recent Challenges in Engineering and Technology
22nd-23rd June, 2022 - Bali, Indonesia

Research of Scanning Speed and Orientation of the Model to the Resulting Surface Roughness in the Process of Selective Laser Melting

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Faculty of Material Science and Technology in Trnava, Slovak University of Technology in Bratislava, Slovakia

Abstract:
The article focused on the influence of part orientation on the surface roughness of cuboid parts during the process of fabricating by SLM technology. The components, in this case, is simple cuboid part with the dimensions 15 mm x 15mm x 30 mm.
SLM or Selective Laser Melting is Additive manufacturing technology based on the Powder Bed Fusion process. SLM is designed to use high power-density laser to melt and fuse metallic powder. A part is built by selectively melting and fusing regions of metallic powders within and between layers. For the research purposes, five different orientations in the X-axis of the cuboid part were set: 0°, 30°, 45°, 60°, and 90°. The internal structure was set at a value of 100%. In this research, we manufactured five specimens for scanning speed 650 mm.min-1 and five specimens for scanning speed 1000 mm.min-1. In the research metallic powders were used, namely austenitic stainless steel SS 316L. In this experiment, we manufactured a total of 10 specimens. Surface parameters (Ra, Rz, Rq) were measured five-time in a row for each print. Prints were carried out on an SLM machine from Renishaw with the designation AM400. After the 3D printing, the surface "A" was investigated by portable surface roughness tester Mitutoyo SJ-210. Surface roughness in the article is shown in the form of graphs. Results show an increase in part roughness with an increasing degree of part orientation. When the direction of applied layers on the measured surface was horizontal, a significant improvement in surface roughness was observed. Findings in this paper can be taken into consideration when designing parts, as they can contribute to achieving lower surface roughness values.

Keywords:
Surface roughness, SLM, Orientation, Model orinetation

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10th International Conference on
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22nd-23rd June, 2022 - Bali, Indonesia

Wide Bandpass Filter Composed of First-Order and Second-Order Active High Pass Filters Simulated Using MATLAB and Multisim Live

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Abstract:
This term project aims to simulate a wide bandpass filter that is composed of first-order and second-order high pass filters that are cascaded in series. The filters are composed of 3-terminal op-amps, 1V AC source with 1kHz frequency, 1uF capacitors, and 1k-ohm resistors. To determine the phase shift and frequency response, the filters are simulated in Multisim Live using AC sweep analysis. On the other hand, to acquire the step response and root locus plot of the circuits, they are treated as control systems and their transfer function formulas were simulated using MATLAB. At the end of the study, the researchers were able to confirm the different properties and parameters these filters have.

Keywords:
Wide bandpass filter, Active high pass filter, Multisim Live, MATLAB, Phase shift, Frequency response, Step response, Root locus plot

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10th International Conference on
Recent Challenges in Engineering and Technology
22nd-23rd June, 2022 - Bali, Indonesia

Arduino Based Obstacle Avoiding Robot with Ultrasonic Sensors and Motor Functions

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Abstract:
A simple robotics project simulated in Tinkercad based on Arduino Uno. It utilizes ultrasonic sensors for obstacle detection and two DC motors for movement. An LCD screen is used to print text when an obstacle is detected and so on.

Keywords:
Arduino Uno R3, HC - SR04 Ultrasonic Sensor, mobile robot, L293D, Tinkercad

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10th International Conference on
Recent Challenges in Engineering and Technology
22nd-23rd June, 2022 - Bali, Indonesia

Analysis and Design of Self-Service Local Water Company (LWC) using Vernam Cipher Cryptography Algorithm

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Abstract:
The main factors affecting the performance of Local Water Company (LWC) when managing consumable water distribution in Indonesia are the level of non-revenue water, less water usage effectiveness, and less efficiency of billing records and customer complaints about services that do not become available up to 24 hours. This happens because the process is still done manually, so errors and fraud are often found. Other than that, there is a lot of complaint from customers about the value of water usage that is not matched with the amount of the bill, and officers who did not come to houses located in some specific areas.
This research aims to provide a solution that proposes the design of an LWC recording and billing system with a practical and safe prepaid Self-Service method. This prepaid Self-Service method is divided into two main functions. First, the real-time calculation function is designed to solve the efficiency problem in recording water usage. Second, the self-payment token's function is designed to resolve constraints related to data processing and bill payment. It was generating tokens for self-payment token functions built using The Vernam Cipher Cryptographic Algorithm, which is programmed using the Android platform and Arduino IDE. Token will be sent to other devices through Bluetooth Serial Communication.
The results showed that making the self-payment token function using The Vernam Cipher Cryptographic Algorithm was successfully performed. The encryption token consisting of 48 characters can be automatically transferred to other devices using Bluetooth serial communication. The encryption process takes about 0.34 seconds, and the decryption process takes about 0,20 seconds.

Keywords:
LWC; Vernam Cipher Algorithm; One Time Pad (OTP); LWC Self-Services;

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10th International Conference on
Recent Challenges in Engineering and Technology
22nd-23rd June, 2022 - Bali, Indonesia

Experimental Investigation on Flap Peening Process of Aluminum Alloys Sheets at Various Flapping Rotational Speed

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Abstract:
In this paper, flap peening treated of 2024 T3 aluminum alloy sheets with 2.5 mm thickness were investigated and presented. The specimens used for the studies were taken from Airbus A330-200 aircraft fuselage skin near the waste vent hole area. There are 5 specimens were investigated. The first specimen is a sheet in a good condition and the rest were damaged by corrosion. The sheets were blended out to remove corrosion areas and sharp edges. Furthermore, the flap peening was applied to improve the characteristics of the material surface at various rotation speeds (1500, 2500, and 3500 rpm). For investigation, the tensile strength and hardness of the specimens were measured to study the effects of the repair process. Afterward, the specimen's macrostructure was investigated to see the effect of these parameters on the metal surface. The macrostructure results show there was a significant modification on the surface morphology of samples with flap peening treatment. The measurements show there was a significant improvement in strength and hardness after flap peening was applied. Although flap peening application at 3500 rpm resulting better material properties, the difference is not significant compared to the 2500 rpm rotational speed.

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10th International Conference on
Recent Challenges in Engineering and Technology
22nd-23rd June, 2022 - Bali, Indonesia

Improving the Sustainability of Cosmetics Small and Medium Industries: A Case Study

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Abstract:
Inefficiency and environmental hostility are major concerns in cosmetics small and medium industries (SMIs). Sustainability has become a goal desired by cosmetic customers. This study aims to encourage the development of sustainable cosmetics SMIs by integrating lean and green principles into production practice. This research combines the lean and green methods and tools suitable for SMIs, namely, green value stream mapping and life cycle impact assessment to evaluate manufacturing waste and environmental impact. We conducted kaizen events to improve existing processes. A case study of a liquid face soap manufacturing company was analyzed. The proposed ideas improved their manufacturing cycle effectiveness (MCE) by 1.8%, shortened inventory lead time by 36%, and reduced environmental impact by 33%. The company also achieved monthly electricity cost reductions of 41%. Despite an insignificant rise in the MCE, this study highlights the scope for using lean and green principles for social-environmental improvement, particularly in reducing damage to human health. Various other industries can emulate these methods.

Keywords:
Sustainability, lean and green, green value stream mapping (GVSM), life cycle impact assessment (LCIA), kaizen events, cosmetics small and medium industries (SMIs)

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10th International Conference on
Recent Challenges in Engineering and Technology
22nd-23rd June, 2022 - Bali, Indonesia

FISGA-IAE ASVSF Algorithm for Effectively Solving the Localization

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Abstract:
The use of Smooth Variable Structure Filter (SVSF) has been successfully overcoming the Localization problem. Generally, its performance depends on the knowledge of noise statistics for the process and measurement. Because this knowledge is not available, both are determined and kept to be constant for all iterations. However, this approach will lead SVSF to the divergence condition. Accordingly, a novel improvement, namely FISGA-IAE ASVSF, is proposed in this paper. This name represents the role of the Genetic Algorithm (GA) used to optimize the Fuzzy Inference System (FIS) that is initially applied for enhancing the adaptive SVSF. Unlike the traditional way, this strategy can recursively update the noise covariance of the process Q and measurement R. In detail, FIS supervises the adaptive SVSF to reduce the mismatch between the reference and estimated covariance of error innovation. To effectively arrange the membership function of FIS, the GA is adopted. Lastly, it is implemented to solve the localization problem of mobile robots in the synthetic simulation perception. By using the term RMSE, the comparatively presented results are analyzed. And the proposed method shows better performance in terms of accuracy and stability.

