ICASMAT

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Universitas Airlangga Support
the Sustainable Development Goals

The 1ˢᵗ International Conference on
Applied Science,
Mathematics, and Technology

2021

"Innovative Research of
Applied Science, Mathematics, and
T**echnology** in New Normal Era for
Implementing Indusrty 4.0"

Book of Abstract

Surabaya, **October** 14ᵗʰ 2021

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Welcome Address from Chief Organizing Comitee

Assalamu'alaikum Warahmatullahi Wabarakatuh
Dear Presenters and Participants

First and foremost, it is my great pleasure to welcome all of our distinguished speakers, presenters, and participants to the International Conference Series held by Doctoral Program of Mathematics and Natural Sciences, Universitas Airlangga. This year, 1ˢᵗ ICASMAT 2021 take on the theme "Innovative Research of Applied Science, Mathematics and Technology in New Normal Era for Implementing Industry 4.0". This theme are inspired by the sudden outbreaks of the coronavirus 2019 (Covid-19) and how people have to deal with the massive changes in Industry 4.0. Thus, are mainly aimed to provide a sharing platform that enables researchers, academics, and practitioners to share their best practices which have been produced through research, as well as to propose the best strategy to help the society in coping with the crisis.

The 1ˢᵗ ICASMAT 2021 invite prominent scholars as keynote speakers who share their thoughts and expertise addressing this year's central theme. We proudly welcome Prof. M. Iqbal Choudhary from University of Karachi, Pakistan; Assoc. Prof. Dr. Sehanat Prasongsuk form Chulalongkorn University, Thailand; Prof. Hei-Chia Wang from National Cheng Kung University, Taiwan; Assoc. Prof. Herri Trilaksana, S.Si., M.Si., Ph.D. from Universitas Airlangga, Indonesia. We also have our homegrown experts, our honorable Dean of the Faculty of Science and Technology, Prof. Dr. Moh. Yasin, M.Si.

We are also happy to share that this year we received more than 40 papers to be disseminated in our conference. We do hope that after following the workshop on writing scientific articles and careful review, all papers are accepted to be published by reputable international publishers. Last but not least, representing the organizer, I wish you all good luck and have a great conference.

Wassalamu'alaikum Warahmatullahi Wabarakatuh

Ridho Alfarisi, S.Pd., M.Si.
Chairman

Rundown ICASMAT 2021
October, 14th 2021

Time (GMT +7)	Event
07.30 – 08.00 AM	**Plenary Session Registration**, click Zoom Meeting Link: https://zoom.us/j/95747732548?pwd=ZHFxbm5od0NZMVA0OUpjOUJMNERIdz09 Meeting ID: 957 4773 2548 Passcode: ICASMAT21
08.00 – 08.20 AM	**Opening Ceremony:** - Singing Indonesia Raya (National Anthem) - Singing Hymne of Universitas Airlangga - Welcome Address Chief Organizing Comitee ICASMAT 2021 by Ridho Alfarisi, S.Pd., M.Si. - Welcome Address by Dean of Faculty Science and Technology Universitas Airlangga by Prof. Dr. Moh. Yasin, M.Si.
08.20 – 08.35 AM	**Do'a (Reading Prayer) dan Photo Session**
08.35 – 09.15 AM	**Plenary Session 1:** Prof. Hei-Chia Wang National Cheng Kung University, Taiwan
09.15 – 09.55 AM	**Plenary Session 2:** Herri Trilaksana, S.Si., M.Si., Ph.D. Universitas Airlangga, Indonesia
09.55 – 10.05 AM	**Question & Answer Session**
10.05 – 10.45 AM	**Plenary Session 3:** Prof. M. Iqbal Choudhary University of Karachi, Pakistan
10.45 – 11.25 AM	**Plenary Session 4:** Assoc. Prof. Dr. Sehanat Prasongsuk Chulalongkorn University, Thailand
11.25 – 11.35 AM	**Question & Answer Session**
11.35 AM – 12.35 PM	**Break**
12.35 – 12.40 PM	**Break out room opened**
12.40 – 14.40 PM	**Parallel Session dan Photo Session** (Breakout room)
14.40 – 14.45 PM	**Closing Ceremony by Moderator** (Parallel session)
14.45 – 15.00 PM	**Closing Ceremony by MC** (Main room)

Table of Abstract

The Intelligent System For Our Life and Its Possible Future Work

Hei-Chia Wang*
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Abstract. Industry 4.0 is a widely discussed term. Many documents share the idea of how it can affect manufacturing factories. We all know that the manufacturing industry has big changed across these years because of industry 4.0. However, industry 4.0 is not limited to be adapted for manufacturing only. It impacts in many ways, including our life. In this talk, we will share the possible impacts on our life. Based on that, we will also discuss the possible research domain related to the changes. The trends of the research domain will also be listed. This talk aims to explore those possible research issues. Examples happened in Taiwan will be used as examples to demonstrate the industry 4.0 impact in our life. Finally, I will present one of my research regarding the intelligent system for our life and its possible future work.

XPS and NICISS as a Combined Spectroscopic Technique for Atomic Investigation

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AbstractX-ray Photoelectron Spectroscopy (XPS) also known as Electron Spectroscopy for Chemical Analysis (ESCA) is the most widely used surface analysis technique because it can be applied to a broad range of materials and provides valuable quantitative and chemical state information from the surface of the material being studied. On the other hand neutral impact collision ion scattering spectroscopy (NICISS) is a powerful spectroscopic technique in microanalysis and characterization of materials, allows for depth profiling of a sample giving an elemental concentration profile to a depth of 40 nanometres, with a depth resolution close to 0.3 nm near the surface. NICISS can be applied to solid samples, polymers and liquids. It is one of the most sensitive spectroscopic techniques associates with the light atom targets. In this study, the use of both XPS and NICISS to investigate the presence of dye molecules in the surface and interface of the application of dye sensitized solar cells is presented.

