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BOOK OF
ABSTRACTS

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20948: Applying Adaptive Genetic Algorithm for Heterogeneous Vehicle Routing Problem with Asymmetric Distance and Fuzzy Demand (HVRPADFD)

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Abstract: This study proposes improved Genetic Algorithm (GA) so-called Adaptive Genetic Algorithm (AGA) and introduce new variant of Vehicle Routing Problem (VRP) inspired from liquid fertilizer distribution in Indramayu, Indonesia. This case is basically combination of some VRP variants where the company has heterogeneous vehicle with asymmetric distance and fuzzy demand (HVRPADFD). Given that VRP is NP–Hard, this study utilizes AGA as metaheuristics algorithm. AGA has been modified in terms of self-tuning parameter feature and reproduction modification to remove exhaustive tuning parameter process and enhance the effectivity of algorithm simultaneously. AGA is then integrated with fuzzy set theory based on chance-constrained programming to handle the fuzziness. The verification is also done by comparing AGA with original GA and Ant Colony Optimization (ACO) in solving HVRPADFD. The result shows that AGA is statistically better than others in terms of effectivity. AGA also has faster computational time and more consistent. The sensitivity analysis is also done to understand the risk of fuzzy demand against travelling distance.

21257: Autofill Valve as a Solution for Automatic Drinking Water Needs Based on Arduino in Laying Hen Coop

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Abstract: NVL ps farm is a relatively small-scale laying hen farm located in Rejotangan area, Tulungagung managed by Mr. Naufal. There is a major problem, the activity of chicken drinking water supply that has not been optimal. Currently, the farm adopts a half-paralon system after changing its chicken water supply system twice. Initially because the activity of giving laying hen drinking water using "paralon" pipe requires more energy and time, the manager switches to the nipple so that the activity can be done practically. However, there is a decrease in chicken productivity using the nipples that make managers re-adopt the half-paralon system that is done manually with the consideration of chicken productivity can be optimal. In addition, there is another risk of loss with adopting half this paralon, namely a decrease in income due to wet feed and chicken manure. Based on these problems, AUTOFILL VALVE is offering a solution to the problem of supplying chicken drinking water needs based on Arduino in laying hen coop. This product is designed while maintaining the shape of the cage and the use of "paralon" pipe as a place to drink chickens. In addition, the product is equipped with a water level sensor and microcontroller to always maintain the availability of water on "paralon" pipe. Various tests have been conducted to ensure the tool has high reliability, ranging from usability tests, reliability, to work time effectiveness tests. The results of the tests conducted showed that the tool has high reliability in accordance with the standards that have been planned. By implementing this product, NVL ps farm provide feedback that the product can be applied to his farm as well as other laying hen farms to address similar problems.

Keywords: farm, paralon, Arduino, solenoid valve

21384 :Feasibility Study of Production Machinery Replacement Investments in CV TU: Management and Finance Aspect

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Abstract. The replacement of the production machine from a Cupola furnace to an induction furnace will be carried out in order to increase production capacity and to produce new products in CV TU. Changes in production machinery will be followed by changes in other aspects of the company, so an analysis of the feasibility of this investment is required. The SCOR 11.0 model was used to help determine the criteria for the workforce competency needed. The list of work skills obtained from the SCOR model will be compared with the workers' expertise that the company has for further analysis in order to find the best solution for the company. The gaps obtained include a shortage of workers of 3 people for casting staff job positions and a lack of worker expertise regarding new FCD products. In the financial aspect, based on NPV and payback period, the new machines (induction furnaces) gave better performance than the old one. Sensitivity analysis also was run to analyze the effect of the change of raw material and product price to the replacement feasibility.

Keywords: Feasibility Study; Machinery Replacement; SCOR

21486 :Crowdfunding in Indonesia: The Use of Data Mining to Predict Success and Failure (A Case Study)

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Abstract. Donation-based crowdfunding is a crowdfunding model that based on social activities and aims to help others. Crowdfunding platform that often used in Indonesia is Kita Bisa. Data shows that every year the number of people who need help by opening donations has increased. However, not all donations are successful and many factors can influence the success of these donations. The purpose of this study is to determine factors that can supporting the successful donations in Kita Bisa, to know how the donations compare before and after the repair, and to determine the performance of the algorithms used in predicting. The method used is classification with C4.5 and K–Nearest Neighbor (KNN) algorithm. Data processing was carried out by experimenting 4 times with a comparison of different training sets and testing sets, and at KNN, experiments were carried out 9 times to determine the best value of k. The results of data processing show that KNN algorithm has a better accuracy, specifically 87.5%. Meanwhile, C4.5 only has 75% accuracy. Both of these accuracy are obtained by comparison of training and test data of 90%: 10% and using a value of k = 5 for the KNN. After obtaining accuracy, the donation is repaired, then compared with the donation before the repair. The result of paired sample t-test results show that there is a difference between the donation before and after repair with the donation after the repair is better. The repaired donation is tested again using the best algorithm (KNN) and predicted to succeed. Thus, it can be concluded that the repaired of donations is able to repair donations that are not successful. Based on the results of data analysis and respondents' opinions, it can also be concluded that the factors supporting the success of donating are quite a lot, with promotions and detailed descriptions being the most important factors.

Keywords: Crowdfunding Donation–Based, KitaBisa, K–Nearest Neighbor, C4.5

21227 :Risk Management System Design in Frozen Shrimp Processing Industry''s Cold Chain

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Abstract. Risk is a loss experienced by the company due to an event that occurs within a certain period of time. In the supply chain, risks can occur in every part of the supply chain and result in losses for the company. Company XYZ is a frozen shrimp processing industry that is vulnerable to risks because there are things that cannot be avoided by Company XYZ which have the potential to trigger risks such as the result of the high level of cold chain complexity applied by Company XYZ, processed products are susceptible to damage and quality degradation (perishable product), and uncertainty due to the system make–to–order applied by Company XYZ. In this study, we will discuss the proposed design of a risk management system on the Company XYZ cold chain to be able to handle and control the existing risks. The design of the risk management system includes the risk identification process using the SCOR model, risk analysis using the Fuzzy FMEA method, determining the selected mitigation strategy using the Fuzzy AHP method, and designing a risk monitoring system. Through this study, 6 priority risk factors were obtained from 77 risk events (potential risks) and 100 risk agents (risk factors) which were divided into 6 risk categories including market/demand risk, supply risk, technical risk, facility risk, human resources risk, and environmental risk and obtained 19 alternative mitigation strategies to deal with the existing priority risks.

21915 : KEY PERFORMANCE INDICATOR SELECTION FOR PROCUREMENT PROCESS

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and Putri Shafira Carolina[4, d)]

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Abstract. Procurement is a part of Supply Chain Management. As a core of a company strategy which plays an important role in determining their success or failure. Hence, it is necessary to measure the performance of the procurement process. Performance measurement is a type of evaluation that can be used to assess both the efficiency and effectiveness of an activity. Managers can use performance measurement to take several actions on a regular basis. The researchers developed a framework to promote a better understanding of the importance of procurement performance measurement and metrics. This study aims to propose key performance indicators (KPI) for procurement performance measurement. The procurement process consists of Procurement planning, execution and performance monitoring. KPI identification was obtained from the study literature and expert interviews from various industries. KPIs are weighted using the Analytical Hierarchy Process to determine the importance of KPIs on procurement performance. This research shows that there are 41 KPIs consist of 8 KPIs for procurement planning, 25 KPIs for procurement execution and 8 KPIs for performance monitoring. These KPIs can be used to measure procurement performance.

Keywords: analytical hierarchy process, key performance indicators, procurement process, supply chain management

21379: An Analysis of Social Vulnerability Clustering to Natural Disaters (Case Studies in All Distric/Cities in Indonesia in 2019)

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Abstract: Indonesia is a country with many natural disasters. Existing natural disasters can cause various risks to the community. The magnitude of the risk that the community must suffer can be seen from the level of social vulnerability to natural disasters in their area. The higher the level of exposure of a place, the higher the risk will obtain. Indonesia has a diverse geographical location which causes the social vulnerability of each region in Indonesia to be different. Therefore, it is necessary to research to find out the description of social vulnerability throughout Indonesia. This study examines the distribution of social vulnerabilities in Indonesia using the method Geographically Weighted Principal Components Analysis (GWPCA). Also, it applies Fuzzy Geographically Weighted Clustering (FGWC) using optimization Particle Swarm Optimization (PSO) for the clustering. The results obtained from this study describe social vulnerabilities that exist throughout Indonesia in high and low vulnerabilities. **Keyword**s — GWPCA, FGWC – PSO, Natural disaster, Social Vulnerability.

21716 :Cognitive Workload Evaluation in Visual-Auditory Navigation System Through EEG Measurement Driving Performance Using Driving Simulator

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Abstract: Yarn is the main material that forms fabric. A quality yarn is able to be woven at high speed and has a high density. One of the indicators of yarn quality is the tensile strength of the yarn with the objective function of Larger the Better (LTB) and the size of the pickup of the yarn with the objective function of Smaller the Better (STB). Factors that are thought to affect the quality of the yarn are the concentration of starch solution (A), the temperature of the starch solution (B), the depth of the roll in the starch bath (C), the pressure of the spinner roll (D), the speed of drawing the yarn (E), the temperature of the drying cylinder (F) and thread tension (G). The TOPSIS method is used to determine the optimal conditions for the factor level of the warp yarn testing process and to reduce the number of experiments. In this study, a combination of factor levels was obtained A2 B1 C1 D2 E1 F2 G2. The combination of this optimal factor level decreased the quality of the tensile strength of the yarn by 0.60% and increased the quality of the size pick up by 26.89% against the initial conditions. In addition, there are 4 alternatives that can be selected to increase the quality of the yarn, both in terms of tensile strength and pick-up size. To accommodate the dynamic weighting of product quality attributes, an analysis of the effect of weighting priority attributes of tensile strength and size of yarn pick-up is carried out on optimal conditions. Based on the sensitivity analysis, the results show that the optimal factor level combination will change if the weighting for the tensile strength of the yarn increases to ≥ 0.65744 or decreases to ≤ 0.27299.

21385: DESIGN OF MECHANICAL QUALITY OF YARN AS A RESULT OF DYEING PROCESS BASED ON TAGUCHI MULTI RESPONS WITH VIKOR METHODS

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Abstract. The quality of yarn resulting from the dyeing process can be identified, among others, from the color aging (color absorption) and the tensile strength of the yarn. Efforts to improve the quality of the yarn are carried out through experiments by controlling the factors that can influence it, namely the amount of dispersing agent (A), carrier (B), temperature of polyester fiber dyeing process (C), temperature of cotton fiber dyeing process (D), glauber's salt composition (E), alkali composition (F), dyeing process time (G). Using the VIKOR method, optimal conditions were obtained at the combination of factor levels A1 B2 C1 D2 E2 F2 G1, namely the system worked on a dispersing agent of 0.5 ml/ltr; carrier 2 ml/ltr; polyester fiber dyeing process temperature 130 °C; cotton fiber dyeing process temperature 70 °C; the composition of glauber's salt is 40 grams/ liter, the composition of alkali is 20 ml/liter, the immersion time is 8 hours. This combination is able to increase the color absorption by 3.57% from an average of 96.54% to an average of 100.11% and increase the tensile strength of the yarn 46.17 Newtons which was originally an average of 105.45 Newtons to an average of 151.62 Newtons.

Keywords: color absorption, tensile strength, Taguchi multi respons, Vikor

21640: SWOT Analysis In Determining The Development Strategy Of Crude Palm Oil (CPO) Using QSPM Method In PT. Xyz Palm Oil

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Abstract. The purpose of this research is to find out how the Crude Palm Oil (CPO) development strategy can be applied and appropriate related to business competition against PT. Xyz Palm Oil(CNIS). Data collection methods used are interviews, image documentation and questionnaires. The analytical method used is by using SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) where there are internal factors (IFAS) and external factors (EFAS) which will then produce a SWOT matrix which produces six SO strategies, four WO strategies, three ST strategies. And two WT strategies with a total of 15 alternative strategies to choose from. The alternative priority strategy decision-making method uses the QSPM (Quantitative Strategic Planning Matrix) method. From the results of the QSPM analysis, one strategy becomes a priority based on the largest total attractiveness value (TAS). The strategy that got the largest total attractiveness value (TAS) was strategy 1 (S–O), with TAS values 6.25, 6.34 and 7.65.