Keywords:
Adaptive SVSF, IAE, FIOS, GA, Localization

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10th International Conference on
Recent Challenges in Engineering and Technology
22nd-23rd June, 2022 - Bali, Indonesia

Effect of Ultrasonic and Ball Milling Process on Particle Size, Specific Surface and its Agglometaion of Metallic Interconnect Material

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Abstract:
Metallic material become interesting field for interconnect application that have high thermal stability and oxidation resistant at high temperature. The main problem is the agglomerates powder and grain growth of metallic material that lead to decrement of properties of interconnect material. Therefore, the main objectives of this research is to develop small size particle up to nano range size and even particle size. The methods of this research was performed though high energy ball milling for 60 h and ultrasonic bath for various holding time of 3 h, 3.5 h, 4 h, 4.5 h and 5 h. The analysis and characterization process will be conducted by Powder size analysis by particle size analyzer (PSA) and Scanning Electron Microscopy (SEM) with magnification of 1000 and 2000 times. The result shows that the particle size decreased gradually from UT samples, Milled 60 h samples and to milled 60 h and UT samples. Its shows that particle size of 38.67µm for raw material, 11.45µm for UT 4.5 samples, 6.27 µm for milled 60 h sample and 5.23 µm for milled 60 h and UT 4.5 h. Fine surface structed and even particle size was shown by UT samples and combination samples due to high energy bubbles through liquid media that collide the material.

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10th International Conference on
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22nd-23rd June, 2022 - Bali, Indonesia

Coating Thickness Analysis of Electroplated FeCrAl Material for Metallic Catalytic Converter Application

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Abstract:
One of the most technologycal to develop and adhere to the catalysts on the FeCrAl substrate are based on electrophoretic deposition. The objectives of this research is to investigate the coating thickness on FeCrAl metallic material for catalytic converter. The electrolyte prepared with distilled water, at a constant temperature of 40±50C, and pH value is 5 using HCl and NaOH reagent. A nickel (Ni) plate substrate acted as anode with dimension of 50 mm x 10 mm, whereas a FeCrAl acted as cathode with dimension of 40 mm x 20 mm. The electroplating was conducted for several times of 15, 30, 45, 60 and 75 minutes, current density of 8 A/dm2 and 3 g γ-Al2O3 inserted into the beaker for each sample. Coating thickness analysis on cross section of the coated samples were carried out using Scanning Electron Microscope (SEM)-Energy Dispersive Spectroscopy (EDS). The result shows that the UBdEL samples has lowest coating thickness of 5µm, the coating thickness of Electroplated FeCrAl increased for 11.3µm and the highest coating thickness signed by UB+EL samples for 12µm. Higher coating thickness potential to increase the thermal stability due to protective oxide layer on FeCrAl substrate material.

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10th International Conference on
Recent Challenges in Engineering and Technology
22nd-23rd June, 2022 - Bali, Indonesia

Crystallite size and Solid Solubility Cr to Fe Analysis of Fe80Cr20 Interconnect Material Treated by Ultrasonic and High Energy Ball milling Process

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Abstract:
In the current research, there is high interest in nanocrystalline iron and chromium based alloys. The iron-chromium has long been used by many engineering alloys as basis in high-strength and corrosion-resistant applications such as for fuel cell interconnect. The problem is there is high crystalline growth at high temperature operation up to 1000 0C. Therefore, this research investigates the crystallite size and solid solubility of the Fe80Cr20 metallic material that projected have high thermal stability to applied as Interconnect fuel cell. The method of this research was conducted through high energy milling for 60 h and ultrasonic bath by frequency of 35 kHz and various holding time of 3, 3.5, 4, 4.5 and 5 h. The analysis of the crystallite size and solid solubility were conducted by X-Ray Diffraction (XRD) with diffraction angle of 10-900 and operation time of 25 minutes. High energy ball milling is the most effective technique to reduce the crystallite size up to 96 % and it combined with ultrasonic achieve 2.171 nm crystallite size and improve the solid solubility up to 86.4 % as compared to the raw material. These results achieved high energy kinetics and the ball slugging the powder during ball milling process.

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10th International Conference on
Recent Challenges in Engineering and Technology
22nd-23rd June, 2022 - Bali, Indonesia

Vehicle Speed Prediction Using YOLOv4 and XGBoost Regression

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Abstract:
There are many ways to detect vehicles' speed these days, which can be categorized into two approaches: a non-computer-vision-based and a computer-vision-based. In this paper, we propose a computer-vision-based approach using YOLOv4 and XGBoost Regression. To predict vehicles' speed efficiently, we use YOLOv4 for vehicle detection and XGBoost regression for speed prediction. In order to get the best speed prediction, we build our dataset by recording the local traffic and measuring their speed using a speed gun. From those traffic videos, we detect vehicles by using YOLOv4 to generate its bounding boxes. From the bounding boxes, we can extract its coordinates relative to the screen, the distance and the angle between the two centroids, and the time it takes from point A to point B. This information will be our features, and the speed from the speed gun will serve as the target to train our XGBoost regression model. In this paper, we conduct several experiments using various features to get the best model. Our experiments conclude that our speed prediction approach using YOLOv4 and XGBoost regression has a very high performance regarding to the ground truth with an MAE of just 2 km/h.

Keywords:
Automatic Vehicle Speed Detection, Computer Vision, Machine Learning, YOLO.

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Functionality, Electrostatic Discharge and Power Quality Magnetic Analysis of the Speed Limiter Integrated Fatigue Analizer (SLIFA)

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Abstract:
Safety devices of the truck and bus critically needed to minimize the possibility of road accident. Several factors found to cause traffic accident, such as external, attitude, fatigue, over speed and technical vehicle (maintenance shortfalls). Therefore, the objective of this research is to investigate the functionality, electrostatic discharge and power quality magnetic analysis of the Speed Limiter Integrated Fatigue Analizer (SLIFA). The dimension of SLIFA is length,width and height 154 mm x 76mm x 57 mm. Assembly process of the electronic component was conducted after an electronic simulation component by PROTEUS software. The result shows that the SLIFA successfully limit the speed through function test using simulator, on vehicle and on the road with selected speed up to 100km/h. ESD test shows all components working at various current of 0.5, 1, 2, 3 and 4 kV in both polarity. PQM result shows that no degradation of function and damage occur during the test indicated by empty step size and fail value.

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Resistivity and Conductivity Analysis of Coated Metallic Catalytic Converter with Wavelength Shape of Monolith

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Abstract:
Removal of pollutants in the exhaust system was an interesting field and it was inspired by the invention of modern Catalytic Converter (CATCO). The problem is low emission conversion from CO, NOx and HC to H2O, CO2 and NO2 due to low CATCO material conductivity. Therefore, the objective of this research is to investigate the conductivity and resistivity of FeCrAl material for CATCO that coated by combined technique of electroplating and ultrasonic methods. Nickel (Ni) plate as anode and FeCrAl as cathode. The distance between anode and cathode was adjusted at 25 mm. Ultrasonic was carried out using frequency of 35kHz. Ultrasonic and electroplating were conducted for several variation times of 15, 30, 45, 60 and 75 minutes. Drying process was performed after electroplating process at temperature of 600C for 12 hours. The conductivity and resistivity analysis will be conducted using 4 point probe machine. Resistivity and conductivity analysis show that the smallest resistivity and highest conductivity has been observed at UB+EL 30 minute for 2.67E+03 ohm-cm and 3.75E-04 S/cm, respectively. UB samples has lower resistivity and higher conductivity than EL, and UBdEL samples. It may caused by surface roughness of the FrCrAl material that embedded during the coating process.

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Microstrip Transmitarray Antenna with Three Layered 5X5 Jerusalem Cross and Square Slot Patches at 38 GHz

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Abstract:
This paper presents a unique design of a transmitarray antenna. The antenna with three layers of Jerusalem cross and square slot in 5×5 array form is designed and tested for 38 GHz frequency. In the design we exploit the phase characteristics of the transmission coefficient through the whole structure. A phase shift of up to 233° can be achieved by variation of the length of the Jerusalem cross and the square slot. The antenna with a size of 20 mm x 20 mm was fabricated using Roger RT4003C and measured. According to the simulation results, a gain of 23.29 dBi is obtained oriented to the horizontal direction as expected from the design view of point.

Keywords:
Transmitarray antenna, Phase Distribution, Beamforming, Gain.

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The Integration of Business Process Reengineering and Snell X's Enterprise Resource Planning for Efficiency and Effectiveness: A Case Study of Cosmetics and Household Sub Sector Companies

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Abstract:
This research discusses about the system improvement using Business Process Reengineering (BPR) framework integrated with Enterprise Resource Planning. The object of this study is the business process of cosmetics and household goods sub-sector company. This study carries the problem of supplier lead time when shipping raw materials supply which results delays in production. Furthermore, the Business Process Reengineering method used for this study aimed to reduce the sub-process time with support of IDEF0. Process mapping was carried out by doing interviews and Focus Group Discussions (FGD) with three experts. This study results the process of As-Is and To-Be that reduced the business process time up to 36%. By the improvement of time efficiency, the cosmetics and household goods sub-sector company experiences rapid changes in working hours. In addition, with the ERP implementation of Snell X's, it helped the workers to carry out their job only by one integrated business management application.