Keywords: XPS, NICISS, Dye Sensitized Solar Cells

Natural Products –Potential Sources of Therapeutic Molecules

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Abstract. Sciences at the interface of chemistry and biology have created opportunities for the identification of lead molecules against various therapeutic targets. For centuries, natural products have served as key sources of therapeutic agents, and still many of the current drugs are derived from medicinal plants. However, synthesis of natural products is still a challenging task due to various reasons, including structural and stereochemical complexities, and low yields. These problems can be overcomed with the help of biocatalysis and combinatorial biosynthesis, as enzymes have high selectivity and specificity, and can work under mild conditions in both organic and aqueous media.

During the last four decades, our research group has focused on the discovery of chemical constituents from plants used in traditional medicines, as well as on the development of new biotransformed products with therapeutic potential. This has resulted in the identification of several novel lead molecules as therapeutic agents against various diseases.

Our most notable contributions, in the broad areas of Bioorganic and Natural Products Chemistry, are the use of structural diversity of natural and synthetic compounds, combined with the understanding of drug targets to discover lead molecules with potential to be developed as effective pharmaceutical agents. These include discovery and development of two most potent anti-epileptic natural products (Isooxylitones A and B), patented in internationally, from a local medicinal plant Delphinium denudatum, which has attracted a major global attention, and are currently in the second phase of clinical trial.

Enzymes are fascinating molecules which modulate the entire machinery of life. Their overexpression leads to the onset of innumerable diseases. Our research group has studies and discovered novel inhibitors of clinically important enzymes, which can be used to halt the molecular cascade involve in the enzyme-related disorders, such as Alzheimer's diseases, diabetes, and ER+ breast cancer. As a result, several new classes of lead molecules were introduced to the world literature, along with associated understanding of their mechanisms of action. Some of the internationally recognized discoveries of our research group include the discovery of novel classes of aromatase, acetylcholinesterase, urease, and α-glucosidase inhibitors, and immunomodulatory agents.

During this presentation, several recent examples of our studies highlighting the translational potential of bioactive natural products, and biotransformation against several diseases will be presented.

The Black Yeast Aureobasidium spp. and their Applications in Biotechnology

Sehanat Prasongsuk

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Abstract. A number of tropical strains of Aureobasidium spp. in Thailand were successfully isolated from various vicinities with diverse species including A. pullulans, A. aubasidani, A. melanogenum and a novel A. thailandense. This black yeast produce a variety of products such as exopolysaccharides (pullulan and ▯-glucan), biomass-degrading enzymes (mainly xylanase and xylosidase), biosurfactant, siderophore and antibiotics. The production of these products was optimized and also investigated for their potential in a range of applications. Therefore, the potential of this tropical black yeast in biotechnology will be presented herein.

Keywords: *Exopolysaccharide; Enzymes; Aureobasidium; Biotechnology*

Determination of Levels of Heavy Metals in Some Selected Traditional Medicinal Plants in Wolaita Zone, Southern Ethiopia

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Abstract. Medicinal plants have worldwide applications in the treatment of different types of human diseases. The purpose of the current study was to determine the concentration of selected essential and non-essential metals; Na, Ca, Cu, Fe, Zn, Mn, Cr, Ni, Cd, and Pb in traditional medicinal plants (Artemisia afra (ariti), Hagenia abyssinica (kosso enchet), Foeniculum vulgare (Ensilal), Echinops kebericho (qeberecho)) grown in Wolaita Zone, southern Ethiopia. A wet digestion procedure involving the use of mixtures of (69-72%) HNO_3 and (70%)$HClO_4$ at an optimum temperature and time duration were used to isolate metals from the medicinal plants by using FAAS.Based on the results, the concentration of Ca ranged from 1.75 mg/kg to 4.98 mg/kg, the concentration of Mg ranged from 1.35 mg/kg to 2.22 mg/kg, the concentration of Na raged from 1.29 mg/kg to1.80mg/kg, Mn ranged from 0.09 mg/kg to 1.21 mg/kg and that of Fe lied in range of 0.23 mg/kg to 0.78 mg/kg in the plants studied. Among the toxic heavy metals, the concentration of Pb was in the least range (0.08 mg/kg to 0.11 mg/kg) and the levels of remaining trace metals were in the ranges of 0.54-0.97 mg/kg, 0.25-0.29 mg/kg and 0.20-0.33 in Zn, Cd and Cu respectively. None of the studied samples were found to contain Cadmium, Copper and Nickel concentrations in above WHO/FAO limits for safe human consumption (25, 40 and 5 mg/kg respectively) Further studies should be continued on the screening of phytochemical activities and compound isolation of the plants under study.

Keywords: Elemental analysis, Medicinal plants, Atomic Absorption Spectroscopy, Essential Metals, WHO limit

Structural Equation Modeling on The Post-Flood Regional Public Welfare in South Kalimantan

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Abstract. This research was conducted to know the structural equation model on the level of public welfare in the flood-stricken area of South Kalimantan in early 2021. The method and analysis used in this study is the Structural Equation Model (SEM) modeling analysis with the Partial Least Square (PLS) approach to test the suitability of the post-flood community welfare model in South Kalimantan. The data collection technique in this study used a questionnaire to the people in areas that were victims of floods in South Kalimantan.