21707: Indonesia"s Energy Policy: a SWOT Analysis and Effectiveness Measure

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Abstract. Reduced production of fossil fuel, especially oil, encourages the Government to leverage renewable energy (RE) to ensure energy security and independence. Achieving a 23% renewable energy mix by 2025 is Indonesia's strategy to maintain energy security and independence. As of now, the renewable energy mix has not reached its target. It encourages research on the effectiveness of renewable energy policies to the renewable energy mix. This research aims to determine which renewable energy policies have been effective enough with the renewable energy mix and choose the strategy of RE using SWOT analysis. Based on time-series data from the years 2000–2019, a multiple linear regression was performed. Regulatory instruments, payments, finance, and taxation did not significantly impact the renewable energy mix; however, voluntary approaches did have a substantial and positive impact.

Keywords: Renewable Energy Policy, Effectiveness, Multiple Linear Regression, SWOT Analysis, Indonesia

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21333: The Design of Yarn Quality with TOPSIS method

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Abstract: Yarn is the main material that forms fabric. A quality yarn is able to be woven at high speed and has a high density. One of the indicators of yarn quality is the tensile strength of the yarn with the objective function of Larger the Better (LTB) and the size of the pickup of the yarn with the objective function of Smaller the Better (STB). Factors that are thought to affect the quality of the yarn are the concentration of starch solution (A), the temperature of the starch solution (B), the depth of the roll in the starch bath (C), the pressure of the spinner roll (D), the speed of drawing the yarn (E), the temperature of the drying cylinder (F) and thread tension (G). The TOPSIS method is used to determine the optimal conditions for the factor level of the warp yarn testing process and to reduce the number of experiments. In this study, a combination of factor levels was obtained A2 B1 C1 D2 E1 F2 G2. The combination of this optimal factor level decreased the quality of the tensile strength of the yarn by 0.60% and increased the quality of the size pick up by 26.89% against the initial conditions. In addition, there are 4 alternatives that can be selected to increase the quality of the yarn, both in terms of tensile strength and pick-up size. To accommodate the dynamic weighting of product quality attributes, an analysis of the effect of weighting priority attributes of tensile strength and size of yarn pick-up is carried out on optimal conditions. Based on the sensitivity analysis, the results show that the optimal factor level combination will change if the weighting for the tensile strength of the yarn increases to $\geq$ 0.65744 or decreases to $\leq$ 0.27299.

20821: User Preferences for video conferencing using the Analytical Hierarchial Process (AHP)

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Abstract: The spread of the Covid–19 virus has changed the social order and led to the emergence of a new era. One of the new habits that emerged is the use of video conferencing for meetings and learning. There are many alternatives to video conferencing that can be found today. This study aims to determine user preferences for video conferencing with criteria based on webqual 4.0. the method used is the Analytical Hierarchial Process (AHP) method with the help of super decision software, which is free and easy to use. Based on the results of this study, it was found that the highest criterion preference was for information criteria followed by interaction and usability. Based on information and interaction criteria, Google meet is preferred by users, followed by BBB and Zoom. Meanwhile, for usability criteria, BBB's preference value is slightly higher than Meet. Based on the sensitivity analysis results, it can be concluded that the value of alternative preferences for information and interaction criteria will not change, regardless of the value of the criteria, in contrast to the usability criteria, which will change the user's preference for the Meet alternative to BBB at a certain point.
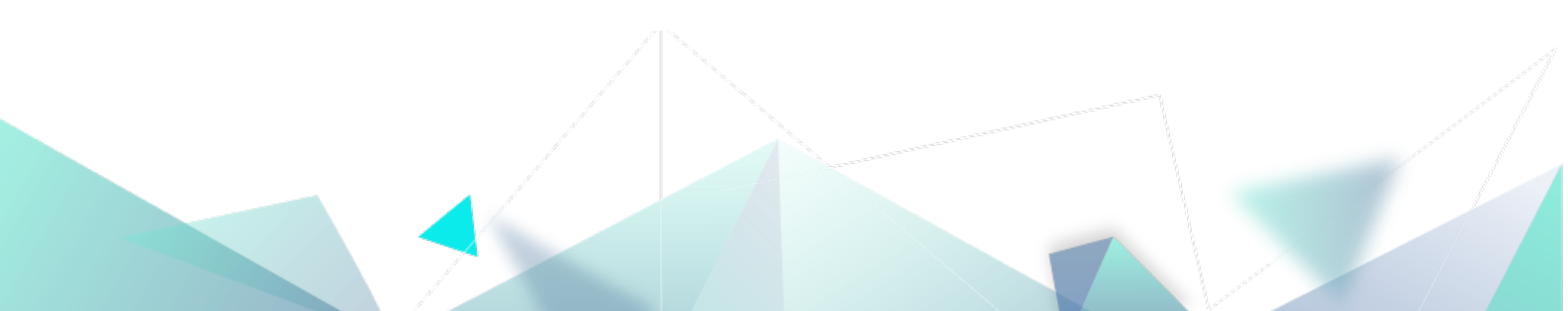
21293: Employee Performance Improvement Using Clustering Method: A Case Study in PT. XYZ

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Rizha Syukrillah[1, c], Annisa Uswatun Khasanah[1, d]

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Abstract. The garment industry is part of the manufacturing industry which is currently growing rapidly. Therefore, the level of competition will be increasing among competitors. PT XYZ is a garment company located in the city of Semarang. During the production process, defective product that occurred when orders increased. The product defect impacts the company getting a penalty and several other losses. Product defects occur due to a decrease in the performance of employees. Then through this research, researchers want to know the characteristics performance of employees in the sewing department and will be grouped using the clustering method. Sewing department employees were chosen as research subjects because the focus of garment production is on this department who turn fabrics into finished products. The grouping method aims to determine the factors that can influence the quality of performance and can find out the right recommendations to deal with problems that cause a decrease in performance quality. The clustering process is carried out using the K–Means algorithm because it is one of the algorithms in clustering that is able to group quickly and easily. (Davies Bouldin Index) DBI is also used in this study to help determine the optimum number of clusters formed. This study resulted in 4 clusters with the most frequent mistakes being when combining panels on a garment and when doing construction. The error occurred due to employee negligence and did not follow the applicable SOP (Standard Operating Procedure). Increasing motivation for all clusters can be done by giving bonuses to employees. The recommendation to minimize errors when combining panels is to provide a detailed explanation of the product design sketch. Then for mistakes during construction is to pay attention to the arrangement of threads and increase the brightness of the lights for employees in the sewing department.

21327: The Vendor Selection in Multisite Project – Multi Location–Based Vendor Using Analytical Hierarchy Process (AHP) Method in Repair Center Project

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Abstract. The continuity and smooth running of the telecommunications system plays an important role during this pandemic. The smooth running of the telecommunications system cannot be separated from the repair function in some part of telecommunication system. NTE (Network Terminal Equipment) is one of the devices in the telecommunications plays important role. PT HIJ as the company that responsible for NTE repair center has the production capacity issue, that is still under its required need. This research helps PT HIJ to make a decision to select the right vendor in the repair center project using the AHP method which will increase the production capacity of the repair center and meet the repair target. With the four main criteria; production capacity, vendor financial, product quality, and business license, the seven potential vendors then selected for evaluation. As the result, three best vendors are selected: Vendor V1 (Bogor) get the highest score (0,37), Vendor V2 (Bekasi) get the score (0,26) and Vendor V3 (Tangerang) get the score of (0,16).

21641: Human Resources Analysis using NASA–TLX Methods, Full Time Equivalent (FTE),, and SWOT Analysis with Case Study in The production Section of PT. Kon Kuwat Indonesia

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Abstract: Indonesia's infrastructure development is currently progressing very rapidly, which makes the need for natural materials for the development process also increases. This research was conducted at a stone crusher company that produces processed natural materials in the form of sand and stone ash. The purpose of this study was to determine the mental workload and time workload of PT Kon Kuwat Indonesia's production workers, to determine the number of HR needs based on the workload felt by workers, and to provide recommendations for company strategies that can be done to improve worker performance by looking at the company's internal and external factors. Based on the results of data processing and analysis, it is known that there are two workers who are included in the category of rather high mental workload and three workers are included in the category of high mental workload. Meanwhile, according to the time workload, there are two workers who are included in the underload category and there are three workers who are included in the overload category. From the calculation and analysis of worker needs, it can be seen that there is a need for additional workers on jobdesc operator 1. This is because the workload felt by operator 1 is included in the high category (overload). So that by conducting a SWOT analysis, it is necessary to have a strategy carried out by the company, namely by refreshing workers by recruiting new workers, conducting training and career development, providing rewards and sanctions to workers according to their performance, and conducting performance evaluations so that it is expected to increase the productivity of workers,

as well as companies.

21329: Application of System Dynamics Simulation in Food Supply Chain: Review and Bibliometric Analysis

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Abstract. Supply chain activities possibly pose a risk, especially during the pandemic. Risk management capabilities greatly determine the development of a business, so in this study risk management was carried out to identify risks, minimize impacts, and control risks. The method used in this research is a house of risk and system dynamic. The case study carried out in Arif jamur, a micro-industry in Pati Regency in Indonesia.The result is that there are three dominant risk agents, namely the sawmill is closed, the negligence of the workers, and the plastic baglog with holes. Based on the risk agent, two alternative mitigation actions were designed. The best is to take mitigation actions that do not cost money. There are PA2 (doing intense coordination with other mushroom cultivators), PA5 (giving sanctions if workers are negligent), and PA6 (checking the condition of the plastic before it is used for pressing). The alternative 2 fulfills the ANOVA and Bonferroni tests with an increase in income of 2.116.402 IDR so that alternative 2 is chosen to be applied to Arif Jamur's SMEs

Keywords – House of risk, risk management, supply chain, system dynamic

21225: Reducing the Rejected Parts Using DFSS,, TRIZ and DFFS for Supply Chain Procedure

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Abstract: Palm oil is a plant-based commodity that is in demand by the world as a substitute for fossil energy. Indonesia is a member of BRIICS which is an exporter of crude palm oil (CPO) as biodiesel raw material. As much as 70% of CPO production is exported to 50 countries. CPO production has both negative and positive impacts on social aspects. The social impact of CPO production is rarely discussed in depth. The sustainability approach is used for renewable resources so that it can be an alternative to using non-renewable material responses. This research identified the barriers that achieved social sustainability was carried out and searched for the relationship between the barriers using Structural Self Interaction Matrix (SSIM). Then made an Interpretative Structural Model (ISM) in the form of digraphs and grouped into clusters using MICMAC analysis. ISM MICMAC method has never been used to analyze sustainable barriers in palm oil industry before it. There are 14 obstacles to social sustainability found in this study which is used as the ISM Model with 6 levels divided into 4 clusters. This research was an initial stage for the palm oil industry to eliminate social sustainability barriers in its supply chain. The study provides the foundation for manager in palm oil industries to understand the influences among the barriers of the social sustainability to avoid it during the implementation.

Keywords: Social Sustainability, Interpretative Structural Modeling, MICMAC Analysis, Palm Oil, Supply Chain

21338: Risk Control in Supply Chain using House of Risk and System Dynamic Method

Fariza Halidatsani Azhra[1], and Elisa Kusrini[1],

Department of Industrial Engineering, Universitas Islam Indonesia

Abstract. Supply chain activities possibly pose a risk, especially during the pandemic. Risk management capabilities greatly determine the development of a business, so in this study risk management was carried out to identify risks, minimize impacts, and control risks. The method used in this research is a house of risk and system dynamic. The case study carried out in Arif jamur, a micro-industry in Pati Regency in Indonesia.The result is that there are three dominant risk agents, namely the sawmill is closed, the negligence of the workers, and the plastic baglog with holes. Based on the risk agent, two alternative mitigation actions were designed. The best is to take mitigation actions that do not cost money. There are PA2 (doing intense coordination with other mushroom cultivators), PA5 (giving sanctions if workers are negligent), and PA6 (checking the condition of the plastic before it is used for pressing). The alternative 2 fulfills the ANOVA and Bonferroni tests with an increase in income of 2.116.402 IDR so that alternative 2 is chosen to be applied to Arif Jamur's SMEs.