Keywords:
Business Process Reengineering, Enterprise Resource Planning, IDEF0, As-Is, To-Be, ERP

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Investigation of the Potential Cash Waqf for Funding Public Infrastructure through Public-Private Partnership

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Abstract:
The need of using green financing for PPP funding is an interesting topic among stakeholders in Indonesia. Cash waqf as part of Islamic finance has the potential for sourcing PPP funding, as Indonesia's potential cash waqf is estimated to reach IDR 180 Trillion/year. Grand climate finance and blended finance are a participant in nature, so the government-public can participate with cash waqf sources and enter into commercial sectors. The purpose of the study is to investigate how actually cash waqf has been implemented in public infrastructure. A semi-structured interview was conducted. NVivo is used and has helped with qualitative data storage, coding, and modeling. Then the interviews were categorized into 7 nodes and 38 child nodes. The result of the study reveals cash waqf implemented in some public infrastructures through blended finance scheme and some barriers to be the most critical issues for successfully cash waqf for infrastructure public funding.

Keywords:
Alternative Funding, Cash Waqf, Green Financing, Infrastructure Projects, PPP

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Performance Evaluation of 5G in Sub-6GHz

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Abstract:
As a successor to the present 4G technology, 5G is a modern technology with a new interface that is being developed. The main purpose of 5G is to deliver a diversified collection of services to clients worldwide, including fast data speeds, wider coverage, low latency, cheap cost, high system capacity, and a variety of connectivity alternatives. Every major carrier intends to build both millimetre wave and sub-6 5G networks, but they choose to start with the lowest frequency bands and work their way up the frequency spectrum. The sub-6 spectrums are a better option for 5G. The recent deployments of the 5G networks are focused on the sub-6GHz spectrums. However, there are limited works reported on the 5G in sub-6GHz and this has motivated us to evaluate the performance of the 5G network in sub-6GHz spectrums. This project evaluates the performance of a 5G sub-6GHz network and the performance of the 5G is compared with the 4G Long-Term Evolution (LTE) network. The Vienna 5G System Level Simulator is a numerical model of wireless communication networks that is used to develop and improve mobile communication standards. It allows the community to do repeatable simulations of crucial scenarios in preparation for 5G and beyond. The performance of the 5G sub-6GHz throughputs is evaluated using the Vienna 5G Simulator. Extensive simulation works that considered a variety of factors, i.e., bandwidths, the number of users, users speed, and carrier frequencies were carried out to evaluate the performance of the 5G sub-6GHz network. The numerical findings indicate that 5G sub-6GHz performance is always better than LTE performance under identical simulation circumstances, demonstrating that 5G always outperforms LTE. The average cell throughput of the 5G sub-6GHz is 8 times more than the 4G network. The average peak throughput dropped when the mobility speed of the users increased. The throughput of the 5G network is directly proportional to the frequency bandwidth allocated.

Keywords:
5G Sub-6GHz, carrier frequency, LTE

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Development of PV Floating and Utilization of Flood Early Warning Equipment in Bening Widas Dam, Madiun, East Java

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Abstract:
The search for alternative energy is increasing along with the increasing global demand for electricity. Utilization of reservoirs as an alternative energy source using a floating solar power plant (FSPP) by utilizing the pool area of the reservoir. FSPP is a flagship program, the electricity price is quite good, licensing is simpler, does not require land acquisition, and can be developed with a large enough capacity. This research utilizes the open space of the Bening Widas Reservoir, Madiun, Indonesia to be developed as a floating solar power plant. The research method uses quantitative analysis of secondary data to calculate rainfall intensity, planned flood discharge and FSPP design on the surface of the water and the Global Solar Atlas application to calculate the duration of sunlight around the reservoir. The results showed that the area puddle in Reservoir Clear Widas 570 ha, with a maximum utilization of 5% which is 285,000 m2. This is in accordance with the Regulation of the Minister of Public Works and Public Housing of Indonesia Number 6 of 2020, which stipulates that the use of dams for generation is 5% of the reservoir area at normal water levels. The maximum capacity of FSPP that can be produced is around 29.63 . With an area of 1 hectare, the resulting generating capacity is 1.04 MWp. The value of Global Horizon Irradiation (GHI) around the Bening Widas Reservoir is 1,962.3 Kwh/m 2 . The role of the Bening Widas Reservoir as a flood controller can be maximized by placing FEDS (Floods Early Detection System), a flood early detection tool equipped with sensors for rainfall, temperature, humidity and water level.

Keywords:
Early detection of floods, FSPP, GHI, Reservoir

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Planning and Control of Information Security on Infrastructure IT Management Project in Pharmaceutical Industry with ISO27001:2013 Approach

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Abstract:
The success rate of implementation and development of IT Infrastructure technology on the pharmaceutical industry in Indonesia is greatly influenced by project management readiness. One aspect that receives little attention in project implementation is information security control. This aspect is a critical point that the instance must manage to maintain information security from the confidentiality (C), integrity (I), and availability (A) sides. The data from the pharmaceutical IT security team in 2021 also shows that there have been incidents caused by internal and external threats of 2928 every month and have a close correlation with the IT Infrastructure project. So that in this study a plan and governance of the application of information security controls to IT Infrastructure management projects using the ISO 27001: 2013 approach will be carried out. The application of these security controls is expected to reduce incidents and can be a recommendation to address vulnerabilities to security threats that could affect future business processes.

Keywords:
Project Management, IT Infrastruktur, Information Security, ISO27001:2013.

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Full Factorial and Taguchi Design for the Impact Strength of Oil Palm Fibre Reinforced Composite: A Comparative Study

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Abstract:
In this research, Taguchi Method is used for optimizing the quantity of the samples in investigating the properties of composite material. The objective of this study is investigating the validity of Taguchi method to optimize the sample quantity in the research on the impact strength of polymer matrix composite reinforced with oil palm fibres. The result was compared to the full factorial design. There were 3 factors used in this work, i.e.: fibre contents/ percentage, Fibre length and chemical treatment. Every factor consists of three levels. The fibre contents were varied into 3 different percentages: 5%, 7% and 10%. The fibre lengths were also varied in three sizes: 5mm, 7mm and 10mm. The level of chemical used factors consist of Untreated, Treated and Coupling agent. NaOH is used here to treat the fibre while PPgMA (Polypropylene grafted Maleic Anhydride) is used here as the coupling agent. The analysis graph, from the two methods were obtained almost same graph. The analyze of multiple regression analysis also results similar regression equation, with the p-value of all independent variables also below 0.05 which indicated all independent variables are significant. Even There are little different in coefficient number of the two equations. But still too small. Taguchi method has succeeded in making research more efficient. The use of a small number of sample combinations is able to produce good analytical validity, equivalent to a complete factorial method which is 3 times the number of combination samples.

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Design Optimization of Composite Resin Pelton Turbine Bucket Using Solidworks

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Abstract:
The Pelton turbine is a type of water turbine whose working principle utilizes the potential energy of water which is converted into kinetic energy through a nozzle. The fluid coming out of the nozzle push the bucket and rotates the Pelton turbine which ultimately produces electrical energy. Micro-hydro power plants that usually use Pelton turbines need to be developed to remote villages to meet electricity needs in Indonesia. Pelton turbine buckets, which are usually made of metal, are not only difficult to manufacture so they have to be specially ordered, but also easy to rust. Therefore, in this study, the bucket was made easier and simpler using an epoxy resin composite material reinforced with palm fiber. This makes it lighter and more corrosion resistant. The results of this study indicate that the epoxy composite fiber reinforced with 9% fiber volume has a higher tensile strength than the volume fraction 0%, 3%, 5%, 7%. The maximum tensile strength for 9% fiber content is 32.61 N/mm2. Then the tensile strength results are applied to the Pelton turbine bucket geometry with laboratory scale sizes that have been varied into 3 different size models in: bowl width (b), bowl height (h), and bowl height (h1). All variations of the laboratory scale bucket design that were simulated using solidworks software with 33.055 N loading had a safety factor above 6. The bucket design that has the highest safety factor is design 3 where the minimum deformation is 0.07922 mm, stress is 2.6670575 N/mm2, strain is 0.000557, and the safety factor is 6.945.

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Analysis of Construction Project Performance during Pandemic Covid-19 Based on Risk

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Abstract:
The rapid spreading of the Coronavirus throughout the world is terrifying. In order to slow down the transmission of the above-mentioned virus the government has no choice but to apply the health protocol to protect its citizens from getting infected. There are steps applied to protect its citizens, such as large-scale restrictions. The restrictions cover working hours, and workers' numbers. However applying this strategy affects the economic and business sectors, especially the construction sector. This study aims to analyze the performance of construction projects in Indonesia during pandemic COVID- 19 based on the risk. Furthermore Toll Road Tebing Tinggi-Prapat, North Sumatera, is chosen for the object of the research. Literature review and questionnaire will be used for gaining the data. The probability and the impact matrix are the methods used to analyze the risk.
In additionThere are 23 respondents selected to complete fills the questionnaires. The research found out that there were eight high risks such as follow. Late payment from the employer Critical activity delay; Financial impact; additional cost limited working hours of the employees; Interruption of Planning and scheduling; Supply shortage. This study is considered essential for construction during the COVID-19 outbreak and the main purpose is for a vital project to keep running.