Keywords: structural, Equation, modeling, sem

Thermal Properties of (2+1) Dimensional Relativistic Oscillator in Noncommutative Space

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Abstract. In this framework, we study 2+1 dimensional oscillator in the presence of a uniform magnetic field in the noncommutative space. Where the energy spectrum and the wave function are obtained analytically using a simple method.Furthermore,we investigate the thermodynamic properties of the studied system which has been influenced by the studied geometry..

Keywords: *noncommutative space, thermodynamic properties 2+1 dimensional oscillator*

The Effect of Sucrose Content And Photoperiod on the Growth of Synthetic Seeds of Stevia Rebaudiana Bertoni

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Abstract. One of the techniques for in vitro propagation of Stevia rebaudiana is using synthetic seed technology. Synthetic seeds are defined as encapsulated explants such as somatic embryos, shoots, aggregates or other tissues that have the ability to develop into plants in in vitro or ex vitro conditions and can retain their potential after storage. This study aims to determine the effect of sucrose content and photoperiod on the growth of synthetic seeds of Stevia rebaudiana Bertoni. The planting material used was the shoots of Stevia rebaudiana, which were encapsulated using 4% sodium alginate and 75 mM $CaCl_2$. The encapsulated seeds were placed on MS medium and given photoperiodic treatment for 24/0 hours light / dark, 16/8 hours light / dark, 6/18 hours light / dark and 12/12 hours light / dark and were treated with sucrose content i.e. without sucrose (0%), sucrose 3% and sucrose 4,5%. The research parameters used were the number of germinated seeds, the percentage of synthetic seed germination, the number of leaves, the height of the plantlets and the number of roots. Sucrose content in the medium and photoperiod affected the number of germinating seeds, percentage of seed germination, number of leaves and plantlet height optimally in the photoperiod treatment of 12/12 hours of light/dark and sucrose content of 3%. However, the sucrose content in the medium and photoperiod did not affect the number of roots.

Keywords: Growth, Photoperiode, Stevia rebaudiana, Sucrose content, Synthetic seed

Modeling The PISA's Score of Indonesian Students Using Multivariate Generalized Linear Model

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Abstract. The Multivariate Generalized Linear Model applies a lot in data science. However, this model is still less discussed in education, specifically in data analysis in the Program for International Student Assessment (PISA), which has complex structure data. This study aims to analyze the factors that influence the PISA's scores of Indonesian students simultaneously covering the three subjects of the PISA assessment, namely mathematics literacy, science literacy, and reading literacy. The complexity of PISA data which involves multivariate response variables which assumes a correlation between response variables, adds to the complexity of the analysis. One approach is the Multivariate Generalized Linear Model with the Quasi Likelihood estimation method. Took the data sources from the PISA survey was conducted by Organization for Economic Cooperation and Development in 2018. This study indicates that the factors that influence the PISA's scores of Indonesian students simultaneously are the class taken, parental education, facilities at home, student discipline, teacher feedback during learning, age of entering kindergarten, and failing a grade during elementary school. Based on the model diagnostic, it can conclude that Multivariate Generalized Linear Model produces a model that fits in modeling the PISA's scores of Indonesian students

Keywords: *Indonesian Students PISA's Score, Model Diagnostic, Multivariate Generalized Linear Model, Quasi Likelihood*

Eco-Detergent : Biodegradable Detergent from Corn Stover (Zea mays L.) and Lerak Fruit (Sapindus rarak DC) as a Water Friendly Solution

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Abstract. One of the agents causing water pollution in the environment is chemical detergent. Detergents are active ingredients in household products that are used as cleaners with chemicals that are difficult to degrade naturally and can cause pollution that can be harmful to living things. The combination of using natural detergents from corn stover (Zea mays L.) and lerak fruit (Sapindus rarak DC) which contains saponins as surfactant agents can be used as natural cleansers and is degradable. The research method used is extraction to produce liquid components, foam test, foam stability test, and pH test. The results obtained in the form of saponin components found in corn stover. Saponin content was 28% in lerak fruit with the highest foam height 2.7 cm in test tube number two and pH of lerak solution 5 while the pH of lerak foam was 6. Liquid detergent from corn stover and lerak fruit can be used as an environmentally friendly liquid detergent and can be used as an environmentally friendly liquid detergent. Become the future biodegradable detergen

Keywords: corn stover, lerak fruit, detergent, saponins

Visual Explanation of Maize Leaf Diaseases Classification using Squeezenet and Gradient-Weighted Class Activation Map

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Abstract. Maize is the second most important agricultural commodity after rice. In Indonesia, maize is an alternative complimentary food, even in some areas it is used as the main food. The future prospect, maize production was increased for national sufficient. However, there are obstacles for achieving it. One of them is the attack of pests and diseases. In this article, image classification on maize leaf diseases is presented. Image classification is a common task when performing image mining. However, classification without a visual explanation certainly makes it difficult for the user to understand the results of the task. This article aims to classify as well as visually explanation the abnormality or emergence of diseases in maize leaf. The research is divided into 2 steps: classification and visual explanation. Classification uses Convolutional Neural Network (CNN) Squeezenet while visual explanation uses Gradient-Weighted Class Activation Map (Grad-CAM). The data experiment used from PlantVillage dataset with 4 classes: healthy, blight, spots, and rust. The percentage of training and testing data was 80:20. Validation using 10 fold cross-validation. The novelty was apply the visual explanation using GradCAM on maize leaf diseases. Performance Measure for classification are 95.2%, 94.03%, and 94.28% for accuracy, precision and recall, respectively..