Keywords – House of risk, risk management, supply chain, system dynamic

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20647: Barriers Model of Social Sustainability in the Supply Chain: A Case in Palm Oil Industry from Emerging Economy

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Abstract: Palm oil is a plant-based commodity that is in demand by the world as a substitute for fossil energy. Indonesia is a member of BRIICS which is an exporter of crude palm oil (CPO) as biodiesel raw material. As much as 70% of CPO production is exported to 50 countries. CPO production has both negative and positive impacts on social aspects. The social impact of CPO production is rarely discussed in depth. The sustainability approach is used for renewable resources so that it can be an alternative to using non-renewable material responses. This research identified the barriers that achieved social sustainability was carried out and searched for the relationship between the barriers using Structural Self Interaction Matrix (SSIM). Then made an Interpretative Structural Model (ISM) in the form of digraphs and grouped into clusters using MICMAC analysis. ISM MICMAC method has never been used to analyze sustainable barriers in palm oil industry before it. There are 14 obstacles to social sustainability found in this study which is used as the ISM Model with 6 levels divided into 4 clusters. This research was an initial stage for the palm oil industry to eliminate social sustainability barriers in its supply chain. The study provides the foundation for manager in palm oil industries to understand the influences among the barriers of the social sustainability to avoid it during the implementation.

Keywords: Social Sustainability, Interpretative Structural Modeling, MICMAC Analysis, Palm Oil, Supply Chain

21482: Risk Management of The Halal Supply Chain: A Literature

Intan Putri[1,2,a)] and Elisa Kusrini[2]

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Abstract. Risk management, an important strategy in the decision-making process, especially in the halal supply chain that requires more extensive risk management than other products and industries. However, the development of literature studies regarding risk management in the halal supply chain is insignificant compared to other subjects, and researchers still have lack consensus regarding the best approaching model to be implemented in halal supply chain risk management. This research aims to provide insight into the investigated area and the scope that needs more recognition in future studies. Thirty-seven international publications were reviewed using a systematic literature review. The previous studies suggested the future research to conduct more research in the risk management of the halal supply chain, especially in the meat industry from the upper stream to the downstream. Future research should provide a preventive strategy by performing risk identification, evaluation, analysis, and mitigation. The researchers should obtain the data from practitioners with a case study using observation, interviews, Focus Group Discussion, or questionnaires to gather more reliable information. A risk map should be employed to analyze the risk since it is practical for the industries to follow. Previous studies recommend investigating other halal supply chains management areas, employing the advanced MCDM method, conducting a case study, and making the standardization and measurement of the halal critical point.

21705: Risk Analysis on Water Distribution Using Failure Mode and Effect Analysis (FMEA) Approach and Fishbone Diagram

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Abstract. Water is crucial for human life, due to its extended benefits to meet human needs. This encourages the demand for clean water. The regional public company was established in the objection to fulfilling people's demand on drink water. Yet in its distribution, issues might occur and obstacles sometimes arise. This research aims to identify the existing risks and prevent the risks that might happen in the water distribution process by the regional public company. Failure Mode and Effect Analysis (FMEA) and fishbone diagram with the approach of 5M + 1E that includes Man, Material, Measurement, Method, and Environment, are selected as the method of the research. It is identified with 16 existing risks, 5 are clustered in the category of high risk (high), 3 medium risks (medium), and 8 low risks (low). The research concludes the risk with the highest RPN (Risk Priority Number), which is the risk of suffering from the ditch widening project, therefore risk mitigation is required by conducting precise estimation for the location of the distribution pipeline network.

21669: Ergonomic and Innovative Infusion Monitoring System Design to Increase Usability

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Abstract. Delay in changing the infusion device can pose a risk to patient safety, both low risk and high risk. 7 out of 10 patients have experienced increased blood flow to the infusion tube and 2 out of 10 patients even died. The survey results showed that 85.7% was caused by the delay in the nurse's response. The monitoring system is one of the important aspects in the use of infusion devices to reduce risks that can endanger patient safety. The purpose of this research is to develop an ergonomic and innovative infusion monitoring system to increase reusability. The results in this study are the infusion monitoring system design parameters that are ergonomic and innovative and have validation for all aspects included in usability.

21254: The Influence of Audio Intervention Based on Drivers Situational Awareness

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Abstract. Human is the main factor in the factors of traffic accidents. Traffic accidents can occur due to active and passive interventions. Active interventions such as drinking coffee, smoking, chewing candy, exercising, singing, using cell phones. Passive intervention can be done by manipulating the environment in the car, such as lighting, alarms, music, air and scent. In this research, we examined about the effects of passive intervention in the form of listening to music on driving performance. This research uses the SART questionnaire which has nine variables. Respondents consisted of 5 men and 5 women with at least one year of driving experience. From nine variables, only three variables have significant differences, concentration of 0.002 attention, 0.000 spare mental capacity, and familiarity with 0.010 situation. Theresults of the three treatments that carried out on average without audio have the lowest value.

21714: The Utilization of Ocular Indicators in Detecting Fatigue in Freight Train Drivers

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Abstract: Freight trains are trains with the largest income in Indonesia. Knowledge of how much fatigue freight train drivers have can minimize accidents when operating the trains. This study examines fatigue in the morning shift with a duration of 160 minutes. A camera was installed in the cabin of the locomotive because the indicators measured in this study were blink duration, blink frequency, microsleep, behavioral observed rated sleepiness (BORS), and driving impairment observed rated sleepiness (DORS). The results of this study show an indication of fatigue in train drivers who worked on the morning shift. However, further study is needed to investigate the influence of other work-related factors such as the effect of shifts, sleep duration, and sleep quality as well as the influence of non-service-related factors such as effects of traveling to work, effects of times awake, and so on.

Keyword : fatigue, train, driver, ocular, video rating

21311: Analysis of Work Posture and Proposed Design of Slondok Printing Machines at Slondok MSMEs in Yogyakarta

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Abstract— MSMEs in Indonesia is currently growing very quickly from year to year. One of the MSMEs is slondok. After conducting field observations and interviews, the slondok printing machines owned by several MSMEs in Yogyakarta have not paid attention to occupational health and safety aspects. Workers complain of disturbances in some parts of the body that interfere with their productivity. This study aims to determine the body posture of workers when doing slondok printing. Researchers conducted initial identification with the NBM (Nordic Body Map) questionnaire, the results obtained that there were several parts that felt painful including below the neck, upper right arm, right elbow, right forearm, left knee, right knee. The next step is using the work posture method. The method used is the REBA method, because the REBA method analyzes all parts of the body. The final result of the REBA method is a score of 11 on a level scale with a high risk for work posture in slondok printing workers. Furthermore, the results of REBA are used as the basis for the recommendation for the design of the slondok printing machine.

Keywords— NBM questionnaire, Work Posture, Tool Design

21262: Analysis of the Influence of ERP Information Systems on Net Benefit using PLS-SEM in Higher Education Institutions

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Abstract. This study aims to determine whether there is a positive impact from using the Enterprise Resource Planning (ERP) system on the net benefits of a higher education institution. The research uses the information system success model proposed by DeLone and McLean. The variables tested in the study include system quality, information quality, service quality, user satisfaction and net benefits. Data was collected using a questionnaire distributed to 54 respondents. The collected data were processed using the PLS-SEM method with the SmartPLS 3.0 application. The study results indicate that the quality of information positively affects user satisfaction (H3), and user satisfaction positively impacts net benefits (H4). While the system's quality does not positively affect user satisfaction (H1), service quality does not positively affect user satisfaction (H2). This research extends the previous study by adding net benefits, which are representations of individuals and organizations. It can be concluded that the use of ERP systems affects individuals and organizations performance.

21685: Discomfort Level of Online Taxi Car Drivers

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Abstract. The development of online taxi applications increases the number of these modes of transportation. Online taxi drivers have the freedom to determine the working time and vehicle used. This research was conducted in the city of Yogyakarta, with deep interview and questionnaire methods. Seventy online taxi drivers with the same car type participated as respondents in this study. Questionnaire based on Nordic Body Map to find out the discomfort of online taxi drivers. The results showed that some areas of discomfort commonly felt by online taxi drivers, including the buttocks area, upper neck, left leg, left ankle, and lower neck.

20605: Production Process Analysis Using Six Sigma Approach and Failure Mode Effect Analysis to Reduce Sheet Break on Core Board Paper Products PT. Indonesian Papertech,, Subang

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Abstract: Quality and productivity are the things that are most often the focus of discussion in the production process. PT. Papertech Indonesia is one of the companies producing cardboard products or paper board industry (hard paper). The products produced in addition to core paper also produce other types of paper including: Chip Board, Super Chip Board, Cone Board, Core B.   In producing paper, the thing that most affects the quality of a product is the change grade or the change in the type of product. If at the time of change grade there is an error in the settings it   will cause problems, namely sheet break or broken paper. Sheet Break is broken paper which can cause a decrease in machine productivity and add defective products in the warehouse, this defect product is meant to not meet the specifications of the consumer. Six Sigma approaches and Failure Mode Effect Analysis (FMEA) used in this study to determine the sigma level value for sheet breaks, factors that cause sheet breaks and find solutions to reduce risk. The results showed that there are two machines that often experience Sheet Break, namely Couch Roll & Lumbreaker and Dryer 1st Group machines which are caused by various factors. Based on the value of the Risk Priority Number which is the largest for the cause of Sheet Break, namely unstable vacuum during Change Grade, Lack of understanding and skills in the Change Grade state, Lack of understanding of the steps for Change Grade. Based on these results, recommendations are given to minimize the causes of priority Sheet Breaks carried out for each category and each cause, one of the recommendations given is the use of appropriate vacuum equipment, conducting regular monitoring, training employees and implementing Kaizen. With these recommendations, PT. Indonesian papertech can use these recommendations as a form of improvement in order to minimize the occurrence of sheet breaks.

Keywords: Failure Mode Effect Analysis (FMEA), Sheet Break, Six-Sigma.

20627: PERFORMANCE MEASUREMENT OF PT XYZ USING THE BALANCED SCORECARD METHOD

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Abstract: The XYZ Company is a company that runs in water supply industries which is engaged in the distribution of safe drinking water to the public. This company in measuring its performance only relies on several aspects, namely revenue target, number of complaints, and water quality which is still not comprehensive. As a result, this research uses the Balanced Scorecard to be utilized to measure the work performance of its business thoroughly. This research aims to measure the results of the work performance by XYZ mineral water company to improve, identify and measure several functions of the internal business and external results of the business. The result shows on the financial aspect, the current ratios from 2018 until 2020 orderly are 2.14, 0.726, and 0.703. For the cash ratios from 2018 to 2020 are 0.71, 0.123, and 0.198. For financial leverages from 2018 to 2020 are 1.108, 1.258, and 1.247. For debt–to–equity ratios from 2018 to 2020 are 0.108, 0.258, 0.247. For ROIs from 2018 to 2020 are 21.13%, 2730%, and 15.54%. For profit margin from 2018 to 2020 are 5.42%, 5.33%, and 4.96%. For ROAs from 2018 to 2020 are 2.61%, 2.71%, and 2.17%. For ROEs from 2018 to 2020 are 2.89%, 3.41%, and 2.71%. For customer perspective, the percentage increase of customer complaints from 2018 to 2020 are –0.0091, 0.020012, and –0.01789. For percentage increase of customer from 2018 to 2020 are 0.073, 0.0703, and 0.0705. For the market share from 2018 to 2020 are 34673, 37111, and 39731. For customer acquisition from 2018 to 2020 are 0.37, 0.04, 0.129. For the business internal process perspective, the company. has carried out developments such as making online complaint services, establishing subsidiaries in new fields, implementing SDGs, collaborating with other companies, making internal quality improvements. For the learning and growth aspect that can be seen from the net income per personalia from 2018 to 2020 are 9,563,586.46, 10.837,952.54, and 9,913,010.36. It can be concluded that the company experienced high performance in 2019 in 3 aspects except for the customer aspect.

20935 : Development of Communication Tools for Deaf and Mute People Using Design Thinking Method

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Abstract. In the post–COVID–19 pandemic, society was required to prepare and adapt in the face of post-pandemic conditions. Adjustment in society is a major problem experienced by people with disabilities, especially for people who are deaf and mute due to the difficulty of communicating. With design thinking method a communication tool for the deaf-mute people idea was obtained from this research. Smart Gloves for Deaf and Mute People (Smart Gloft) is a product in the form of a glove where there is a device that uses Arduino technology with the principle of converting visual text into audio and converting audio into visual text. This tool also contains sentences that are often used by users, making it easier for them to ask or answer something quickly. In this study, the researchers presented the design ideas in the form of 3D designs and prototype devices.