Keywords:
COVID-19, Construction Performance, PPP, Risk, Toll Road

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The Impacts of Internal and External Factors on Developing Global Digital Innovation: A Case Study of the Provincial Electricity Authority in Thailand

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Abstract:
The study aimed to investigate the impacts of internal and external factors on developing global digital innovation by means of a case study of the Provincial Electricity Authority (PEA) in Thailand. The research framework was based on the concepts of disruptive leadership, Thailand 4.0, Industry 4.0, PEA Digital Utility or Electric Utility of the Future, ICT/Digital Innovation, and Sufficiency Economy Principles (SEP). The research sample group comprised 419 PEA employees randomly selected from throughout the country. The research tools consisted of structured questionnaires on content and technical quality validated by five qualified experts. Assumptions of multiple regression analysis- normality, linearity, no multicollinearity, independence, and homoscedasticity were examined. The data verifying the assumptions were analyzed by multiple regression and PEA Digital Utility, Industry 4.0, ICT/Digital Innovation, Disruptive Leadership, and Thailand 4.0 were estimated for the development of global digital innovation. It was also found that most PEA employees, or 51.55 percent, refer to the innovation they know of as PEA Smart Plus. This is because PEA will focus on the use of communication technology to improve efficiency in the distribution system which is the foundation for further development of other parts of the system. Furthermore, most PEA employees identified innovation as being environmentally friendly.

Keywords:
Digital Disruption, Digital Transformation, Global Digital Innovation, Internal and External Factors

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Utilization of Waste Heat Recovery to Reduce Water Content in Low-Calorie Coal with Fluidized Bed Dryer

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Abstract:
Coal drying process using FBD (fluidized bed dryer) which utilizes low temperature waste heat, especially from industrial air heaters, has been developed in the United States by the GRE (Great River Energy) team since 1997. Technology is still considered an expensive investment. This study uses a prototype FBD with a drying heat source is an air heater that simulates the amount of water content that can be removed in low-calorie coal for boiler use. Furthermore, it can be considered the use of waste heat recovery from machines in the industry as a substitute for the energy source of the dryer by the air heater. The water content or Total Moisture Content that can be removed by using FBD with an air heater dryer energy source is 20%. The savings due to TM which has decreased by 20% in the industrial scale of the power plant can be calculated as 650,289 EUR/Year. The savings will be even greater, if the energy of the air heater dryer is replaced with waste heat recovery from industrial machines such as air heaters or boilers.

Keywords:
Fluidized Bed Dryer, Coal, Drying System, Waste Heat Recovery

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Reduce Waste of Aircraft Maintenance Process with Value Stream Mapping

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Abstract:
PT. GMF AeroAsia is an aircraft maintenance company for several customers around the world. Maintenance companies always try to improve the best service. One way is to use tools in the form of a gate system, where the system is expected to achieve the planned lead time target of 4 days. In the process of the works, the gate system still cannot meet the expected target. During the aircraft maintenance process waste was encountered which caused the target not to be met. The condition of the aircraft maintenance process is described in the Current State Value Stream Mapping, which is then described activities that have value added, non-value added, and necessary non-value added. From the result of weighting waste, it is known that gate 1 to gate 6 encountered waste which can slow down the maintenance process, where gate 3 and gate 5 are the gates that have a lot of waste. From the ranking of waste in the process activity mapping, the results obtained in the form of a sequence of critical waste from each existing waste, where the highest weight is waste waiting with a weight of 0.38. Then an analysis of the causes of waste waiting by using the Root Cause Analysis method is due to data that is not monitored properly, lack of attention to people development, and an error in the system. From these causes, recommendations for improvement and the results of the recommendations for improvement are reflected in the Future State Value Stream Mapping. The results of partial implementation show a decrease in lead time from the previous 7.02 days or 7 days become 4.08 days or 4 days and cycle time from the previous 5074.20 minutes become 3331.96 minutes.

Keywords:
Value stream mapping, value added, non-value added, necessary nonvalue added, process activity mapping

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Developing Digital Marketing Maturity Index Indicator in the Training Industry

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Abstract:
Digital business transactions in Indonesia reached US$ 1.6 billion in 2021. It showed that the Internet is a very strategic digital marketing tool. From the initial observations of this research, 95% of the fifty training industries in Jakarta stated that digital marketing was very much-needed, and only 20% of the training industry partially implemented digital marketing. This study aims to provide an instrument for establishing digital marketing maturity index indicators. By using a mixed-methods approach, this study concludes that there are six dimensions and twenty-five indicators that represent the digital marketing maturity index, namely: interconnectivity (Business to Business, Customer to Customer, Business to Customer), platform & technology (social media, digital technology, channel), digital relations (digital communication through two-way social media, real-time communication, influencers), leadership and management (vision, mission, plans, programs, and strategies), human resources and human resources (availability of budget, availability of digital skill qualifications), organizational orientation (campaign, and measurement).

Keywords:
maturity index, digital marketing, mixed methods, training industry

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The Effect of Chilled Casting Ductile Iron to the Shrinkage Porosity on the Surface of the Y-Shaped Specimen

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Abstract:
One of the surface hardening processes is chill casting. Chill casting is used for surface hardening of nodular cast iron materials. The problem that often occurs in the chill casting method is porosity which is influenced by the fast cooling rate between the casting object and the mold wall. This study aims to analyze the microstructure, hardness, and porosity that will form on the surface of the Y-shaped specimen after chilled casting. The material used for casting the Y-Shape specimen is nodular cast iron and the chill material is stainless steel plate. The chill is varied with a thickness of 0.2mm and 0.4mm and will be coated on the surface of the sand mold wall then the chill is preheated at a temperature of 700oC and 900oC, then pouring is done at a temperature of 1400oC. The average hardness value on the surface of the specimen is 500HV-900HV, but in the middle area the hardness only reaches 200HV while the microstructure results in the surface layer are cementite and ledeburite phases, but in the middle area ferrite, and perlite are seen surrounding the nodule graphite structure. In the chill-coated area, although the hardness is high, there are micro-porosities and macro-porosities formed randomly.

Keywords:
Chilled Casting, Ductile Iron, preheating temperature, shrinkage porosity

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Smart IoT Mobile Medication Dispenser

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Abstract:
The increase in the population of senior citizens created a new challenge of the shortage of healthcare workers to take care of the elderly. The elderly with multiple chronic conditions face problems in managing their daily medication intake. This has inspired us to design a low-cost Smart Internet of Things (IoT) Mobile Medication Dispenser (SMMD) to take care of the daily medication intake of the elderly. SMMD consists of hardware (medication dispenser) and software (an app for the user to control the SMMD and program the time to dispense the medication). The NodeMCU is used to control the stepper motor, organic light-emitting diode (OLED), and motor driver. The OLED displays the current time and the time set by the caregiver/elderly to take the medicine. The SMMD with three wheels enables it to move and dispense medication to the elderly. The NodeMCU is connected to the Firebase database to access the time required to dispense the medicine. The total cost of SMMD is USD50 and is affordable for the elderly from the lower-income group and making the process of taking medicine not a hassle for the elderly. The price of SMMD can be much lower when it is mass-produced.

Keywords:
Medication dispenser, Smart Internet of Thing, Low-cost

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IOT based Smart Environmental Monitoring for Oyster Mushroom Production

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Abstract:
This paper presents an Internet of Things (IoT) smart environmental monitoring for oyster mushroom production which is based on Arduino microcontroller. These IoT sensors measures various changes like the humidity and temperature and sent to the Arduino microcontroller for configuring the control algorithm. Oyster mushrooms (Pleurotus ostreatus) can be produced from a wide array of agricultural waste material, which makes them the easiest mushrooms grown. It can grow at moderate temperature ranging from 20 to 300 C and humidity 55-70% for a period of 6 to 8 months in a year. The misting system can automatically control the water pumping system on the misting site based on the moisture content of the soil media acquired from the moisture content sensor. Misting is the best and widely used to get good propagation, a balance in humidity and transpiration is needed to allow water and nutrient uptake without excess dehydration especially in mushroom culture. If the growing medium is also saturated with water, there is a potential for the growth of bacteria.

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Dominant Factors in Value Engineering Aims for Improving Function and Cost Reduction in Jakarta Green Building Project

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Abstract:
The concept of green building becomes the basis for efficiency resources and environmentally friendly. The concept is carried out through the planning, construction and building operation by minimizing waste and negative impacts on the environment. The application of this concept potencially for increasing costs. The risk of increasing costs especially in initial building cost needs to be eliminated by improving function with the Value Engineering (VE) method. The effectiveness for implementation of VE important to know about dominant factors about VE method through development stages. The reseach objective is to find out the relationship between variables VE aims (Y), VE stages (X1), Development stages (X2) and VE methods (X3). Research implementation by survey with quetioner to responden in Jakarta green building project. Data compiling from owner, consultant and contractor staff organization. Correlation result between variables calculated with mean value at 21 indicators. Calculation proceed by SPSS signify, strongly correlation variables Y and X1, Y and X3, X1 and X3. The result indicate all VE factors are important to be implementation. In development stages, VE implementation are important in the planning stage of cost estimation and operational efficiency.