Keywords: Visual explanation, Squeezenet, Image Classification, Grad-CAM, Maize Diseases

Feature Selection to Increase the Attractiveness of Visitors in Bangkalan Tourism, Madura Based on Chi-Square Method

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Abstract. Visitors in traveling to a tourist attraction have several criteria in determining the features that influence in increasing the attractiveness of tourist attraction visitors. There are several types of tourist objects in the Bangkalan area, Madura, including: natural, religious and artificial attractions. And each tourist attraction has several features to attract visitors, including several public facilities at the tourist attraction, the trend of entrance ticket sales, management services, tourist attraction names, number of visitors, background, age of visitors, time limit for visits, discounts. admission ticket, gender of visitor. From the complexity of the features involved, it causes visitors to have difficulty in making decisions to determine the destination tourist attraction. Therefore, in this study, the chi-square method was used to perform feature selection. The chi-square method is a data analysis method that performs comparative hypothesis testing based on an average of k independent samples with each sample containing several classes or categories. The contribution of this study is to determine the destination of tourist objects with influencing features, using the chi-square method to produce dominant features and reduce features that do not have an effect. From the sample data of the Bangkalan Tourism Office, Madura, it shows that 10 features for 21 attractions and 3 types of tourism objects based on the learning process with 105 datasets, there are 4 features that are very influential and meet the rejection criteria of $\alpha = 0.05$ and the accuracy result is 76.19%. This proves that the chi-square method is able to provide better results in selecting features that are very influential in determining tourist attractions that have a lot of visitors. Keywords: Feature Selection, Improvement, Tourist Attraction Visitors, Method, Chi-Square.

Keywords: *Feature Selection, Improvement, Tourist Attraction Visitors, Method Chi-Square*

Design of K-Means Method Segmentation for Visitor Characteristics of Bangkalan Cultural Heritage Tourism

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Abstract. Tourism is a travel activity that is carried out temporarily with the aim of fulfilling curiosity, spending time off or leisure and other purposes. Indonesia has a lot of potential and natural resources to be developed into an attractive tourist attraction. And some of these natural resources have been utilized and developed into some very interesting tourist objects, especially in Bangkalan Madura. And the tourism sector is one of the sectors of economic development. Therefore, in this study it is necessary to strive optimally in developing tourism objects in the segmentation field. The segmentation that will be made is a mapping system that can help classify the number of tourist attraction entrance tickets into three classes, namely high, medium and low classes. The system that will be made is web-based to make it easier for tourism object managers to analyze tourism potential in classes. The importance of analysis and modeling in the problems in the development of this mapping system, so that it can be used in the analysis for the development of tourism potential in Bangkalan, Madura. In this study, we propose a modeling stage using the K-Means method. The contribution of the system design is that the segmentation of tourist attraction visitors using the K-Means method can help the tourism object manager in developing existing tourist attraction facilities so as to increase the number of visitors. To strengthen this contribution, the design of this system is carried out in the stages of problem identification and survey, data collection, literature study, design and implementation. The results of testing the effectiveness of this system using a Likert scale of 1 to 5 with 63 respondents and resulting in 74.60%. This shows that the design of the mapping system of visitors who come to Bangkalan, Madura tourism objects is very influential on the development of facilities and infrastructure according to the needs of market segments. Keyword: Design, Segmentation, Visitor of Tourism, Method, K-Means.

Keywords: *Design, Segmentation, Visitor of Tourism, Method, K-Means*

The Design of The Least Square Method on Sales of Admission Tickets to Madura Tourism in Forecasting Cases

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Abstract. The prediction system that will be made is a system that can help provide forecasts of tourism ticket sales in the future. The system that will be made is web-based so that it can be easier to use. The importance of analysis and modeling in problems in the development of prediction systems, In order to provide references and instructions to developers in making the system. This research proposes the stages of modeling in designing the system including problem identification, data collection, literature study, analysis, and design. In knowing the core of the problem, it is done to collect information related to the problem with interview and observation techniques. Followed by collecting tourism data on all tourism in Bangkalan district and also collecting literature studies related to the least square method. The result, the breakdown of system requirements at the analysis stage. Finally, the system design is conducted in the form of use case diagrams.

Keywords: *Modeling system, Forecasting, Least Square Method, Ticket sales*

Prediction of Corn Crop Yield Using Back propagation Neural Network Algorithm

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Abstract. Corn is one type of food crop commodity in Indonesia. Malang Regency is one of the producers that ranks 10th in corn production in the East Java region. People are very interested in planting corn because this crop commodity has many benefits so as to make the demand for production increase. There was a significant increase in market demand, but the uncertain amount of production made the supply of corn plants unable to be fulfilled properly. In this study, it predicted the demand for corn by using the Backpropagation Neural Network algorithm in Malang Regency. The data in this study were obtained from the Department of Agriculture and Food Security of East Java Province starting from 2007-2020 every month using maize data from the Malang area. The results showed that the backpropagation algorithm produced an MSE value of 0.00004178.