21112 :Analysis of Problems on Zoom Cloud Meetings Application Based on End User Reviews using Text Mining and Fishbone Diagram

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Abstract. In the era of the industrial revolution 4.0 as it is today, there has been a rapid technological development that has penetrated into various fields, especially in the telecommunications sector. One of the advances in telecommunications technology is a technology that can support audio and video communication simultaneously and in real-time, namely video conferencing. One of the companies engaged in video conference- based telecommunications services is Zoom Technologies, Inc. which launched the Zoom cloud meetings application which can be downloaded via the Google Play Store.. However, until December 2020 the Zoom Cloud Meetings application only received a rating of 3.6 stars out of a total rating of 5.0. Therefore, there is a need for research related to Zoom Cloud Meetings using user reviews from the Google Play Store. The reviews analyzed in the study amounted to 75,454 which had been classified into positive and negative sentiment classes using the Naïve Bayes Classifier algorithm and association rules were carried out. Classification with Naïve Bayes Classifier with training data of 85% and test data of 15% produces an optimum accuracy of 86.67%. From the results of the review analysis, eight key words were found, namely, "meeting", "video", "audio", "class", "work", "update", "time" and "connect". Some of the causes of problems include connecting to meetings for a long time, complaints about the quality of sound, video and limited time for free users, and problems related to applications that cannot be run.

20889: Analysis of Potential Hazards in Snack MSMEs Using HIRA Method with FMEA Perspective

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Abstract— MSMEs have a role in the economic growth of a country. There is one MSME that produces snacks in several areas on the Java island, Indonesia. Based on observations, there are risks related to work safety in the process of making these snacks. To identify the risk of work accidents in the process, research was conducted by combining the HIRA and FMEA methods. Risk identification is expected to be material for proposals to design procedures or equipment in the production process and act as technical control. In addition, risk identification can be the first step to minimize or prevent work accidents and create work safety. The steps of the research are identifying the process of making snacks, identifying hazards by recognizing the probability and consequence values, determining risk values, making risk maps, determining detection levels, calculating risk priority numbers, and controlling risk. Based on the steps that have been taken, risk control can be exposed to the use of PPE, administrative control, and engineering.

Keywords— MSMEs, HIRA, FMEA, hazards, risk control

21276 : A Self-Assessment Model for Measuring the Fitness Level of Industrial Engineering Graduates Competence to a Quality Control Job Position

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Wahyudi[1,d)] and I Made Ronyastra [1, e)]

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.**Abstract**. Competence mismatch is a mismatch between the company's job specification and employee competences. Competence mismatch has to be reduced in order to increase employee's satisfaction and motivation to improve company performance which leads to great benefits for both the company and their employees. A measurement tool is required in order to reduce the potential for competence mismatches at an early stage. This paper proposes a self-assessment model to measure the fitness level of Ubaya Industrial Engineering alumni competences. The criteria were collected from job vacancies from 8 companies and categorized as subjective and objective criteria. Criteria reduction was performed using pareto principle and yield 4 objective criteria and 4 subjective criteria. The criteria weights were determined based on the evaluation from 3 experts who provided their scores in preference ordering and utility values. The experts'evaluation scores need to be unified by transforming to Fuzzy Preference Relations and then aggregated to get the criteria weights. The criteria and their weights will be used in this self-assessment model for measuring the fitness level of candidates interms of the fitness percentage for the Quality Control job.

20921: Life Cycle Cost of Mobility Electrification with Renewable Energy in an Off-grid Rural Area: The Karya Jadi Village Case in Indonesia

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Abstract. Renewable energy (RE) has been used to support electrification in off–grid areas. However, not all RE systems can be sustained for the intended lifetime of the technology. A major technical cause of a premature RE project failure in an off-grid area is the short lifespan of the battery and the economic and access inability of the end-users to make a battery reinvestment. For example, in Karya Jadi Village, South Kalimantan, Indonesia, a government program providing household solar photovoltaics (PV) lasted only 3 years due to battery deterioration. While PVs are still functional, they are limited, as daytime lighting is unnecessary because sunshines occur during the daytime. On the other hand, the affordable electric motorbike industry in Indonesia is currently growing. This study explores the financial saving potential of electric motorbike usage in villages charged by existing PV systems by employing the life cycle cost (LCC) methodology. Transportation is an essential basic need for people living in remote off-grid villages such as Karya Jadi. Furthermore, gasoline sold in such villages is pricier than in the city because it must be transported for a considerable distance and challenging topography. This study calculates the savings from shifting from an internal combustion engine (ICE) motorbike to an electric motorbike in Karya Jadi village in Indonesia.

21706: Maintenance Scheduling for Compressors Considering Asset Performance and Cost

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Abstract. PT. X is an oil and gas company. As a petroleum processing company, this company has various types of machines, one of which is a compressor which requires structured maintenance. The high rate of damage and downtime causes high maintenance costs. This study uses the Reliability Centered Maintenance (Rcm) method. This method is used to determine the reliability of the machine, determine the maintenance schedule and the cost required for maintenance. The first step of the research is to determine the critical machine, then perform a breakdown interval analysis of the machine and calculate the reliability value of the machine, determine the maintenance schedule is also carried out to reduce maintenance costs. The results showed that there were 3 types of critical compressor engines, the 3 machines were identified as TBF from cylinder K–3–02 with TBF of 82. 3 days and reliability when TBF was 37.28%, K–5–02 with TBF 109.37 days and reliability when TBF was 36.8%. K–1–01 with TBF 114.7 days and reliability when TBF was 34.5%. The suggestion is that maintenance when failure approaches 70% on each machine, it is found that the breakdown time for the three components is reduced from 96 hours to 65 hours in one year with maintenance intervals of 35 days on K–3–02 and 70 days on K–1–01 and K –5–02.With the new maintenance policy, maintenance costs for these three components can be reduced up to IDR 62,617,707 in one year.
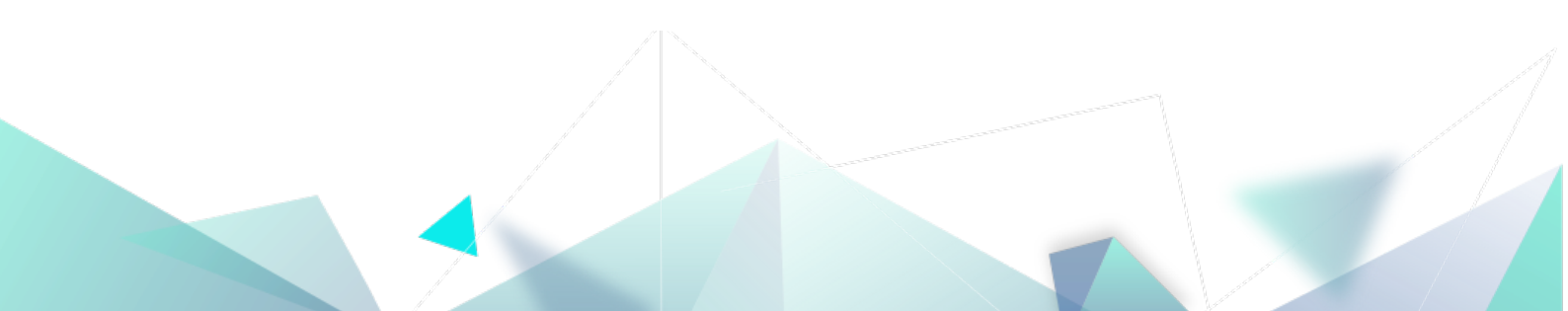
21533 : Influence of UI/UX on Online Purchase Decisions in E–Commerce

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Abstract. Shopee and Tokopedia are e-commerce with the most users in Indonesia, but there are several factors that can influence online purchasing decisions such as the user interface, user experience and user habits. The purpose of this study is to measure the level of usability in this case the user interface (UI) and user experience (UX) by involving the users cognitive and analyzing the level of influence of UI/UX on online purchasing decisions in e–commerce. The method used in this study is a cognitive walkthrough for measuring usability by involving the users cognitive; user experience is measured with the help of the User Experience Questionnaire (UEQ), and path analysis to calculate the level of influence of UI/UX on online purchasing decisions in e–commerce through consumer habits as an intervening variable. Non-parametric statistical tests are also used to test some classical assumption tests and hypotheses in path analysis. The results showed that usability measurement using cognitive walkthrough (CW) was easy to use with a success rate of 60 to 100% in completing three tasks. A positive impression is given by e– commerce shopee and tokopedia with all indicator values above 0.8. Based on the path analysis, it is known that the indirect effect or the influence of the user interface on e- commerce shopping decisions through consumer behavior is 58.6%, while the effect of user experience on e–commerce shopping decisions through consumer behavior is 41.4% smaller than the influence of UI.

20923: Redesign of Production Table for Boiling And Removing Chicken Feathers Using NBM (Nordic Body Map) and Reverse Engineering to Reduce Musculoskeletal Disorder Complaints at XYZ Chicken Slaughterhouse

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Abstract. Currently there are a lot of food that is consumed a lot along with population growth which is also increasing, one of which is food from animal, namely chicken. There are several processes for producing cut chickens from live chickens to chicken that are ready to be cooked. At this stage of production there are several obstacles, one of which is uses tools to produce it is still not in a single unit. This causes an excessive workload, besides that a low place causes workers to experience complaints of musculoskeletal disorder. The purpose of this study is to determine the problems experienced by one of the workers of the complaints muscular tightness disorder by using the Nordic Body Map questionnaire and making new product designs according to the reverse engineering method. After interviewing several diseased parts based on the Nordic Body Map questionnaire including lower neck, left shoulder, right shoulder, left upper arm, back, left hand, right hand. The anthropometric part used is the stretch of the hand, the height of the elbow standing and the reach of the hand. based on calculations with the anthropometry bank data of Indonesians, in the height dimension, the angle used to determine the height of the table uses a percentage of 50. The height is 106.82 cm. Whereas to determine the width of the table using width dimensions with dimensions of 50. For the width of the table that is equal to 80.31 cm. The anthropometry used to determine the length of the table is the spacing from the fingertips of the left hand to the right. The type of nthropometry used is 95% percentile, which is 167.78 cm. The tool is regenerated using reverse engineering methods according to the needs of the workers. This machine is also felt to be very helpful in threshing chicken feathers and boiling chicken feathers by making one on a production table.

Keywords: Nordic Body Map Questionnaire, Reverse Engineering, Anthropometry, Product Design.

20920 : THE CHARACTERIZATION OF COAL WASTE BY PAITON POWER PLANT

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Abstract. The waste generated by power plants in Indonesia is dominated by fly ash. Although the Indonesian Government Regulation No. 22 of 2021 states that fly ash is no longer a toxic and hazardous waste, if it is not managed properly, it can cause environmental pollution. Currently, fly ash is only used as a building and road construction material. On the other hand, fly Ash has the opportunity to continue to develop its utilization in order to increase the use value of the waste. The characterization of coal fly ash was carried out including its elemental content and structure so that it could be used for the development of fly ash utilization. The fly ash used in this study is the waste from the Paiton power plant. Characterization is done by testing XRF (X-Ray Fluorescence), XRD (X-Ray Diffraction) and Scanning Electron Microscopy (SEM). XRF testing showed that the most dominant compound was CaO of 29.7%, Fe_2O_3 by 26.3% and SiO_2 by 26%. The results of the diffraction pattern analysis showed that the dominant phase contained in fly ash was Tricalcium Silicate (Ca_3O_5Si). The characterization with SEM showed that the dominant morphology formed was spherical. The particle size looks heterogeneous around 1–15μm.

21499: CFD Simulation Analysis of Thermal Comfort with Variations in the Number of Cooling Inlets

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Abstract. The increase in heat generated by the sun is an effect of global warming that can harm both life and the surrounding environment. In this case, sweltering weather in urban areas can create a massive problem regarding workers' productivity. An improper ventilation system can make the room temperature increase. Therefore, comfortable thermal conditions will make indoor activities run effectively. This study aims to determine the number of cooling inlets in the mosque room, measuring 11.1 11.4 3 meters. This research was conducted by numerical simulation modeling. Thermal conditions were analyzed using ANSYS Workbench CFD simulation software. Weather conditions are adjusted to the Surakarta area, Indonesia, in June. This thermal comfort condition analysis was based on the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE). Calculations are carried out to determine the appropriate inlet temperature with consideration of indoor and outdoor temperatures. Based on the simulation results, 80% of the room reaches the desired temperature of around 20°C in Case 3. In this case, the configuration of the Air-Conditioner and outlet flow greatly affects the desired room temperature.