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Regression Test List Sharding in a Distributed Test Environment

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Abstract:
One of the major issues during the regression test of the new version of Real Time Operating System (RTOS) is the time involved in test case execution. The main reason being a single embedded system device under test (DUT) is used to execute the test list containing several test cases. This traditional method of regression test also leads to wasted productivity of the other devices at hand that could be otherwise used during this regression test. Hence, in this paper, we propose a technique that aims at reducing the overall regression test cycle time of a newer version of a Real Time Operating System (RTOS) by employing a method known as "test-list sharding" in a distributed test environment. In the proposed work, multiple DUTs are connected to the test server via a communication network. The test server executes the test list containing several test cases and performs the test-list sharding, that is, distributing test cases to different DUTs and executing them in parallel. After the test is executed on the DUT, the test results are sent back to the test server which will summarize all the results. In the proposed work, the sharding is done by distributing the test cases without overloading or under loading any of the DUTs. Test list is sharded in such a way that the same tests are not sent to multiple DUTs. The main advantage of the proposed method is that the test sharding can be easily scalable to accommodate any number of devices that can be connected to the test server. Also, the test list sharding is done in a dynamic way so that the tests are distributed to an idle DUT that has completed a test execution and ready for another test to execute. The comparison study of executing a sample test list sequentially on a single DUT and distributed test system with multiple DUTs is performed. Results obtained showed the performance gain in terms of test cycle time reduction, scalability, equal load distribution and effective resource utilization.

Keywords:
Real Time Operating System, Test-list Sharding, Embedded system, Regression Test, Distributed Test Environment

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Design of River Floating Trash Traps Using Recycled Plastic Bottles and Characterization of Waste Collected in Odiongan, Romblon Philippines

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Abstract:
Accumulation of solid waste from rivers that hinder the quality and life below water is one reason for this pollution. Rivers and creeks in the Municipality of Odiongan are used as solid and liquid dumping sites, resulting in water pollution. In addition, the municipality also generates tons of waste every month. This project aims to design floating trash traps installed in the municipality's three (3) rivers, specifically Bangon River, Gabawan River, and Poctoy River. These plastic-made traps are strategically placed in rivers and streams to stop solid waste from floating further downstream without hampering aquatic life movements. The materials used in the proposed design consist of plastic bottles, poultry net, and nylons. Fieldwork was done at the rivers and characterized the collected wastes by their wet weight. The floating trash traps generated a total of 285.76 kilograms. A total of 68% (193.08 kilograms) of biodegradable waste were collected, consisting of leaves, twigs, driftwoods, and coconut husk. 14% (40.57 kilograms) of trash were gathered for recyclable, containing plastic bottles and cans. 12% (33.66 kilograms) is residual waste (plastic packaging, Styrofoam, miscellaneous plastics, cigarette butts, and mainly heavily soiled plastics), and 6% (18.45 kilograms) is special waste, mostly bulky waste from construction and logs were accumulated. The trash traps can hold 28.58 kg of solid waste for 5-days and 2.09 kg, 1.82 kg, and 1.8 kg per day for Trap 1, Trap 2, and 3, respectively. In conclusion, the design of the floating trash traps has been proven as a potential solution for collecting marine wastes, particularly in rivers.

Keywords:
marine waste, recycled plastic, Solid Waste Management, trash traps, waste characterization

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Automated Students' Rating Distribution System for a Local College

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Abstract:
It is imperative for educators to provide frequent and immediate feedback concerning the academic performances of their respective students. However, this mandate is quite taxing to implement without an automated system in place. This applied research is all about an automated system that may be used in the distribution of the students' academic performance ratings. The agile software development methodology has been employed; a number of stakeholders also used a product quality evaluation system - the ISO/IEC 25010. The system achieved the research participants' expectations about the facets of a quality software product. Such is also a commendable start for the promotion of e-governance in the academe, once the said application program has been ultimately implemented and maintained.

Keywords:
automated system, academic performance ratings, agile software development methodology, ISO/IEC 25010, e-governance

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Ferrocement Structural Components Molded from Ordinary PVC Pipes: Tests for Low-Cost Housing Use

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Abstract:
The integration of ferrocement as structural element in a building is one of the breakthrough studies that promotes sustainability and environmental protection. Several studies have been conducted and applied globally yet has not been fully developed in the Philippines. This project intends to first, evaluate maximum compressive stress and maximum bending stress capacity; and second, evaluate cost-effectiveness of the material and manufacturing process for hollow-cored columns and beams made with ferrocement. A total of 4-set of 4m hollow-core ferrocement samples with varying cross-sections, and another 4-set of 0.3m were designed and prepared for the flexural and compressive strength tests, respectively. Commercially available 3-inc uPVC pipes were used as an inner form to support the wire mesh and mortar cement. The house is now designed with 36 single pipe cross-section of various heights and 23 double pipe cross-sections acting as columns. Most of the double pipe cross-section were installed as columns hidden in the firewall. This is to follow the National Building Code Provisions of having firewalls not less than 150mm in thickness for fire and heat resistivity. The total bill of materials for the designed house is calculated to be at 391,000.00 pesos. Under the current administration, the total cost of the unit would still fall below the new costing rules for the National Housing Administration. In essence, it can be concluded that a ferrocement house can be created using modular members which can carry the loads safely and is cost efficient.

Keywords:
Structural Engineering, Quantitative Method, Experimental Study, Structural Analysis, Cost Estimates

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Cloud Based Agile Test Automation Using Open Source Tools

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Abstract:
Cloud Automation Testing is a concept that entails testing cloud-deployed applications that make use of cloud-based resources. Companies can save provisioning time by employing a cloud infrastructure system for testing because the cloud allows test servers to be provisioned as needed. Selenium is a free and open-source testing tool that may be used to test a variety of online applications. However, selenium has a number of drawbacks, including the inability to generate structured reports and cross-browser testing. To work around these issues, selenium is frequently combined with additional tools like as JMeter, Junit, and Test-NG. By combining and comparing several tools that are expected to be effective for cloud automation testing alongside selenium, this article presents a study of some of the technologies that are estimated to be effective for cloud automation testing by combining and comparing various technologies together with selenium.

Keywords:
Cloud Automation Testing, Selenium, JMeter, JUnit, Test-NG

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AI for Education with AI-Mining Prototype Study Case of Hydrogen Gas

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Abstract:
The research aims to provide a new perspective on AI in education by using a case study in the form of prototype sensor data on hydrogen gas. Those data were analyzed by LSTM. The study uses a high-touch and high-tech approach with design thinking on the implementation of LSTM for hydrogen gas sensor data. The analysis was carried out by sequential modeling. The result has been successful due to RMSE of about 7,9%. The research here can be used to make the right hydrogen gas handling decisions in the future. The results obtained in this study are needed to improve the analysis of sensor data from hydrogen gas which is only one period of time. Additionally, the authors have collected several gases that are available to analyze and introduce the method for the purpose of education.

Keywords:
Artificial Intelligence (AI), Long short-term memory (LSTM) LSTM, hydrogen gas.

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Integrated Sensors into Artificial Intelligence Mining (AI-Mining) Data Acquisition of Environmental Features

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Abstract:
Artificial Intelligence (AI) and the Internet of Things (IoT)are blended into a small prototype called AI-mining which is designed for a company related to features environment to the acquisition of data. The activity is initially started from one unit multisensory as hardware part from AI-mining consisting of gas sensor and radiation sensor. The software is then done by the Internet of things (IoT) as a network protocol for scalability to support real-time data from sensors. Machine learning as the method in AI is employed for classification where accuracy, sensitivity, specificity, and F-measure are performed for untransformed and transformed data. Additionally, tested AI-mining is then executed in an industrial area to measure environmental features from its surrounding. These initial results show that communication sensors placed at particular distances are successful and needed to scale into future industrial-scale development of AI-mining.

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Impact Evaluation of Mechanized Tiger Grass Postharvest Technology in Banton, Romblon using General Systems Theory Model

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Abstract:
This impact evaluation of the mechanized tiger grass (Thysanolaena latifolia) postharvest technology in Banton, Romblon focused on 1) participants' characteristics, social functions, physico-economic profile, and technology advocacy; 2) machine characterization in terms of gender and development, technological aspect, institutional and socio-economic impacts; and 3) machine's areas for improvement. Using sequential purposive sampling, data from stakeholders were gathered and analyzed. Focused group discussion was done to validate the feedbacks and gather recommendations. Findings revealed that most participants were females, above 31 years old, high school graduates, with families of 5-8 members. Both fathers, mothers and youths/children were involved in Masikap Farmers Association. For about five years, they participated in tiger grass industry as farm owners, farmers, laborers, processors and broom makers earning less than 5,000 pesos monthly. They supported adoption of mechanization technology and attended related trainings. The characteristics of the machine satisfactorily met gender and development requirements, technological aspects, institutional impact as well as socio-economic impact to people organization. Enhancement of the design and specification of the cleaner unit is recommended to increase output. A portable pedal-operated type of the device may be designed for the same purpose. Similar researches can be conducted to include more stakeholders in the region.