Keywords: *Prediction, Backpropagation, Corn Crop Yield*

Clustering Tourism Places in Madura Based Facilities Using Fuzzy C-Means

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Abstract. Madura Island consists of four districts namely Bangkalan, Sampang, Pamekasan, and Sumenep. Each district has many choices of interesting tourist attractions. There are various types of tourism ranging from natural tourism, cultural tourism, historical tourism, and artificial tourism. With the diversity of these tourist attractions, it is enough to invite many tourists to come on vacation to Madura Island. Each tourist attraction has a different number of visitors, the number of public facilities, and ticket prices. All the criteria possessed by each tourist attraction have their own assessment for potential tourists. The local Tourism Office must know the developments in each tourist attraction, so that it can maintain the quality of the tourist attraction. Improvement of infrastructure can be through public facilities provided at tourist objects is very necessary. The purpose of this study was to determine how well the Fuzzy C-Means method in grouping tourism objects in Madura. Fuzzy C-Means is a grouping method which the development of the k-means cluster is not a hierarchical method that allocates data into each group by utilizing fuzzy set theory. From the trials that have been carried out, the best grouping results are found in cluster 10 with a silhouette coefficient value of 0.825 which is included in the strong category

Keywords: *Fuzzy C-Means, cluster, tourist attraction*

Query Expansion Using Pseudo Relevance Feedback Based on the Bahasa Version of the Wikipedia Dataset

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Abstract. The work of finding documents that are relevant to a user's query on an information retrieval system (IRS) is a very interesting study. The relevance of the list of documents returned by the IRS is influenced by the accuracy of the method of calculating the similarity between documents and the determination of the keywords. Many users difficult to describe their information needs in words. Sometimes the user enters only one or two words that do not reflect the domain of information required. This results in a list of documents that are not or very less relevant to the user's needs. The approach that is often taken is to improve the list of words in the user's query to make it more representative, called Query Expansion. One technique that can be used to expand a query is Pseudo Relevance Feedback. This paper describes the results of research that has been carried out to expand Query using Pseudo Relevance Feedback on an IRS based on the Indonesian version of the Wikipedia dataset, totaling about 450 thousand documents. Calculation of the similarity between the query and the list of tourism news documents uses the cosine similarity, while the weighting scheme for each term uses tf.idf. The test results shown that the pseudo relevance feedback decreases the precision of the IRS up to 30%. This is due to the failure of the chosen approach to find the right words to expand the original query. The abstract of articles in the Wikipedia is general in nature and is not limited to the tourism domain. The selection of the expansion base dataset is greatly determine of the new query quality, datasets from the same domain are recommended. If someone continue to use general datasets such as Wikipedia, it is better to do some filtering first.

Keywords: *Information Retrieval System, Query Expansion, Pseudo Relevance Feedback, Wikipedia Bahasa, Tourism News, Focused Search Engine*

Application of Ant Colony Optimization Algorithm to Determine Optimal Value in Choosing Tourist Attractions in Bangkalan – Madura

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Abstract. The impact of COVID-19 leaves a deep sadness, especially in the tourism sector. Many tourist places are not open to prevent the transmission of this virus. Madura is one of the islands located in the province of East Java which has many tourist attractions. Bangkalan is one of the districts in Madura which has 21 tourism spots. There are many tourist attractions scattered in Bangkalan district, but there is a problem arisen in determining the shortest path to get to these tourist attractions. There are several route options available in each area. Optimal value search can be used to obtain the highest and lowest values of a problem. One of the popular problems that can be solved by optimization algorithms is the Traveling Salesman Problem (TSP) to determine the closest route using the Ant Colony Optimization algorithm. The ant algorithm is an algorithm adopted from the behaviour of the ant colony. An ant colony can find the shortest route between the nest and a food source based on footprints on the trajectory it has traversed. The more ants that pass through a track, the clearer the footprints will be. Ant Colony algorithm is very appropriate to be applied in solving optimization problems, one of which is to determine the shortest path. The final result of this discussion is the algorithm used is able to determine the shortest path to find tourist destinations as an alternative route. The accuracy results obtained are 100% with a rho value of 0.5, an alpha value of 1, and a beta value of 1.

Keywords: the tourism sector, Ant Colony Optimization, the shortest path

Analysis Average Waiting Time Search Performance in the Queue Process on CPU Scheduling Using the Round Robin, Shortest Job First and First In First Out Algorithm

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Abstract. Round Robin (RR), Shortest Job First (SJF), and First In First Out (FIFO) are popular CPU scheduling algorithms used in multiprogramming systems. These three algorithms are used to find Average Waiting Time (AWT) in different process sequences. In the Round Robin algorithm there is a Qu which influences the number of sequence processes. AWT value is obtained from the number of waiting processes divided by the number of existing processes. The value of the make span in each algorithm must be the same even though the order of the process is different regardless of the arrival time. This study describes and analyzes how RR, SJF and FIFO algorithms work in the queuing process on the CPU (Central Processing Unit). To make it more clearly visible and easy to understand the analysis carried out then made a form of application programming that is interactive and easy to understand. This application shows that the queuing process in AWT runs gradually according to the principle of the three algorithms.

Keywords: *Average Waiting Time, First In First Out, Makespan, Round Robin, Shortest Job First*

Thermal Properties, Mass Spectra and Root Mean Square Radii of Heavy Quarkonium System with Class of inversely quadratic Yukawa Potential

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Abstract. In this paper, the thermal properties, mass spectra and root mean square radii of heavy quarkonium system is studied with a newly proposed potential called class of inversely quadratic Yukawa potential. The Schrödinger equation is solved analytically using the Nikiforov-Uvarov method and the energy eigenvalues and the corresponding wave function obtained in close form. The obtained energy eigenvalues is used to predict the mass spectra of heavy quarkonium system such as charmonium cc and bottomoniumbb . The thermal properties such as mean energy, mean free energy, entropy and specific heat capacity was calculated as well. The wave function was used to determine the root mean square radii of the system. A special case of Coulomb potential was considered when some of the parameters of the potential were set to zero. The present potential provides satisfying results in comparison with experimental data and other theoretical predictions with a maximum error of 0.0059 GeV.