21269 : MODELING OF 2D FLUID FLOWS IN GEOTHERMAL AREAS BY USING FINITE ELEMENT METHODS

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Abstract. Indonesia is one of the countries with the largest geothermal potential in the world, up to 40% of the world's potential. In geothermal areas, there are several layers, such as parts of cap rock, reservoir, fracture and heat sources. The pattern of subsurface fluid flow in geothermal areas is a topic that is often discussed, especially for exploration purposes. Fluid flow basically uses the principles of Darcy's law, the principle of continuity and the Navier–Stokes equation. In solving this equation, a numerical approach can be used, where the results are closer to the true value. The numerical method used in this research is the finite element method, in which the geometric domains are divided into smaller domains. The shape of the two-dimensional elements used is a non-linear triangle. The purpose of this study is to describe the fluid flow pattern in a porous medium, especially in the case of geothermal areas and to determine the effect of rock permeability anomalies on fluid flow patterns. The results of modeling using the finite element method show that rock permeability affects the fluid flow pattern. The fluid will flow at a higher speed to an area with higher permeability. After getting the fluid velocity in each nodes, then remodelling it to get the fluid temperature. Thermal conductivity is one of the variables that affects the heat transfer, where the greater the thermal conductivity, the greater the heat transfer rate.

21676 : Improving the greenhouse microclimate in tropical country using shading and natural ventilation technique

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Abstract. Thermal comfort is not monopolised by human being but plantation also must be taken into consideration. In order to improve the quality of microclimate in a tropical greenhouse, some treatments have been done. The effect of shading and natural ventilation have been investigated, experimentally. A double layer of plastic shading net and insect net have been applied above a built greenhouse and on its some facades. Some measurement tools were set inside and outside the greenhouse for measuring temperature, relative humidity, and light intensity for 24 hours observation. The results shows that the treatments could reduce the inside temperature up to 20 °C and stabilise the relative humidity above 60%–90%, 20 points higher than before. Furthermore, it was found that utilising white UV Sheet as the facades improved the light intensity dispersion almost twice.

21700 : Performance Of Solar Panels as Electricity Source To Burn Rice Powder in the Biomass Gasification Process

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Abstract. Currently, energy needs are one of the sources of human life that cannot be separated. Energy can be classified into two, energy sourced from fossils of living things and plants, with high rice production, making gasification tools an alternative to the use of rice husks into energy. Gasification is a thermochemical process of converting solid fuels into gas thus gasification using this resource is itself a renewable energy. This research is experimental. The air flow rate valve is set at speed $= 2.2$ m/s for the glowplug variation 3, 2.5m/s for the glowplug variation 4, 2.6m/s for the glowplug variation 5, 2.9 m/s for the glowplug variation 6 with Air Fuel Ratio (AFR)) 0.7%, 0.8%, 0.9%, 1%,. With the glowplug variation, the highest temperature is up to 888°C with 1% AFR.

Keywords : Reactor Gasifier, airflow rate, glowplug

21491 : Simulated Comparison between Different Roof''s Construction Materials "A Study to find Best Roof Material for Energy Consumption Efficiency in Residential Buildings"

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Abstract. The internal Building environment in architecture is very important for researchers in the field of architecture from a side and for users from another side. Especially in the residential building the residence needs to live in a comfortable zone with less energy consumption. While the energy is very less all over the world generally it's almost missed in Baghdad. That's why the researchers looking for a different solution to reduce energy consumption in Iraq and the all world. This research tries to give a clear vision to the architects and other engineers the best materials which can be used in the residential buildings in Iraq. While the roof is one of the most important elements in the building envelope and solar energy can reach the interior spaces through the roof more than the other buildings' surfaces. This research focus for using the different materials can be used to construct the roof in Iraq (Baghdad). The research use four materials which can be used commonly, these materials are wood, stone, concrete and brick.

21216 : Influence of Friction Pressure and Friction Time Interaction on the Joint Strength of Friction Welded ST 41 Steel

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Abstract. Influence of heating stage parameters in RFW (rotary friction welding) of ST 41 steel is studied in this work. Series of experiments of ST 41 steel were conducted in lathe machine equipped with hydraulic powerpack system. Full factorial design of experiments is employed to investigate the influence of the parameters, i.e., friction pressure and friction time on the joint strength of the samples. Replication experiment is carried out to study if the factors' interaction affects the joint strength. Cross weld tensile tests were performed using tensile specimen that ensure failure at the joint. The results indicated significant influence of friction pressure, friction time, and their interaction on the joint strength.

Keywords: RFW, ST 41, factorial, design of experiments, joint strength

21017 : Effect of Friction Welding Parameters to Weld Joint Performance of Cylindrical Stainless Steel

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Abstract. Stainless steel cylinder was used in this study, a friction welding uses friction of both based metals to generate the heat input in welding process. The effect of rotation speed, friction area, and friction time to performance of a weld joint was studied. The rotation speed, friction area or diameter of based metal, and friction time were leveled. Performance of a weld joint was based to the load of tensile test result. The highest load was 55478 N from a specimen with 9 mm diameter of the based metals and friction time 2 min with 850 rpm of rotation speed and 12111 N was the lowest load of tensile test could be resisted. The performance of weld joint from based metal with diameter 12 mm could be achieved more than 45000 N, although could not achieved the highest load however load value was average near with the highest value. Rotation speed, friction area or diameter of both based metals significant affected to performance of weld joint.

21779: Introducing New CNC Machining Strategy for Thin-Walled Structure (Case study on Acrylic Machining for Butterfly Jewellery Frame Master)

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Abstract: This paper deals with a method to control the machining strategy to realize a thin wall structure for butterfly jewelry frame master with acrylic material using CAD/CAM and CNC. Butterfly jewelry is found as good solution for increasing the added value for beautiful butterfly wings. Its ability to utilize the incomplete portion butterfly wings as it is found in a dead butterfly make this solution is supporting the green product issues. Frame is a part which support the stiffness of cut outed butterfly wings part, ensure the standard size & shape, and increase aesthetical aspect of jewelry. Hence frame quality is very important.

It is strict requirement in jewelry frame, it must have strong structure, light weight, consistence geometry, high quality surface finish, high formability, etc. Thin-walled frame structure is finally designed to meet requirements to support the butterfly jewelry, and CNC machining is chosen to realize the design. Acrylic material is then chosen as the optimum material for strong and surface quality achievement. Problem found in machining because acrylic is fragile and small machining force may cause it fail. Conventional method in CAM strategies will consume time and do not increase the strength of raw material. A combination method introduced to ensure that machining process will not affect the critical part of frame structure. This solution is effective and thin-walled frame for jewelry master can be realized and used in mass production using investment casting. As conclusion, this method is very effective for successful machining with shorter machining time as it compared with conventional CAD/CAM strategy and may inspire the machining strategy for low strength structure by increasing the strength of workpiece during machining process.

Keyword: Thin–walled machining, CAD/CAM, CNC, jewelry, New Method Machining

21697: Laterite Nickel Hydrometallurgical Residues Characterization and Potential Utilization of Valuable Elements

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Abstract: Approximately 80% of the hydrometallurgical process of low-grade laterite nickel ore is converted into residue. The handling of residues from processing is a significant challenge in this process According to the characterization test, each type of extraction process produces a different type of residue. The characteristics of the compound in the extraction process using High Pressure Acid Leaching (HPAL) and Sulfation–Roasting–Leaching (SRL) methods are similar to the dominance of Hematite (Fe_2O_3) and Fe content > 40%. Atmospheric leaching (AL) residues are dominated by compounds in the form of the mineral Fayalite with a high Si content (Si > 50%). Furthermore, Jarosite is a residue of the precipitation process of Fe impurities dissolved in Pregnant Leach Solution (PLS). Depending on the properties of the elements and compounds, each type of residue has divergent utilization potential. With a variety of recycle methods, SRL, HPAL, and jarosite waste can be converted into hematite as a raw material for the iron-steel industry. Roasting or alkaline leaching procedures can reduce the sulfur concentration in the residue to less than 1%. Furthermore, sponge iron (Fe metal) can be extracted using the direct reduction method from SRL and HPAL residue. The AL residue can be processed into the intermediate product sodium silicate. Sodium silicate can be utilized as a chemical absorbent, geopolymer, and adhesive product with the addition of additives and certain production process.

21780: The Analysis of the Acrylic,, CNC and SLA 3Dprint Results as the Basis of the Jewelry Master Production

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Abstract: It is hard to dismiss technology advanced in the processes of jewelry manufacturing. One of the processes is jewelry master production. The current method in this process is using a CNC machining process to obtain it. However, Additive Manufacturing or known as 3Dpinting technology has offered some advantages in the production of the jewelry master especially Stereolithography (SLA) 3Dprinting. This technology can reduce the remaining material caused by cutting, grinding, polishing, and buffing processes. This research studied the use of SLA 3Dprinting to fabricate Jewelry master. The results were compared to the master made of acrylic, the CNC results, and the CNC results with the finishing process. The results showed that Jewelry masters made of acrylic were the best among the samples and SLA 3Dprinting performance better quality in the surface roughness than the product obtained by the CNC. However, the products of the CNC processes could be improved better than the jewelry master resulted of the SLA 3Dprinting by doing a finishing. The best and the worst surface roughness of the jewelry master was tested to manufacture the final jewelry product by using gypsum molding. The Analysis was developed by evaluating their surface roughness. The conclusion shows that both jewelry master had produced an object with slightly different values of the roughness test which mean that the use of either CNC machining process, Acrylic, or SLA 3Dprinting is not significantly different. This was possibly caused by the size of gypsum particles which are more determining the roughness of the jewelry final product.

21405: Selected Basic properties of concrete with Polypropylene Plastic Granular Aggregates

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Abstract: Excessive plastic exploitation has an impact on the accumulation of plastic waste. The use of plastic waste in concrete is one of the partial solutions for handling plastic waste in the world. In this study, polypropylene plastic granules function as a partial substitute for sand. This study aims to analyze the physical and mechanical properties of the selected base concrete by taking into account the potential of polypropylene plastic granules as a substitute for sand in the concrete mixture. compressive strength, workability and density are variables to be investigated. The results of this study indicate that the use of polypropylene plastic granules as a substitute for fine aggregate starting from 10%, 20%, 30%, and 40%, produces slump values of 8.1 cm, 8.4 cm, 8.6 cm, and 8.8 cm respectively, so it is considered to still meet Indonesian national standards. The results of the measurement of concrete density are 2211.46 kg/m3, 2138.21 kg/m3, 2105.73 kg/m3, and 2021.65 kg/m3. The results for the compressive strength test at the age of 7 days of concrete were obtained at 9.12 Mpa, 8.704 MPa, 8.5 MPa, and 7.85 MPa.

21698: Implementation of Lean Tools as Waste Assessment Method in a Coil Spring Manufacturing

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Abstract. Plastic Waste, Fly Ash, Rice Husk Ash contribute to environmental problems. Starting from the problem of CO2 gas emissions to ecosystem damage due to the accumulation of waste on earth. Therefore, this study focused on the use of Fly Ash, rice husk ash and LDPE Powder as a mixture of Alkaline-Activated Mortar. In this study, Fly Ash as a Pozzolanic Material is mixed with an activator solution so that it functions as a binder in Mortar. Rice husk ash is used as a substitute for fly ash while LDPE powder serves as a substitute for sand. The percentage of LDPE powder used in the mortar mix ranges from 0 to 15% of the total weight of the mixture. While the percentage of rice husk ash used in the mixture was 7%, Activator Solution 27% and Sand ranged from 24.5 to 39.5%. There were six variations of mortar specimens (AA-LDP1, AA-LDP2, AA-LDP3, AA-LDP4, AA-LDP5, AA-LDP6). Initial setting time testing was carried out on the binder mortar. The compressive strength test of mortar was carried out at the age of 7 days after oven curing at a temperature of 60oC. From the test results obtained the highest compressive strength of 11.3 MPa on the AA-LDP6 specimen where the percentage of LDPE powder on the test object is 15%. The longest initial setting time is the variation of the AA-LDP6 specimen, which is 180 minutes.

21375: The effect of loading type,, anchoring type,, and material selection on a MEMS switch design

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Abstract: Radio Frequency Microelectromechanical (RF MEMS) switches proved to be a good potential to replace conventional microelectronic switches in telecommunication applications. An analytical approach was carried out in this paper to calculate the effect of loading type, anchoring type, and material selection on the performance of a MEMS switch. It is found that the location of the load has a large effect on the switch performance and beam characteristics (electrostatic force, pull–down voltage, and mechanical restoring force… etc). In addition, the selection of the anchor type as well as the method of connecting MEMS switch to the circuit has a significant effect on the switch design and performance. The effect of the anchoring type and design of the switch (in the case of cantilever and fixed-fixed beam) is discussed. Finally, the effect of the MEMS material type on the design of MEMS switches was investigated to demonstrate its effect on the switching time, the force required to pull the switch down and the pull-down voltage.