Keywords:
Gender and development, Impact evaluation, Tiger grass pollen-remover machine, Post-harvest technology

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The Influence of Neoclassicism on Ho Chi Minh Architecture in the Twentieth-First Century

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Abstract:
The influence of Neoclassicism in Vietnam in general and Ho Chi Minh, in particular, is attributed to the influence of local culture and perception. This trend creates buildings that diverge from the standards of Neoclassical architecture in both positive and negative senses. This paper aims to demonstrate the influence of Neoclassicism in Ho Chi Minh Architecture, its progress in the modern era, and its potential adoption in Ho Chi Minh City through the evaluations of specific city construction projects in the twentieth-first century.

Keywords:
Neoclassicism; Neoclassical architecture; influence, classical style; Ho Chi Minh City; Colonial style; French style

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Exploring Challenges and Opportunities in Internship amidst Pandemic Using Sentiment Analyzer for Interns

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Abstract:
An internship is a period during which students can get work experience related to their studies. This study aims to find out the challenges and opportunities that the IT, Business, and Accountancy students experience while conducting their internship program amidst the Covid-19 pandemic.
The researcher used a qualitative approach in data collection from 12 participants from Information Technology, Business, and Accountancy students who conducted their internship during the pandemic. The respondents were interviewed online through semi-structured questionnaires, and the information collected was recorded, refined, and analyzed using Monkey Learn sentiment analysis.
The study discovered that students have some difficulties adapting to work-from-home internships due to the Covid-19 pandemic. The findings show that students frequently encountered issues such as the need to learn new software and IT tools, difficulty locating companies, an unstable internet connection, a lack of necessary resources for the job, lack of supervision, noise and distraction in the workplace, limitation of the task assigned, and difficulty collaborating with other interns. However, they highlighted positive responses, such as the assigned tasks are related to their programs. They gained new knowledge, learned new IT tools, improved collaboration and communication skills, and developed study habits. Furthermore, they feel safer in their home, have no hassle going to work, save money on travel and boarding costs, and discover new companies offering online internships.
The findings provide an insight into the challenges and favorable impact students encountered during their work-from-home internship. Even amid a pandemic, the institution and organization can collaborate to deliver the learning objectives required for students' career advancement.

Keywords:
Internship; challenges; opportunities; pandemic; interns; work-from-home internship; sentiment

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Consumer Behavior Analysis in Electric Vehicle Adoption in Indonesia

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Abstract:
PLN's electricity reserves during the Covid-19 pandemic have increased to above 40% with the new generator (CNN Indonesia, 2021). Meanwhile, electricity sales growth decreased by -8.72% y.o.y (PLN, 2021). So, there needs to be a massive increase in electricity sales. Among them is to increase the use of Electric Vehicles (EV) so that there is an indirect effect on increasing electricity consumption.Thus, in this study, consumer behavior in the adaptation of electric vehicle technology in Indonesia will be studied, especially what factors determine a person's purchase of electric motorcycles and electric cars. This study uses descriptive and quantitative methods. The analytical technique used in the quantitative process in this research is logistic analysis. From the OLS regression results for electric motor users, it can be seen that the control coefficient (0.244), cognitive (0.312), and value (0.423), have a significant correlation to purchasing intention. While for electric car users, it can be seen that the avgresiko coefficient has a significant correlation to purchasing intention, which is 0.026.

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Acceptability Assessment of a Locally Developed Onion Harvester Hand Tractor in La Union, Philippines

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Abstract:
Onion farmers' attitude toward a locally developed onion harvester in the Philippines has been unstudied due to the unavailability of the machine. Based on a respondent of 26 onion farmers, an acceptability assessment of the onion harvester was implemented. Data were gathered using questionnaires with two activities of actual hands-on operation and lectures and analyzed using fisher's exact test. The ease of operation, cleaning and maintenance, safety of operation, ease of transport, technical field performance, adaptability, and investment viability were relevant attributes used in the acceptability of the onion harvester. The majority of the respondents positively accept the onion harvester. The user operation, cleaning and maintenance, ease of transport, adaptability, and investment viability are correlated positively to the willingness to buy or rent the machine. Conversely, user safety, technical performance, and aesthetics are not a hindrance to adoption. Since 38.5% of the farmers have no hand tractor, the preferred acquisition is renting the onion harvester.

Keywords:
acceptability assessment, hand tractor, onion harvester

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Prediction of Service Life Base on Relationship between PSI and IRI for Flexible Pavement

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Abstract:
Uncertainty about the remaining service life of the pavement occurs in developing countries even though the structure is designed with the planned life. As a result, there is damage to the network and the structure and function of the road. Uncertainty in volume, traffic growth that exceeds the plan, and limited funds have a very strong influence on the shape of the road. This study aimed to determine the condition of the road surface and road service functions to find out the service life of the pavement and the relationship between the Present Serviceability Index value and the International Roughness Index on the flexible pavement. Secondary data collection such as IRI and traffic volume is used for modeling and reviewing road service functions. The results show that the remaining road life will end in year 8, a 2-year decrease from the 10-year plan. The relationship between PSI and IRI plans has an R2 value of 0.9981, while the actual condition has an R2 of 0.9976.

Keywords:
About four key words or phrases in alphabetical order, separated by commas

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Stakeholder Satisfaction in Long Segment Maintenance Contract: Application to a Hills Road Network

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Abstract:
Hills road network has an essential role in maintaining the flow of transportation and logistics in mountainous areas. Implementing the Long Segment Maintenance Contract (LSMC) is one step in producing better road services and performance. The success rate of PMS implementation can be seen from the road performance and the level of satisfaction of stakeholders consisting of owners, implementers, supervision consultants, and users. This research was conducted to determine stakeholders' level of interest and satisfaction in the implementation of LSMC in the mountain road network. The methods used are Importance Performance Analysis and Customer Satisfaction Index. As a case study, the hills road network in Cirebon-Kuningan-Ciamis, West Java, Indonesia, was chosen along 103.08 km. Questionnaires were distributed to all stakeholders in the implementation of LSCM in these sections. Data analysis was carried out on questionnaires obtained from the owner as many as three respondents, contractors four respondents, supervised seven respondents, and road users as many as 100 respondents. The results showed that, in general, the level of stakeholder importance was relatively high, with an average of 4.22, an average performance level of 3.70, and a CSI value of 86.9.% or very satisfactory. In comparison, road users' on-road performance is relatively high, with an average of 4.44 with, an average level of performance of 4.41, and a CSI value of 86.83%, or very satisfactory. Furthermore, the importance of road users' on-road response time is relatively high, with an average of 4.42, an average performance level of 4.41, and a CSI value of 86.09%, or very satisfactory. Attributes that greatly influence the opinion of road users and stakeholders on LSCM in the Hill Road Network are related to the control of runoff water and routine road maintenance.

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Agile Global Software Development Challenges and Mapping Solutions: A Systematic Literature Review

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Abstract:
According to the Project Management Institute, project management in the view of Agile approach is extensively employed. This method has a substantial impact on project success and business growth. Another approach that piqued the interest of the software development team was the Global Software Development Framework (GSD). However, implementing Agile in GSD is difficult. As a result, a systematic literature review (SLR) is performed to uncover the challenges encountered in the execution of Agile projects in Global Software Development. The knowledge categories of the Project Management Body of Knowledge (PMBOK) were used to categorize the difficulties. As a result of SLR extraction, 23 papers out of 400 were identified. The PMBOK knowledge areas were used to categorize the problems from related studies. The PMBOK Guide was used to map the challenges to solutions. This research presents a list of Agile challenges as well as their solutions. Among challenges found which broken down to communication, resource, integration, stakeholder, and scope management, the most common problem identified in most research is communication management. This challenge encompasses issues such as coordination, communication, and collaboration, as well as a lack of knowledge sharing. Project resource management, project integration management, project scope management, and project stakeholder management are among the other challenges. This paper offers academics a new perspective on Agile issues in GSD and their corresponding solutions from the project management standpoint which attributed the solution to communication, resource, integration, stakeholder, and scope management knowledge areas. For practitioners, the findings present potential lessons learned and ideas for coping with the challenges.