Keywords: *Schrödinger equation; Nikiforov-Uvarov method; class of inversely quadratic Yukawa potential; heavy quarkonium system; thermal properties*

Optical Fiber Sensor for Monitoring of Liquid Level

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Abstract. In our work, optical fiber sensor to measure liquid level was designed and constructed. In our technique, u-shaped optical fiber was utilized as part of the sensing system. One arm of u-shape fiber was fixed position while the other arm was attached to the surface of the silicone membrane. The silicone membrane was installed at the surface of liquid container. As the level of liquid was changed, the liquid hydrostatic pressure was changed and stretched out the membrane. The displacement of membrane was clearly observed. Thus, force from stretched membrane would compress the attached arm of u-shape fiber. As a result, the radius of curve section of u-shape fiber was changed. This action caused strain in the fiber and changed the refractive index of core and cladding of fiber. If bending beyond the condition of a critical radius , then macro-bending loss was raised up and the amount of refracted loss could be monitored from the transmitted signal at the end of fiber. According to our results, sensor composed of u-shaped fiber covered with polymer coating provided higher response than sensor composed of u-shaped bare fiber. The quite linear relationship between the change in intensity with the level of liquid was obtained. The sensitivity of this sensor was equal to -0.0178 a.u. per centimeter

Keywords: *Optical fiber sensor, liquid level sensor, u-shape fiber, macro-bending loss*

Bioreduction of Cu Nanoparticles (CuNPs) using Sargassum sp. Seaweed Extract

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Abstract. The purpose of this study was to synthesize Cu nanoparticles (CuNPs) using Sargassum sp. extract. Synthesis of Cu nanoparticles has been carried out through the bioreduction method using Sargassum sp. seaweed extract. The obtained nanoparticles are then used as an anti-bacterial material on woven fabrics. Sargassum sp. powder. mixed with distilled water then heated in the microwave for 1 minute. The extract obtained was added to CuSO4 solution as a precursor then heated in a microwave for 5 minutes and Cu nanoparticles (CuNPs) were obtained. The woven cloth was soaked in colloid for 24 hours and dried, then characterized using X-Ray Diffraction (XRD) and Scanning Electron Microscopy (SEM) and tested for antibacterial activity. The results of XRD and SEM showed that CuNPs had been deposited on the woven fabric, which was indicated by the difference in spectra and diffractogram of the sample and blank of the woven fabric. Woven cloth deposited with CuNPs provides antibacterial activity, both against S. aureus and E. coli bacteria.

Keywords: Bioreduction, Cu Nanoparticles (CuNPs), Sargassum sp. Seaweed Extract

Application of Genetic Modifications to Increase Biofuel Yield from Microalgae: A Review

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Abstract. Nowadays, non-renewable energy mainly deriving from fossil fuels is known to cause carbon dioxide emissions and contribute to climate change and global warming. There has been another energy source founded to be a better eco-friendly alternative. So far, studies show that microalgae are considered a potential source to play a role in third-generation biofuel feedstocks. The reason why microalgae is a better alternative is due to the many advantages. One of the advantages is the size of space to grow because microalgae require less land area than the biofuels from food crops. An outcome of microalgae is the production of lipids. Data proves that microalgae are a biomass source to receive massive production in oil content and yield. Microalgae biomass with increased amount of biomass and lipids yield are being used to produce biofuel and biogas. Microalgae cultivation is also being integrated with other technologies, such as carbon capture systems. The purpose of genetically modifying microalgae biomass is to increase production and obtain more oil content from the microalgae. To obtain greater biomass yield, genetically modified microalgae has been proven to be a better alternative. However, genetically modified microalgae also pose some risks, such as horizontal gene transfer and outcompeting wild-type strains. Therefore, field testing and close monitoring are much needed to ensure the application of bioethical principles.

Keywords: *Genetic Modification, Biofuel Yield, Microalgae*

Bioactivity of Zingiberaceae Family from Indonesia

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Abstract. Several species of the Zingiberace family can be found in Indonesia. The Zingiberaceae family had used by Indonesian people as traditional medicine. In this study, the bioactivity of nine species of the Zingiberaceae family from Indonesia will be carried out. The nine Zingiberaceae families showed high Total Phenolic Content (TPC), ranging from 10 mg GEA/g. Meanwhile, C. longa has a high Total Flavonoid Content (TFC) value compared to other extracts, namely 1.7 mg QE/g. All extracts have potential as antioxidants. Z. officinale Rosc. showed the best inhibition of DPPH and ABTS radicals with IC50 values of 233.05 and 320.28 μg/mL, respectively. The Z. officinale var. Rubrum, Z. officinale Rosc., and B. rotunda were able to inhibit the growth of HeLa cells. The best inhibition of PC3 cell line growth was shown by C. longa, Z. officinale var. Rubrum, Z. officinale Rosc, and C. xanthorrhiza. Of all extracts from the Zingiberaceae family, C. xanthorrhiza showed the best anti-inflammatory activity in this study. Therefore, plants from the Zingiberaceae family from Indonesia have the potential to be antioxidants, anticancer, and anti-inflammatory.