Keywords: RF MEMS, anchor, microcantilevers, micro bridges, MEMS material

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21369: Utilization of Low Density Polyethylene (LDPE) Powder and Rice Husk Ash (RHA) on Compressive Strength and Initial Setting Time of Alkaline Activated Mortar

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Abstract. Lean manufacturing is a systematic methodology to minimize waste while maximizing resource utilization which helps business become more effective and competitive in the marketplace. Lean manufacturing is about the enthusiasm for waste elimination. Any business can remain competitive if it is flexible enough to continuously and systematically improve its manufacturing process by eliminating waste, optimize processes, and cut unnecessary cost. This review aims to discuss a wastage assessment method that has been used to implement lean manufacturing across all manufacturing sectors like automotive, electronics, plastic, textile, food, dairy, even services. Specifically, it investigates which are the most common lean tools to be utilized and which has an impact on an organization's performance. In this context, waste is defined as unproductive manufacturing practices by which it does not add value to the product or services and customers are not willing to pay. A comparison of lean tools was made and discussed to analyse the effectiveness of the tool's performance.

21695: Laboratory Study Using LDPE Plastic Waste and Zeolite Stone on the Characteristics of AC-BC Mixtures

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Abstract: The problem that always appears in everyday life is the accumulation of waste around us, especially plastic bag waste. Plastic waste is a non-biodegradable waste and the best way to reduce plastic waste is to recycle or use it. Plastic bag waste is an LDPE type polymer where LDPE plastic has a low density, causing this material to receive traction or stress. The research was conducted to determine the effect of using LDPE plastic waste and zeolite stone by using it as a substitute for the Laston AC − BC mixture. The variation used is 0%; 2.5%; 5%; 7.5%; 10% LDPE plastic waste and 25% zeolite stone. Based on the results of the study, the durability value of the variation of LDPE plastic waste was 0%; 2.5%; 5%; 7.5% with 25% zeolite stone obtained a value of 91.45%; 92.18% ; 92.10% ; 90.53% and can meet the required specifications 90% while for the variation of 10% LDPE plastic waste with 25% zeolite stone, 87.85% does not meet the required specifications. However, based on the results of research conducted using LDPE plastic waste and zeolite stone, it was found that these materials can be used as a substitute for the mixture of Laston AC−BC.

Keywords: AC − BC, LDPE Plastic, Zeolite Stone.

21224: Process Simulation of Fixed Bed Downdraft Gasifier for Rice Husks and Sawdust

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Abstract: The objective of the research was to figure out the performance of a fixed bed downdraft gasifier fed by mixtures of rice husk and sawdust using Aspen Plus simulation and to compare to the present work. The gasification model was applied with varying equivalence ratio, i.e., 0.23 to 0.35. The characteristics of the gasification temperature, syngas composition of CO, H2, CO2 and CH4 and the Lower Heating Value (LHV) were observed and studied. In addition, the mixtures of rice husk and sawdust fed by gasifier reactor model are analyzed. As seen from the comparison of simulation results and the referenced ones, the value of syngas composition in are comparable. The average deviation of CO and CH4 contents is slightly higher than the referenced ones. Meanwhile, the average deviation of H2 and CO2 contents are slightly lower than the referenced ones. Also, the simulation results showed that in the range of gasification temperature of 800 − 1000 0C, the content of CO increased while the compositions of CO2 and CH4 decreased. In addition, the composition of H2 reached its peak at the temperature of 900 0C. As a consequence, the measure calorific value of syngas reached its peak when the temperature and Equivalence Ratio (ER) were applied at 900 0C and 0.3 respectively. Also, the added volume ratio of sawdust on rice husk resulted in an encroachment on the calorific value of syngas. It also increased the content of CO and H2 and decreased the content of CO2 and CH4. These conditions showed that variating mixture of sawdust ratio would optimize the quality of syngas.

21678: Extraction of Bioactive Compound from Mangosteen Peel (Garcinia mangostana L.) Using Ternary System Solvent

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Abstract: 65% of the mangosteen (Garcinia mangostana Linn.) identified as waste from its peel. It has been reported that mangosteen peel extract contains bioactive compounds xanthones with therapeutic activity, especially α–mangostin. α–mangostin is a polyphenolic compound that plays as an antioxidant, anti–inflammatory, anti–cancer, antidiabetic, antibacterial agent, etc. Various research extraction methods have been conducted to produce a good yield of bioactive compounds. This study aims to determine the effect of the ternary system solvent on the antioxidant activity of mangosteen peel extract. In this study, mangosteen peel extraction was done by a simple Liquid–liquid Extraction (LLE) method using a choice of ternary system solvent by heating and shaking. The solvents used are 96% ethanol, isopropyl alcohol, and ethyl acetate, which are added with hexane and H_2O mixture and will form two solvent layers. Extraction was performed at operating temperature conditions of 40°C, a solid to solvent ratio was 1:20 (w/v), and the extraction time was 1 hour. The soluble solids content was determined by the gravimetric and the antioxidant abilities tested using the DPPH method (1,1–diphenyl–2–picrihidazil). The results showed the best antioxidant results in the solvent mixture isopropyl alcohol: Hexane: H_2O 1:1:1 upper fraction, with extract yield values of 17.52% and %DPPH inhibition of 60.42 for 20 μg/mL extract. In comparison, the α–mangostin standard has a DPPH inhibition value of 24.737% for a concentration of 20 μg/mL.

Keywords: mangosteen, Garcinia mangostana Linn., α–mangostin, Liquid–Liquid Extraction (LLE), extraction method

21381: Utilization of Mangosteen Pericarp Extract (Garcinia mangostana L.) as Herbal Medicine Using Microwave–Assisted Extraction (MAE) Method

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Abstract: Mangosteen pericarp (Garcinia mangostana L.) has been known as a source of bioactive compounds with broad medicinal effects, such as antioxidant properties. In this study, mangosteen pericarp was extracted to obtain the extract with the best antioxidant activity using the microwave–assisted extraction (MAE) method. The results obtained were extracts with a yield value of 14.306 % w/w dried mangosteen powder with % DPPH (1,1–diphenyl–2–picrylhydrazyl) inhibition was 61.758 for 20µg/ml extract. The extract was obtained at an operating temperature of 70ºC, solid to solvent ratio of 1:10 (w/v), power of 450 W, irradiation time of 6 minutes using 95% ethanol as solvent. The effect of using single-phase and two-phase solvents was also studied. The single–phase solvents used were ethyl acetate (EtOAc), 95% ethanol (EtOH), isopropyl alcohol (IPA). Meanwhile, a two–phase system was created by mixing water and EtOAc, and the effect of adding EtOH or IPA to the two–phase system was investigated. Two–phase solvents produce extracts that are in the top phase and bottom phase. At operating temperature 60ºC, solid to solvent ratio of 1:10 (w/v), power of 450 W and radiation time of 6 minutes, the best extract was obtained from a mixture of EtOAc:EtOH: water 2:1:2 (v/v/v) bottom phase with yield value of 14.670% and % DPPH inhibition was 57.437 for a concentration of 20µg/ml extract.

Meanwhile, under these working conditions, the extract from EtOH was only 53.729, and pure α-mangostin, an antioxidant compound found in the mangosteen fruit, was only 24.737 for a concentration of 20µg/ml.

Keywords: α–mangostin, antioxidant, bioactive, microwave–assisted extraction, two–phase solvent

21403: Alkyl Polyglucoside from Tapioca Starch as Emulsifier for an OW Emulsion

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Abstract: Sugar-based surfactant, alkyl polyglucoside (APG), has been developed for years. The Fischer synthesis was used as a base in the development of APG. In this research, tapioca starch was employed as a carbohydrate source to form APG. Two steps transacetalization process was selected as the main reactions. Butanol ($C_4H_{10}O$) and Decanol ($C_{10}H_{22}O$) were employed as short- and long-chain alcohols. The varied variables were the mass ratio of starch (S) and butanol (C4) in the butanolysis stage (1:2 and 1:5) and transacetalization temperature (TTA = 110 and 150 oC). The highest yield of APG was obtained at 75.7% when the S:C4 = 1:5 and transacetalization temperature was 150 oC. Based on the HLB of APGs, almost all APGs were categorized as water-dispersible surfactants, while APG (S:C4 = 1:5 and TTA = 150 oC) was categorized as water-soluble (hydrophilic) surfactant. Thus, this APG was suitable for emulsifiers for O/W (Oil-in-Water) emulsion.

21693: Cashew Nut Shell Liquid (CSNL) As A Renewable Adhesive

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Abstract: Cashew Nut Shell Liquid (CNSL) is a renewable resource produced from agricultural by-products of the cashew nut processing industry. It contains some components, such as anacardic acid, cardol, cardanol and 2-methyl cardol. The CSNL-based adhesive (novolac resin) can be synthetized from CSNL through epoxidation and polycondensation. This study evaluated the effect of volume ratio of CSNL to peracetic acid (on epoxidation) and volume of formaldehyde (on polycondensation) on the adhesive strength and density of novolac resin. The epoxidation reaction process was carried out at 80°C with constant stirring at 500 rpm for 30 minutes. Polycondensation was carried out at constant stirring at 500 rpm and a temperature of 30°C for 120 minutes. Resin sampling was carried out periodically at 30-minute intervals. The adhesive strength values for the volume ratio of CSNL to peracetic acid 1:1 at the reaction time of 30 and 120 minutes were 0.0907 kN/m2 and 0.2352 kN/m2, respectively. At a higher ratio (5:1 ratio), the adhesive strength of novolac resin at 90 and 120 minutes were about 9.1591 and 9.2943 kN/m2, respectively. For varied volume ratio of CSNL to peracetic acid, the obtained density ranges from 0.7753 g/cm3 to 1.1654 g/cm3. In the polycondensation with 4 mL of formaldehyde, the optimum time was 60 minutes with an adhesive strength of about 14.340 kN/m2. The density of novolac resin for the varied volume of formaldehyde was in the range of 0.8603-1.1926 g/cm3.

21319: Utilization of Styrofoam Type Waste into Fuel Oil by Pyrolysis Method

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Abstract: This study aimed to determine the ratio of catalyst and styrofoam mixture, which produced the optimum pH, the weight ratio of catalyst and pyrolysis temperature, which produced the volume of kerosene, the ratio of catalyst, and styrofoam mixture, which produced the highest kerosene. This research method consisted of; first, preparing tools and styrofoam materials as much as 250 grams and has been cut by ± 2 cm. Then, the material was put into the pyrolysis reactor and run according to the time variables of 30 minutes and 60 minutes, and the temperature variables were 250ºC, 350ºC, and 450ºC. The research results in pyrolysis liquid from styrofoam waste had a heating value of 42.238 J/gr. The best flame test was at a variable of 60 minutes 450º C. The fire was orange and produced smoke. If the temperature of the pyrolysis process was higher, the fire would ignite faster so that the phenomenon would occur. The highest volume pyrolysis liquid was 60 minutes at 450ºC at 83 ml. The lowest volume was 30 minutes at 250ºC, the highest density was 60 minutes at 450º C at 0.87966667 J/gr, and the lowest density was 30 minutes at 250ºC at 0.83933333 J/gr, the highest calorific value pyrolysis liquid was 60 minutes at 450ºC at 42.238 J/gr, and the lowest calorific value was 30 minutes at 250ºC at 35.348 J/gr. The gas chromatography test with the highest composition was found in benzene at 26.36%, and the lowest composition was in eicosane at 4.31%.

Keywords: Fuel Oil, Plastic Waste, Pyrolysis

21703: Synthesis and Characterization of Poly–lactic Acid (PLA) Biocomposites Reinforced with Rice Husk and Clay

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Abstract: The use of non-biodegradable plastic causes piles of plastic waste that will pollute the environment for a long time. Poly–lactic acid (PLA) is considered a green polymer due to its biodegradability and biocompatibility. However, there are some limitations in applying PLA as a bioplastic. The use of rice husk microcrystalline cellulose (MCC) and clay as fillers are considered possible routes to improve the characterization of PLA biocomposite. Extraction of MCC was carried out by several process, namely: alkali treatment, bleaching process, and acid hydrolysis. Morphological analysis of MCC was observed using Scanning Electron Microscopy (SEM) showed that MCC is short, irregular, and rough. Fourier Transform Infrared (FTIR) spectroscopy showed the removal of non-cellulose constituents. Furthermore, fabrication of PLA biocomposite was done by solvent casting method. The response of the developed biocomposite resulted in high water absorption properties with the addition of filler. The results are accordance with the rate of biodegradation of biocomposite films which can be observed through burial in the soil. In addition, this study presents a slight improvement in the characterization of mechanical properties,

namely PLA/10% Clay and PLA/10% MCC have higher strain than pure PLA.