Keywords:
Agile, project management, systematic literature review, Global Software Development, GSD

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Collaboration of Industry with Job Placement Cell for Graduates of Dhaka Mohila Polytechnic Institute

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Abstract:
Collaboration with job market industry for any technology, it is the key of National Economy. Job Placement is the new informatics phenomena of our country. Most of our Polytechnic graduate is the employable due to collaborate with job market industry.
The vision of Bangladesh that Dhaka Mohila Polytechnic graduate relevant to professional skills guiding by Job Placement Cell to absorb the Industry with a bright future. Job Placement is the critical issue of Bangladesh. Most of our Polytechnic graduate is the employable due to their curriculum, communication skills and proper way to findings of job. Bangladesh Technical Educational Education Board enhancing the quality of polytechnic graduates to achieve these major goals by conversation with industry. As a result curriculum contents provided to graduate in terms of job market requirements oriented. Dhaka Mohila polytechnic is prior and old polytechnic of female graduates. It gives a candidate knowledge, skill and attitude and meets the requirement manpower of Industry. Thus a Polytechnic graduate mind set up is grown up. They played a major carrier goal which they expected.
Bangladesh is a developing country. Labor force participation rate for ages 15-24 is economically active. Current male population (50.6%) and Current female population (49.4%), among this adult population, Bangladesh Labour Force: Female: % of Total Labour Force data is updated yearly, averaging 30.399% in 2021, with 32 observations (World Bank). If we can increases this percentage anyhow Bangladesh will be reach short and long term goals 2041.
Dhaka Mohila polytechnic is prior and old polytechnic of female graduates. . It gives a candidate knowledge, skill and attitude and meets the requirement manpower of Industry. They played a major carrier goal which they expected. The benefits of placement training are the industry shaping of Dhaka Mohila Polytechnic graduate in the form of necessity of industry. The Mohila Polytechnic graduate also oriented to their academic campus, equipment's settings, industry rules and regulations. Thus a Polytechnic graduate mind set up is grown up. They played a major carrier goal which they expected as their dream. So a satisfactory performance about their duties and tasks improved through the placement cell.
So to get an achievement successfully all the parameters want to be perfectly by collaboration with job market industry. Bangladesh is economic development country. Now it also change the economic status in 4041. Dhaka Mohila Polytechnic graduate relevant to professional skills guiding by Job Placement Cell to absorb the Industry with a bright future is related to the vision of Bangladesh.
Placement cell of Dhaka Mohila Polytechnic Institute also many kinds of facilities are given such as Industry Visit, MoU with Industry, Job Fair etc to collaborate with industry. The function of Job Placement cell is not only created a carrier path to the graduates with industry, it also arranged carrier build up Seminar, Guest Teacher Provision ftom different industries, Study Tour and Industry Visit with many industry. Job Placement Cell works by keeping the objective in front of industry success with graduates. So it is effective for Dhaka Mohila polytechnic Graduate which is whispers more advantage related industry to graduate day by day.

Keywords:
Collaboration, job market, industry, Job Placement Cell, Graduates, Dhaka Mohila Polytechnic Institute (DMPI)

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Analyzing Toll Road as a Solution to the Existing Highway Problem

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Abstract:
Pantura national highway or Route 1 in Indonesia is one of the important routes which drive the most economic movement in Indonesia. For years this route suffering over dimension and overloading phenomenon causing serious early failure to it's pavement. Republic Indonesia government recently built the Trans Java Toll Road connecting Java island with a toll road from west to east, the initial route is Cipali (Cikampek to Palimanan) Toll Road Section as long 116 km which officially opened at 13th of June 2015. One of Cipali Toll Road Section aims is to move the most traffic from Pantura highway to Cipali Toll Road to reduce the Pantura highway burden. This research aimed to find out the impact of the Trans Java Toll especially Cipali Section to Pantura National Highway Pavement Service Life. The Liddle's formula used with k–factor = 1 for single axles, 0.086 and 0.031 for tandem and tridem axles to get the CESA between before the toll existence and after the toll existence. The findings are that Trans Java toll road reduce Pantura national road (route 1) traffic as much 180.818 PCU, and the Trans Java toll presence road help Pantura national road (route 1) back to it's designed CESA.

Keywords:
overloading truck, pavement service life, vdf, ESAL

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Implementation Security Digital Signature using Rivest Shamir Adleman (RSA) Algorithm as a Letter Validation and Distribution Validation System

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Abstract:
A digital signature is a type of asymmetric cryptography that is used to ensure that the recipient receives the actual received message from the intended sender. Problems that often arise conventionally when requiring letter approval from the authorized official, and the letter concerned is very important and urgent, often the process of giving the signature is hampered because the official concerned is not in place. With these obstacles, the letter that should be distributed immediately becomes hampered and takes a long time in terms of signing the letter. The purpose of this study is to overcome eavesdropping and data exchange in sending data using Digital Signature as authentication of data authenticity and minimizing fake signatures on letters that are not made and authorized by relevant officials based on digital signatures stored in the database. This research implements the Rivest Shamir Adleman method. (RSA) as outlined in an application to provide authorization or online signature with Digital Signature. The results of the study The application of the Rivest Shamir Adleman (RSA) algorithm can run on applications with the Digital Signature method based on ISO 9126 testing by expert examiners, and the questionnaire distributed to users and application operators obtained good results from an average value of 79.81 based on the scale table ISO 9126 conversion, the next recommendation for encryption does not use MD5 but uses Bcrypt secure database to make it stronger.

Keywords:
Digital Signature, ISO 9126, Cryptography, Rivest Shamir Adleman (RSA)

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Autopilot Control System for Damping the Dutch Roll

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Abstract:
The main aim of this research is to design an autopilot control system for damping the most difficult motion of the aircraft, which is the Dutch Roll. The aircraft get disturbed from its equilibrium and oscillate. So, designing an autopilot control system for it and to install it in the aircraft will damp these disturbing motions. There is lot of yaw dampers available already which can reduce and damp these kinds of oscillations, but still after the development of electronics and invention of autopilot boards, designing of autopilot control system has become a vital role for Avionics engineers. As a UAV engineer autopilot control system has fascinated us as it reduces the pilot's work and designing of autopilot is in the realm of Aerospace and Avionics engineering.
In this research we took the data of Boeing- 747 transport aircraft, used it to substitute in formula of lateral directional derivatives. The data of stability coefficient was also useful in finding the stability derivatives. Now these derivatives are dumped in the equation of Dutch Roll approximation. Through that approximation we solve the equations through determinant method and frame the corresponding rudder and aileron transfer functions. Now these transfer functions are fed in the control system loop where the rate gyro and washout circuit combined to form an autopilot control system which damps the Dutch Roll oscillation. This control system is solved through Matlab software and corresponding root locus is obtained and further the stability is checked.

Keywords:
autopilot control system; dutch roll

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Awareness Level of Heritage Building Owners and Construction Professionals in the Repair, Construction, and Conservation of Heritage Buildings in Taal

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Abstract:
The purpose of this study was to investigate the level of awareness of building owners and technical stakeholders in the guidelines for the repair, construction and conservation of heritage buildings in Taal's defined core and buffer zone as well as the variations in the respondents' assessments when they are grouped according to their profile. These were investigated using the descriptive method and purposive sampling with the aid of survey questionnaire as a data collection tool. The study found that the respondents, classified as owners/tenant and technical stakeholders, were moderately aware of the guidelines in the repair, construction, and conservation of heritage buildings. It further revealed that there is a significant difference in the respondents' level of awareness when they are grouped according to the type of stakeholder and according to the number of restorations, construction, or conservation of heritage building projects they have handled or participated in. While the variance in their awareness level when they are grouped according to age, number of seminars/orientation/convention/trainings attended, and length of experience as a professional is not significant. This study highlighted the importance of raising stakeholder awareness about the heritage building restoration, construction, and conservation regardless of their profile. Based on the results and conclusions, an action plan for heritage restoration, construction, and conservation may be formulated and implemented.

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Development of a Time-based Computer Software for Monitoring and Maintaining Multiple Diesel Generating Units

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Abstract:
Monitoring and maintaining multiple generator units in a diesel power plant is a challenge and commonly causes information complexity to workers resulting in forgotten maintenance schedules. This study aimed to address this issue through the use of a computer software-based monitoring and maintenance system. The software was developed to monitor each generating unit components running hours (RH) and to display these in real-time while having the function to notify the operator through an alarm system, perform employee and activity management, and generate system reports. The software was tested based on its functionality per test case, system reliability by obtaining reliability coefficient per hour, and evaluated using an evaluation tool in form of questionnaires. Result shows that the software's main functions and modules were all functional with 95.12% reliability and the use of the software based on the evaluation tool is 4.62/5 functional, 4.56/5 reliable, 4.38/5 usable, and 4.81/5 effective. The study has successfully developed a functional time-based computer software monitoring and maintenance system for multiple diesel generator units.

Keywords:
computerized maintenance management system (CMMS), diesel power plant, planned maintenance schedules (PMS) running hours, (RH)

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Student e-Handbook Packet: A Mobile Application for Bulacan State University

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Abstract:
This mixed-method research utilizing descriptive-developmental design is about designing and evaluating Student eHandbook Packet Mobile Application employing agile-scrum methodology for mobile app development. Consultative meetings and Focus Group Discussions were held to obtain data from 16 BulSU administrative council members as the alpha evaluators, 10 IT experts as the beta evaluators, and 43 student leaders as the gamma evaluators chosen using purposive sampling. Results show that the mobile app is excellent in terms of functional suitability (M=4.72), performance efficiency (M=4.78), compatibility (M=4.72), usability (M=4.80), reliability (M=4.67), security (M=4.58), maintainability (M=4.73), portability (M=4.77) recording a grand mean of 4.72 interpreted as excellent. This means that the application satisfies both software quality standards and end-user requirements. Word cloud analysis suggests that the application is useful to students. Thus, it is ready for adoption. Along with its implementation, it is recommended to conduct an impact analysis of the effectiveness of using the student eHandbook mobile application.