Keywords: Antioxidant, Anticancer, Bioactivity, Indonesia, Zingiberaceae,

Investigation on Fe2+-dependent Reaction on Methyl Orange Biodecolorization by Daedalea dickinsii

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Abstract. The investigation of Fe2+-dependent reaction on methyl orange (MO) biodegradation by brown-rot fungus Daedalea dickinsii was performed to evaluate the involvement of Fenton reaction. The MO degradation (final concentration 75 mg/L) was evaluated for incubation period at 0, 7, 14, 21, and 28 days in mineral salt media with and without Fe2+. UV-Vis Spectrophotometer and LC-TOF/MS were used for degradation analysis. The highest MO decolorization by D. dickinsii was approximately 77.1% and 60.5% in medium without and with Fe2+, respectively, occurred for 28 days incubation. It indicated that the optimum decolorization was obtained in medium without Fe2+, which assumed that Fe2+ dependent reaction might be not enhanced decolorization of MO by D. dickinsii. Based on LC-TOF/MS analysis, 2-hydroxy-4((2-hydroxy-4(methylamino) phenyl) diazinyl) phenolate ($C_{13}H_{12}N_3O_3$), and 4-(2-(4-(dimethylamino)-2,3,5,6-tetramethoxy phenyl) hydrazinyl)-2,3,5,6- tetramethoxy benzenesulphonate ($C_{22}H_{32}N_3O_{11}S$) were detected as metabolites of MO degradation. $C_{13}H_{12}N_3O_3$ was a transformation product of demethylation, hydroxylation and desulfonation, while $C_{22}H_{32}N_3O_{11}S$ was a product of methoxylation. This study indicated that the methyl orange (MO) decolorization was a hybrid process between Fenton's mechanism and enzymatic activity

Keywords: Fe2+-dependent Reaction, Methyl Orange Biodecolorization, Daedalea dickinsii

Analysis of Tuberculosis Patient Data Distribution using the Aggregation Function

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Abstract. The human body has an immune system that functions to defend the body and prevent bacteria from entering it. However, a weak or vulnerable immune system can make the body susceptible to bacteria, for example, minor illnesses such as the flu or severe diseases, namely tuberculosis (TB). Tuberculosis is a disease that is caused by infection with the bacterium Mycobacterium tuberculosis which is contagious and deadly. In 2017, in Indonesia, TB patients increased to the third rank in the world. In the field of computing, the application of statistical science cannot be separated. One application of the field of computing is data mining which aims to find and explore or add knowledge based on data or information. This effort serves to reveal important information contained in the data. Aggregation queries are formulated using the simple SQL language that computes aggregation functions (such as MIN, MAX, COUNT, SUM, AVG). The distribution of TB patient data shows an increase every year with an average age of 46-65 years, which is dominated by men.

Keywords: Tuberculosis patient, data distribution, Aggregation function

Quality Analysis of E-Commerce Services in Indonesia

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Abstract. E-commerce agency is a good strategy to survive in this pandemic era, where many offline business people have to change their promotion and product sales strategies through online media using digital marketing. To help business people who need digital marketing services, e-commerce agency is here by providing services such as digital marketing and branding. At this time, there are various kinds of complaints that arise from agency of e-commerce customers, regarding the services provided by the company. As a company engaged in the service sector, the e-commerce Agency must be able to provide service satisfaction to its customers. This study aims to determine the level of customer satisfaction with the services provided by the e-commerce agency. The method used in this research is the method of Service Quality (Servqual) and Quality Function Deployment (QFD). From the data processed using the servqual method, 21 service attributes have negative values that must be taken corrective action. By using the QFD method, the priority of the voice of the customer is obtained, including good quality design results with a value of 6.28 as the first priority, good video quality with a value of 6.19 as the second priority, and good quality branding results with a value of 5,88 as the third priority. As for recommendations for improvement based on the value of contributions, including being able to carry out good discussions with customers, the briefer team and the design team are able to work well together and update procurement of equipment technology periodically and as need

Keywords: customer satisfaction, service quality, quality function deployment.

Impact of Solar Photovoltaic Systems on Low Voltage in Buildings Distribution Networks

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Abstract. Currently, the use of photovoltaic (PV) systems as an energy source to supply some of the energy use in buildings is increasing rapidly. This is due to the government's encouragement to use the rooftop as a location for the installation of PV modules. In addition, the price of solar modules and inverters is getting cheaper and there are more choices, and the investment costs are getting more affordable. However, one of the problems is the concern from PLN as the electricity provider that there will be disturbances to the network such as voltage variation, reverse power, and harmonics. This study to analyze the impact of PV modules installed on the rooftop of the building to supply electricity during the day. The method is carried out by measuring electrical parameters using a PQ measuring instrument installed on the PV output and input from the PLN grid on the distribution network inside the building in two time periods, before and after connecting the PV generation to the network. There are several issues that are studied and discussed such as measuring the impact of variations in solar radiation on PV output power and voltage variation. Also presented are characteristics and orders of harmonics at various operating conditions.

Keywords: *Photovoltaic(PV),rooftop PV, low voltage, distribution network, voltage variation, harmonics.*

Bernoulli Logistic Map Encryption Algorithm for Digital Images

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Abstract. The sophisticated of technology make eazy and fast while transfering or saving digital information. There are so many technique to encrypt data, especially digital image. The algorithm that be use in usually need a long time, although the data was goodly encrypted. But there are better if the encryption time faster with good security. Chaos function can make that possible. Logistic map is one of chaos function that can be used on cryptography. This thesis will develop new chaotic map, that is composition of Bernoulli map and logistic map, (Bernoulli logistic map) and descibe about algorithm digital image encryption using Bernoulli logistic map. The key sensitivity achieve 10^{-18} and key space this algorithm is $[(2^{31}-1)-b\times k\times d]\times 1.6\times 10^{634}$, by b, k, d are measure of row, column, and dimension of the image make hard to break this algorithm by bruteforce attack. Based on test by National Institute of Standards and Technologies (NIST) test, the keystream produced shown to be random. The distribution of pixel intensities is uniform. Moreover, the original digital image and decrypted digital image from this algorithm is same by PSNR value is ∞.