20917: A proposed prototype of TRIZ mobile application in Business and Management

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Abstract: This study aims to propose a prototype of a mobile application for TRIZ implementation in business and management. It focuses on the implementation of contradiction matrix to solve the problem of how to increase interaction between users and the system. TRIZ, as a tool for inventive problem solving, was originally used in engineering and technology. Since 1999, TRIZ has been introduced to one of the non-engineering areas, namely business and management. The study and application of this area is wider and continues to grow. It indicates a great opportunity to accelerate broader adoption. TRIZ has provided 40 Inventive Principles that can be used for idea generators in finding solutions to the problems at hand. Its application uses a Contradiction Matrix (CM). The implementation can use software designed to provide convenience in learning and using TRIZ. Some software is openly available. However, in the business and management fields, it is still limited. The initial design of the prototype was determined through a review of three existing systems. This prototype will be designed to increase the interaction. The design is taken from the results of the existing systems review. The interaction between features is described using the Function Model. Testing the prototype using Diagnostic Analysis using the Ideality formula. The result shows that a more detailed features lead to less interaction. Therefore, the features must be reduced.

21397: Portrait vs Landscape: A User Experience Analysis in Education based Mobile Learning

Sunardi, GG Faniru Desak, Rudi Bachtiar, Christianna Wulan Sari

Binus Online Learning, Bina Nusantara University

Abstract: This study aims to determine the user experience related to the screen orientation used during mobile learning–based education. The research method used is a mixed–method, which is a mixed method of quantitative methods with research instruments, which is system usability scale questionnaire (SUS) and qualitative methods with interviews to the experts. Respondents who were tested on the questionnaire were online learning students majoring in information systems, totaling 100 respondents, while respondents during interviews were resource persons related to research. In testing with quantitative methods, it was found that the usability scale system in portrait mode had an average score of 81,825 with an Excellent rating classification, while landscape mode had an average score of 76.3 with a Good rating classification. Both orientations are acceptable, but a better experience is obtained when using portrait mode. From the interviews, it was found that screen orientation affects the user experience when using eLearning content. Therefore, portrait orientation is recommended and desirable in determining learning methods, content, and platforms that accommodate eLearning content.

Keywords: Portrait, Landscape, Mobile Learning, Education, User Experience, System Usability Scale

21183: A Survey on Top-Ranked Android Traveling Applications to Assist in Planning Itineraries

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Abstract: Having application to support traveling becomes increasingly a standard for someone who wants to visit places either for pleasure or work. It normally assists the traveler when searching for places to go, airfare tickets, hotels, activities to do, and creating an itinerary before departure until arrival. This paper presents a survey on several Android applications for traveling purposes. The survey focuses more on how the applications provide a complete itinerary to ease users prior to their trip. Among eight applications that were reviewed systematically, the main findings are one application provides automatic itinerary creator, one application focuses on the local destination, five applications support for review and rating, one application has the ability to calculate the cost, and thus, there is a need to have a smart itinerary generator for local destinations within a traveling application. Smart itinerary means the application can generate the best itinerary based on user needs, including the estimated expenses.

21277: Usability Evaluation on Pre-Worker eLearning Websites

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Abstract: The COVID–19 pandemic is a world disaster that has been implicated in all sectors. This has resulted from a surge in the open unemployment rate in Indonesia. One of the government's programs to improve capabilities and competitiveness is by launching a Pre–Worker Training program. The training program is relatively new when it conducts in the eLearning approach. The purpose of this study is to evaluate the usability of eLearning websites as media to reskill and upskill pre–worker. The methodology is used by ISO 9241:11 and the Nielsen Usability Evaluation. Research activities were conducted in the virtual lab to evaluate five aspects of usability, four famous eLearning websites, four big tasks, with twenty participants. From the tasks given, the eLearning website is compared and resulting 5 aspects and provides some suggestions inefficiency factors, that correlates with the sign-up or login process task. The memorability factor, that correlates with the path to access eLearning websites task, and The user satisfaction, that correlates with the User Interface from eLearning websites to align between company identity and pre-worker-specific persona. Further research is also necessary since the program still going and increasing.

20896: Virtual Reality in Tourism: Content Quality or System Quality? Evidence From New Zealand Tourism Destination

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Abstract: The increasing popularity of virtual reality during the covid–19 pandemic creates new opportunities for the New Zealand tourism industry. The aim of this study is to investigate the role of VR system quality and content quality in influencing satisfaction and behavioral intention toward VR tourism destinations in New Zealand. The data were collected from 185 tourists who have experienced visiting VR tourism destinations in New Zealand. The Qualtrics software with a self-administered method was used to gather the data through Amazon Mechanical Turk (M- Turk). To test the hypothetical relationships, the Partial Least Square Modelling software was employed. The result indicates that VR content quality has a direct influence on behavioral intention. This study emphasizes VR system quality and VR content quality in creating satisfaction and behavioral intention of VR tourism destinations visitors in New Zealand. It also provides additional knowledge about the role of the tourist experience in VR tourism and gives in-depth knowledge for VR tourism practitioners to build VR tourism strategies that can create tourist satisfaction and behavioral intention.

21666: Online Attendance System Implementation in Pandemic Era Using ITIL CSI

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Abstract: The COVID–19 pandemic has forced many businesses to change. Work From Home becomes a new trend in the business world. One of them is the usage of mobile device-based online attendance system to control the attendance of employees who are WFH. Newly implemented system, requires its users' adaptation. Therefore, it is essential to apply change management at the time of implementation, even though the users are WFH. The purpose of this study is to evaluate the use of change management to facilitate the new attendance system implementation for WFH users. The main methodology used is ITIL–Continual Service Improvement. However, this methodology is adjusted to make it more appropriate to the user in pandemic era. The results of this study show that ITIL CSI can help companies to be able to implement the system more quickly, and help user to adapt to new system faster, even in work from home environment.

Keywords: ITIL, Change Management

21684: State Transition Diagrams for Business Process Flows Testing

Luthfi Anggy Kurniawan, Hanson Prihantoro Putro

Abstract: Software testing consists of reviewing software to determine whether it is functioning as expected or not. There are many testing techniques available. A tester should be able to choose the appropriate technique for each case at hand. Sometimes, testers find it difficult to test software, especially dynamic ones that describe the flow of an organization's business processes. This study focuses on testing the process flow in an information system and applying state transition diagram to test the transition between states. This research aims to determine how to properly test the business process flow of an information system using the state transition diagram and ensure the suitability of the business process flow. This stage of research begins with creating a state transition diagram based on the business process flow. Following the creation of the state transition diagram, the system will be tested. The final stage is to make changes based on the test results. The study concludes that the system, which was initially unable to handle business processes properly, has now succeeded in running precisely by the existing business processes. Tests and improvements have resulted in a system that is correct in terms of business process flow. Since state transition diagrams have proved successful in testing information systems, new guidelines for testing the transitions between states have been developed.

21708: Design and Implementation of Honeypot Indicator of Compromise (IoC) Profiling using Information Sharing Platform (MISP)

Hilya Qothrun Najahah, Muhammad Arfan Salamun,
Fadhlan Zaky Muttaqin, Nur Rohman Rosyid

Abstract: The Cyberthreat Defense Report by cyber–edge in 2019 mentions that the amount of attack data that needs to be analyzed becomes a problem that ranks first related to the obstacles experienced by organizations to improve the effectiveness of cyber–defense. This problem also occurs in the implementation of Honeypot as a security sensor. The amount of data generated and not identified causes honeypot implementation to be less effective. Malware Information Sharing Platform (MISP) is a forum for malware researchers to share information related to incidents on cyber security. This study proposes an Indicator of Compromise (IoC) assessment method derived from Honeypot based on data correlation between Honeypot and MISP. MISP is used as an external feeder used to supply analytical data from organizations registered with the MISP. Profiling gives the IoC a numerical value (0–100) that can represent the level of risk. The profiling system built using python programming language and elastic stack framework in this study succeeded in creating a system that can collect, store, visualize, and assess IoC. This benefit can be used as a trigger for early warning systems for security threats to an organization to take rapid action against further security incidents.

21710: DNS Query Log Data Enrichment Based on Cyber Threat Intelligence

Luthfi Anggy Kurniawan, Hanson Prihantoro Putro

Abstract: DNS is an essential part of the internet; therefore, DNS security is a crucial issue that must consider. Performing log data analysis can anticipate DNS attacks. Log itself is a file that contains records of events that happen in a system. So, utilizing log data can help prevent and identify harmful activities that may occur in a system. Cyber threat intelligence provides current threat information; therefore, enriching data using relevant information can make data more proper. This research carried out enrichment mechanisms based on cyber threat intelligence. The system is designed to analyze and process DNS query logs and add some relevant information. This research aims to enrich the DNS query log with a series of information related to correlation events and the reputation of IP, and it can identify possible threats to DNS.

21591: Virtual University Tour Using 360-Degree Technology and Interactive Virtual Tours to Present Academic Atmosphere

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Abstract: Currently, due to the spread of the Covid-19 virus, the government has imposed restrictions on community social activities, as well as teaching and learning activities at schools and universities. This also has an impact on student learning activities, teaching process, and administrative processes are carried out online. Even the new students have never seen the school/campus. This of course, has an impact on providing an academic atmosphere for students, because students will conduct study from home. Another impact is on the promotion of school/university in the community, especially for prospective students, schools/campuses are no longer able to promote their facilities and infrastructure. Therefore, this study will develop an interactive virtual school/university tour application that provides information about information on existing facilities at the school/university in the form of 360-degree images and videos, virtual tour guides (sound), and interactive tours. It is hoped that the application made can provide integrated and interesting information for students about the school/university. As a case study, the information data used is Petra Christian University, Surabaya. The result from the questionnaire that given to respondents, it is known that this virtual tour media is very interesting as a tool to bring an academic atmosphere to students and prospective students (84.8%).

21300 : Photoplethysmograph-Based Real-time Emotion Recognition Using Logistic Regression with Heart Rate Changes Parameter

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Abstract. Emotion is a multifaceted phenomenon that plays a critical role in enhancing one's quality of life by influencing motivation, perception, cognition, creativity, empathy, education, and decision–making. Emotion is also closely related to stress regarding previous reports. Most reported studies use a long-duration of data recording and employ complex features to classify certain emotions. However, those systems are challenging to be implemented in a real-time environment. We proposed a low-cost real-time detection system that can recognize two basic emotions. Fifteen male university students participated in this study. To elicit various emotions, we provided pictures as the visual stimuli for six seconds during the experiment from the International Affective Picture System (IAPS) database that represented five fundamental emotions (happiness, sadness, fear, surprise, and anger). We proposed a single photoplethysmograph parameter, namely Heart Rate Changes (HRC), before and after viewing a picture's event. As a single parameter, HRC can be obtained in six seconds and utilized as an input of a classifier model. We employed logistic regression as a binary classifier to differentiate positive and negative emotions. We tested with 30%, 40%, and 50% test sizes data and obtained the best performance when recognizing positive (happiness) and negative (sadness) with 47%, 55%, and 57% regarding the AUC metric. We concluded that the HRC is sensitive to sadness as negative emotion during this study rather than the others (fear and anger). Our proposed system has the possibility of real-time emotion recognition with further specific improvements for future studies.

21318 : Industrial Internet of Things for Condition-based Maintenance of an Induction Motor

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Abstract. Condition-based Maintenance is a type of maintenance based on collected information through monitoring of the machine condition. This system uses Node–RED in Raspberry Pi to read the parameter value in the PLC Siemens S7–1200. The parameter being read is the motor vibration, the motor temperature, and the motor load factor (only simulated). This system monitors the motor parameter, sends a notification to users, keeps the parameter value to the database, and gives the average parameter value on that day. The measured parameter enables the system to analyze the possible causes of the increasing parameter values. Based on the testing results, PLC succeeds in sending the data to the Node–RED, monitoring the online dashboard, performing condition-based maintenance process, storing the motor parameter to the database, and sending the alarm notification through an email or SMS for users who are connected to the internet. We perform the experiments using PLC's simulated inputs and outputs, as the sensor reading of motor data still cannot be done accurately.