Keywords:
Agile, ehandbook, FGD, mobile app, Philippines, scrum

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An Assessment of Healthcare Administration to Senior Citizens in Catanduanes Using Text Analytics

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Abstract:
As the population of senior citizens expands, challenges on how healthcare is delivered are becoming extremely important, this study aims to evaluate how the government provides healthcare services to senior citizens in Virac, Catanduanes using text analytics to enhance the programs in place that can help them manage the healthcare services provided. The research made use of the mixed-methods approach, which included qualitative and quantitative research methods to assess the healthcare administration of government to senior citizens. The machine learning text analytics was also used in this study to assess if the respondents' sentiments on the services provided are positive, neutral, or negative. Based on the responses, the assessment of the healthcare administration for senior citizens is ineffective, according to the study's findings. The sentiments and opinions expressed by senior citizens are based on their experiences with the services provided to them. This research suggests that the government should improve its services for senior citizens' healthcare administration, especially in the province to better meet their needs and satisfaction. This may be evident in their feedback on what services they want to receive and how they want them to be improved.

Keywords:
sentiments analysis, machine learning, health- care, healthcare services, senior citizen

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MedPlantBot: AI Chatbot Architectural Design Framework for Responsible Use of Medicinal Plants

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Abstract:
Medicinal plants become a viable substitute goto treatment for common ailments when overburdened with hospitalization expenses and low accessibility to the government's health care system. As support and advancement with Catanduanes' alternative healing, this paper presented an approach to integrating Artificial Intelligence (AI) with Chatbot technology to address queries on treatment forms and usage of various medicinal plants. Employing documentary analysis and AI Chatbot framework design for its mixed-methods approach, the MedPlantBot prototype was built using conversational AI Chatbot architecture, Google's DialogFlow platform, and Kommunicate, a web chat interactive platform for bot and human interaction (Bot + Human hybrid). User acceptance, consisting of experts, traditional healers, and users of medicinal plants, for the prototype, averaged as "Strongly Agreed" in terms of its usability. Significantly, this study can serve as an educational platform for the community to learn how to use medicinal plants available in their area to treat ailments. Ultimately, this study brings potential in providing local folks with a cost-effective alternative as an initial healing practice to improve their health and wellness, thereby contributing to the attainment of the third Sustainable Development Goal of the United Nations – Good Health and Well-being.

Keywords:
Artificial Intelligence, Chatbot, Chatbot Framework, Natural Language Processing, Machine Learning, Medicinal Plants

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The Need for Digital Sustainability for Startups in India

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Abstract:
Digital sustainability uses digital transformation tools like improved connectivity and the Internet of Things (IoT) to help the environment and assist sustainable company operations. However, because the internet is responsible for about 4.6% percent of global greenhouse gas emissions, it can be a difficult circle to square. Fortunately, some well-established, real-world examples of how it can function already exist.
Smart digital technology, for example, can assist building managers in reducing the carbon footprint of elements of our built environment by optimising energy use using IoT connectivity and artificial intelligence (AI). Big data analytics can help to support and strengthen social safety nets that would otherwise struggle to identify, reach, and serve all potential beneficiaries. The problem is figuring out how to apply technology to solve a problem or improve an existing solution.
We look at how digital technologies are assisting in the combating climate change and promoting sustainable development. New startups have used digital technologies to develop innovative solutions to unresolved societal problems. These are referred to as "digital sustainability activities" in general. We propose a research agenda that creates new concerns for entrepreneurship, business models, and ecosystems, as well as new ways of thinking about trust and institutional logics, by focusing on the digital toolset used by pioneering businesses. We believe that digital sustainability may catalyse empirical gains in entrepreneurship, innovation, and strategy, all of which have the potential to benefit society.
The findings of this research imply that digital sustainability for entrepreneurs has a huge impact on growing their business. If they do not utilize latest digital techniques effectively, the augment is slow and redundant in some cases. It does show that digital transformation impact sales numbers and lead numbers for startups.

Keywords:
sustainable; startups, technology; digital transformation; digital ecosystems

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Philippine Stock Market Forecasting Using the Nonlinear Autoregressive with Exogenous Input (NARX) Model

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Abstract:
Utilizing historical data to forecast the future value of the stock market is one of the most popular and rewarding research disciplines in both industry and academia. This research aims to identify the optimal parameters and configurations for artificial neural networks (ANN) that improve the performance of the nonlinear autoregressive with exogenous input (NARX) model. This study primarily examines the efficacy of three distinct techniques, namely Levenberg–Marquardt (LM), Bayesian Regularization (BR), and Scaled Conjugate Gradient (SCG), for training the NARX model with variable data sizes. The simulations utilized a subset of one-, three-, and five-year Philippine Stock Exchange Composite Index (PSEi) time-series data from a ten-year dataset. Accordingly, this dataset has 242, 728, 1219, and 2432 samples. The model inputs the open, low, and high prices and then estimates the closing price for the following day based on these values. The mean squared error (MSE) and correlation R are used to evaluate performance.
The empirical comparison shows that the BR algorithm performs better than other models. In addition, regardless of the training algorithm employed, the three-year dataset with 728 samples improved results. Overall, the performance of the proposed model was superior to that of prior models that predicted the PSEi. Consequently, the model can contribute significantly to forecasting the Philippine stock exchange. It can also be used to predict other emerging financial markets.

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Microgrid Solar-PV Power System Socio-Economic Benefits and Challenges

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Abstract:
Globalization and long-term growth necessitate an enormous amount of energy from various sources. Since fossil-based fuels are depleting and having an adverse effect on the environment, renewables are being viewed as viable alternatives for sustained growth. Despite the rising need for electricity, rural populations in many developing countries are yet to be connected to the grid. **Objective:** The study aimed at determining the socio-economic benefits and challenges of a microgrid solar-PV power system. **Methods:** A survey and a focus group discussion were conducted in a village of about 100 families to know their electricity requirements. A 50-kW off-grid solar-PV power plant was designed, and installed that eventually supplied electricity to the community houses. **Findings:** The 50-kW off-grid solar PV system, which includes 168 300-Wp PV panels, ten 4.8-kW inverters, and two sets of 84 100-Ah 12-V batteries, harvested and provided an average of 206.55 kWh of solar electricity per day, enough to cover the people's daily 192 kWh electricity need. **Conclusion:** Solar-PV is a suitable power technology for supplying clean electricity even in rural areas. It allows community members to spend time with their families at night, as well as equipping them to prepare farm produce and creating a new industry that provides a source of income. Nonetheless, the community's inability to pay is a major stumbling block that must be solved for the operation to sustain.

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The Influence of Scope in Affecting the Successful of an IT Project: a Systematic Literature Review

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Abstract:
Previous studies have shown that bad scope management is one of the most problems causing IT projects failure with 92% of participants in the survey finds a failure in IT projects. This failure project is caused by overtime, over cost, and over budget. To overcome the failure, it is necessary to have a good scope skills and project management skills, especially when determining every part of the project scope. Every stakeholder pushes the quality of the projects to the highest level, when the scope cannot clearly define, there will be some risk between the development. The risks can be reduced by planning the project scope and manage the scope. The role of determining the scope is very crucial in an IT Projects. This study aims to find out how the scope influence IT projects success and find how to make a project scope that led to the IT project success. This study used a Systematic Literature Review (SLR) method and obtained 16 relevant publications. This research found five factors that affect the scope to affect the success of IT projects. The most important thing to make a scope that led to the success of IT projects is realistic expectations.

Keywords:
Scope, Successful IT Projects, Systematic Literature Review, The Influence of Scope

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Adaptive System Framework for Preemptive Road Damage Awareness against Climate Change in Albay

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Abstract:
Climate change is an act of a significant change in weather behavior that happens in everyday perspective. In the Bicol region, Albay is one of the most common provinces which is greatly affected by climate change in which heavy rains, drought, volcanic and hurricane is an occurring event each year. This province's common problem due to climate changes is the issues on road damages. Road Damage is one of the major problems in which the assessment of the road status needs to be updated to the drivers for safe traveling road experience. The research aims to create a framework design that integrates adaptive systems to Road Damage Awareness. Using the system methodologies for creating architectural frameworks for information systems, the research used interactive architecture and model-view-control design pattern to design the framework with the integration of adaptive systems. The development of the framework allows the identification of the needed processes of the existing information data to be targeted for the integration of the adaptive systems concept. The framework consists of the improved concept that changes depending on current climate changes that can affect the services of Road Damage Awareness. The design integrated with adaptive systems from the concept can reorganize and change tactics on changes to adapt to the current situation on climate change. This concept consists of the integration of Google Mapping API and weather information services that would base the current changes. The designed framework system represents that adaptive system concepts can be implemented to road damage assessment.

Keywords:
Adaptive System, Climate Change, Road, Framework

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