21493 :Performance of Built Microclimate System Control Arduino-Based

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Abstract. The process of plant growth is strongly influenced by soil conditions, both temperature and humidity. The right soil temperature and humidity levels will support plant growth. However, sometimes plants wilt and die for unknown reason even though environmental conditions have been controlled automatically. Therefore, this research investigated the performance of a built control device that not only can be used to monitor and control the conditions of soil temperature and humidity, but also to analyse the performance of the control system and the controlled microclimate. A logger system has been embedded to save the history of control data. This system used DS18B20 sensor and the YL–69 sensor for the soil temperature and humidity measurement, respectively. The measurement results from both sensors were displayed on its LCD display and stored in the micro SD card. The system was set to irrigates the soil when the soil moisture is less than 60%. In addition, this control device was also equipped with an automatic air suction that is useful to help the temperature around the plant decrease quickly and work when the soil temperature exceeds 32°C. As the results, the soil temperature data obtained in this study were in the range of 23.94°C – 28.5°C and the soil moisture data obtained is in the range of 0.83 – 100%, indicating an over–watering. The further test proved that decreasing the number of sprayers could improve the irrigation quality. Furthermore, based on the calibration, the measurement system has a good accuracy of 99% and 96% for soil temperature and humidity, subsequently. Therefore, clearly, the system control worked as it was desired and by embedding the data logging feature, ease the performance analysis of the controlled microclimate and the
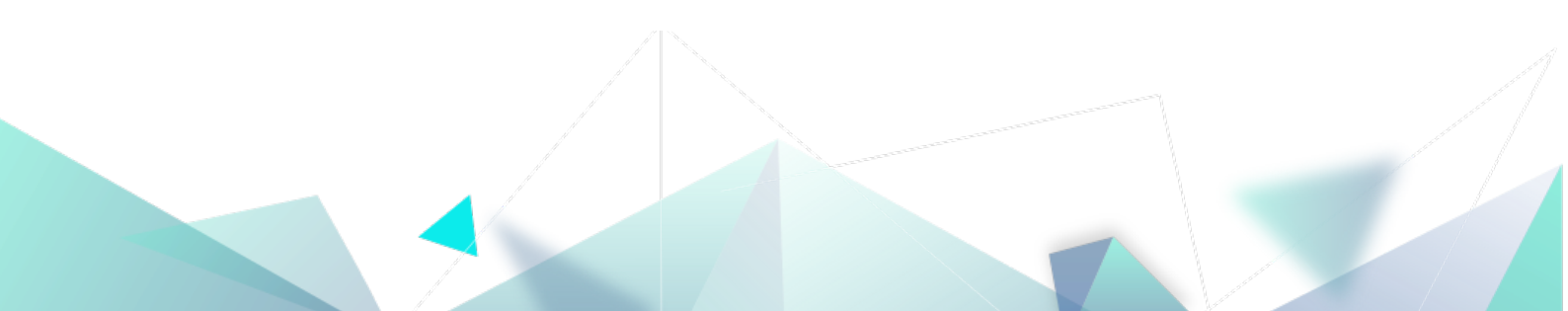
control system itself.

21688 : Design of Recirculating Aquaculture Monitoring System Based on Internet of Thing and Machine Learning Algorithms

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Abstract. Recirculating Aquaculture Systems is a fishery production system that reprocesses water used to meet water quality requirements for aquaculture activities. Several ways to improve water quality are by applying aeration, circulation, and controlling temperature properly. In this research, a system will be developed to monitor the quality of water quality in fishponds with recirculating aquaculture system (RAS) technology. The system consists of smart sensor modules supporting modularity, intelligent aeration system for controlling system, local network system, cloud computing system. Apart from that, the condition of the water environment will be visualized using mobile-based multidimensional data visualization technology. This visualization serves as the delivery of information or knowledge base. Thus, this system is able to anticipate the disruption of cultivation growth. This can also be monitored in real time, maintain the condition of the cultivation environment in order to be maintained according to the quality standards of aquaculture water, and obtain more optimal yields. This study aims to develop a product in the form of a prototype tool that is able to monitor and monitor water quality conditions automatically in order to be able to maintain the quality requirements of brackish water for cultivation using Artificial Intelligence of Thing (AIoT) technology.

21715 : Monitoring Systems Design and Data Acquisition on Powerhouse and Utility using MES Interface based on Programmable Logic Controller

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Abstract. This research has been conducted in a manufacturing industry company that produces automotive components for four-wheeled vehicles. The Department of Powerhouse and Utility has an important role, namely, to supply and serve all supporting needs other than raw materials and additives used for the production process, it is so that it can run smoothly and produce products according to predetermined standards. So far, the Powerhouse & Utility Department is still monitoring and retrieving data from the Power Meter manually. This condition has several drawbacks, namely: data collection is done manually by coming to each power meter post, totalling 63 posts. While the distance between posts has a long enough distance, where the furthest distance is 500 meters. Of the 64 posts, 4 posts are used for electricity payments, while the rest are used for internal analysis. Data collection is carried out 6 times a month and has the potential for human error to occur at the time of data collection. Therefore, we created a Monitoring and Data Acquisition system using a PLC–based MES Interface. The process of recording data and monitoring electricity usage can be done remotely and in real–time, namely through a server. Making a PLC program to read data from the Power Meter is made in the Mitsubishi Q03UDVCPU PLC using the Modbus RS–485 protocol and using Dedicated Instruction. Sending data from PLC to database using Intelligent Function Module MES Interface. Meanwhile, monitoring data is stored in a Microsoft SQL database using Open Database Connectivity as a gateway between the MES Interface and SQL Server. With this system, the process of recording and monitoring electricity usage can be done more effectively, and the data obtained is accurate.
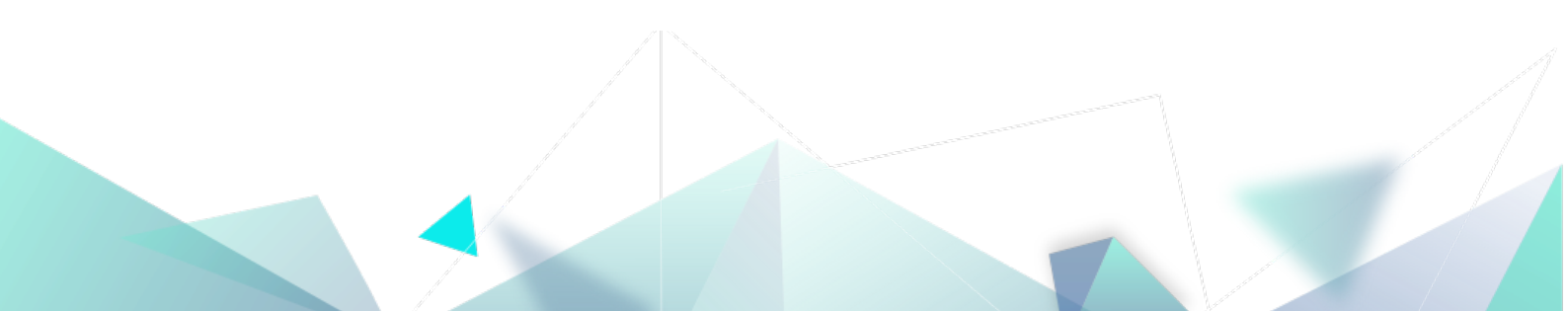
21275 : A Flight Control System in VTOL Plane for Waypoint Tracking Using LQR Method

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Abstract. The fixed-wing UAV vehicle can fly glide and has long-range roaming capability. On the other hand, rotary–wing UAVs can fly (hover) but cannot fly during fixed–wing. Fixed–wing rides can experience deviations when turning at large turning angles when doing waypoint missions. Deviations that occur due to maneuver limitations can be overcome by combining fixed-wing UAV and rotary-wing UAV types. The LQR control stabilizes both vehicle modes by processing multiple inputs for use on multiple outputs. System testing is carried out on the path tracking to find out the system's functioning, while the results of tests that have been carried out for three waypoint points were obtained, for the WP1 point to the WP2 point, and the deviation occurred by 3 meters. Then for the movement from the WP2 point to the WP3 point, the deviation is 2.5 meters. The ride time from the start point to the finish point is 30 seconds.

21717: Implementation of Support Vector Machine (SVM) Based on Particle Swarm Optimization (PSO) with Synthetic Minority Over-Sampling Technique (SMOTE) on Tweet Data

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Abstract. In the current period, almost all individuals utilize social media to discover information. One of them is Twitter. Many details can be obtained from Twitter about technological advances, such as the launch of the Livin' by Mandiri application by Bank Mandiri. The public submitted various positive, negative, and neutral comments, especially Bank Mandiri customers, regarding the application by tweeting it on Twitter. In this study, a classification analysis was carried out on these comments using two methods, namely the Support Vector Machine (SVM) and the SVM–Particle Swarm Optimization (PSO), to get the best performance and classification model. PSO–based SVM classifier is able to optimize SVM parameters to improve classification accuracy. The dataset used consists of 4,131 positive comments, 746 negative comments, and 5,746 neutral comments. Because there is an unbalanced amount of data, a data balancing process is carried out using the Synthetic Minority Oversampling Technique (SMOTE). However, the data analyzed are only positive and negative comments to see the tendency of people to have an opinion about the Livin' by Mandiri application. Compared to SVM, SVM–PSO provides the best classification performance with an accuracy of 98.77%, the sensitivity of 99.64%, specificity of 93.57%, the precision of 98.93%, F1 score of 99.28%, and AUC of 0.966. Based on the AUC value, the model is included in the excellent classification category, meaning that the model is good in classification accuracy and predicts positive and negative comments.

21360: Modified nanocellulose by Trivalent Cationic Ions as an Antimicrobial for Paper-Based Food Packaging

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Abstract. Paper-based food packaging serves to maintain product quality for a longer period.The addition of nanocellulose as a coating agent on paper can improve the quality of therecycled paper. Modification of nanocellulose with Al^{3+} can occur due to the interaction betweenAl3+ ions and the electrostatic negative surface charge of nanocellulose which can degrademicrobial cells. Modification of nanocellulose was carried out by soaking it in $AlCl_3$ solution thenhomogenized by an ultrasonic wave which was used for defibrillation of nanocellulose andencourage crosslinking of nanocellulose and Al3+ ions. The paper coating technique uses a deepcoating by immersing the paper in modified nanocellulose suspension. The variations of AlCl3concentration used were 0.01, 0.05, 0.1, and 0.15 N as much as 25 ml on 1 g dry basenanocellulose. The concentrations of nanocellulose used were 0.5, 1, 1.5, and 2 g in 25 ml of Al3+solution. The results of paper water absorption and WVTR test showed that modified nanocellulose can reduce the absorption of water vapor and water absorption from the paper, soit has water resistance. Nanocellulose coated can increase the hydrophobicity of the paper based on contact angle test. Antimicrobial test on coating paper also showed antimicrobial activity on E.coli test bacteria and not on S. aureus bacteria.

22164: Active and Intelligent Packaging Films based on Cassava Starch and Anthocyanins from Red Cabbage Extract with the Addition of Lemongrass Essential Oil

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Abstract. Red cabbage (Brassica oleracea L) has the ability to change colors under different pH conditions due to its anthocyanin content. On the other hand, lemongrass (Cymbopogon citratus) is known to have antimicrobial properties. Therefore, acitive and intelligent packaging films were produced based on cassava starch and red cabbage extract (RCE) with the addition of lemongrass essential oil (LEO). Effect of anthocyanin content and essential oil content on the physical, mechanical, and pH-sensitive properties of starch-anthocyanin-oil films were evaluated. Furthermore, starch-RCE-LEO films were used to monitor the freshness of fish fillet. The incorporation of RCE decreased the water vapour permeability and transparency of the films. On the other hand, the addition of LEO could decrease film moisture content but increasing its water vapour permeability. Starch-RCE-LEO films demonstrated the pH-sensitive property and could show various colors in different pH conditions. When used to monitor the freshness of fish fillet, starch-RCE-LEO films showed remarkable color variations with the change of quality of the fish fillet. The incorporation of LEO could prolonge the shelf life of the fish fillet. These results suggested the potential of starch-RCE-LEO film as active and intelligent packaging films in food industry.

Keywords: Brassica oleracea L; Cymbopogon citratus; Edible film; pH-sensitive; Smart packaging.

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