Keywords: *Bernoulli logistic map, Encryption, Digital image*

Effects of Leaf Ethanol Extract of Graptophyllum pictum L. Griff. on Liver Glycogen Synthesis of Ovariectomized Mice

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Abstract. Menopausal condition with low estrogen level caused decreased in glycogen synthesis. Glycogen had a rol in maintaining glucose level between 60 and 140 mg/dL and also for supplying energy of cells. Glycogen made up 5 % of liver volume more than in skeletal and muscle (2%).This research was aimed to determine the effects of leaf ethanol extract of Graptophyllum pictum L. Griff. to promote liver glycogen synthesis of ovariectomized mice. It is used 24 female mice divided into six group, namely group 1,2 and 3 were control group and group 4,5 and 6 were treatment groups that were given leaf ethanol extract of Graptophyllum pictum L. Griff. with dosis 10 mg/kg, 20 mg/kg and 30 mg/kg. In group 1 until group 6, all mice were ovariectomized. The treatment was done for 6 week orally and then all mice were measured the serum glucose level by Glucometer. The all mice were anesthetized and dissected to take the liver for measuring liver glycogen level by colorimetric. The resultshowed that its leaf ethanol extract effected to normalized glucose level and promote the liver glycogen level. And its optimal dosis was 10 mg/kg.

Keywords: Graptophyllum pictum, glycogen, ovariectomized mice

The Effect of Glucose on Local Recombinant β-Xylosidase and Cellulase Cocktails Production

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Abstract. Production of enzyme cocktails showed better results than compared to the single enzyme. Recombinant E. coli harboring gene encoding β-xylosidase and cellulase, have cultured in one flask at the same medium, as a cocktail. mCDM is an alternative growth medium for recombinant E. coli, containing of natural extracts, minerals and salts. Recombinant E. coli BL21 on mCDM had a maximum OD600 of 2.420 until 2.686. The growth curve of recombinant E. coli BL21 showed a faster logarithmic time in mCDM with glucose than without glucose. Enzyme cocktails activities on natural substrate showed optimum results in mCDM with the addition of glucose. Enzyme cocktails activities on specific substrates showed that β-xylosidase and cellulase did not lose their activities even though they were grown in the same culture. The synergism of β-xylosidase and cellulase cocktails provides effectiveness in the hydrolysis of biomass to be used as raw material for making environmentally friendly bioenergy.

Keywords: *enzyme cocktails, β-xylosidase, cellulase, bioenergy*

Utilization of Agricultural By-Product as Inducers and Carbon Sources for Cocktail Enzyme Production [GbtXyl43B] and [abfa51]

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Abstract. The main components agricultural by-product of lignocellulosic biomass are lignin, cellulose, hemicellulose and pectin which account for 90% of the total dry weight. Lignocellulosic biomass waste can be utilized optimally after bioconversion into its constituent components. Hemicellulose in water hyacinth and corn cobs, can be used as an inducers and nutrients for bacterial growth and produced cocktail enzymes of β-xylosidase and α-L-arabinofuranosidase. The growth curve profile was measured by OD600 density detection and enzyme activity was measured by DNS method. In water hyacinth xylan extract, the best growth curve profile on MTM-X 1:3 media has an exponential phase from 0 to 8 hours with a stationary phase starting from 10 hours to 12 hours and peak exponential phase at 8 hours with OD600 is 4.355. In corn cobs xylan extract, the best growth curve profile on MTM-X1:1 media has an exponential phase from 0 to 8 hours with a stationary phase starting from 8 hours to 16 hours and peak exponential phase at 8 hours with OD600 is 5.565. The best enzyme activity test on MTM media at 10 hours is 0.285 U mL-1.

Keywords: water hyacinth, corn cobs, hemicellulose, xylan, xylanolytic enzymes, defined media

Application of Fish Flour Liquid Waste as Alternative Growth Media for Producing Xylanase

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Abstract. Fish-based processed products are increasing, especially fish-based flour. However, processing fish into flour can produce liquid waste that can be harmful to the environment. Meanwhile, this liquid waste contains carbon, nitrogen, and mineral rich element that can be used as bacterial nutrient. Luria Bertani media is one of commons bacterial media. But, its price is expensive and is not feasible in industry scale production as a whole media. Thus, this research aims to devise a formulation of mixture between fish flour liquid waste and Luria Bertani media. Furthermore, xylanase is produced and tested its activity in the formulation media and was compared to Luria Bertani media. The result showed that the optimum formulation to produce xylanase was 1:2 and indicated its activity of 0,7260 U/mL and 0,6213 U/mL after 9 hours and 12 hours incubation time respectively.

Keywords: *Modified media, waste utilization, xylanase*

Utilization of Rice Straw (Oriza sativa) as raw material for Bioethanol Using Consortium Enzyme

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Abstract.

Abstract. Rice straw is one of the abundant lignocellulosic agricultural by-product in Indonesia. Rice straw has several characteristics that make it a potential raw material for bioethanol production. It contain high cellulose and hemicelluloses content that can be hydrolyzed into fermentable sugars. This study aimed to hydrolize rice straw cellulose and hemicellolose using xylanase, cellulose, and xylose isomerase enzymes. 2% H_2SO_4 was used in pretreatment before the rice straw hydrolyzed with consortium enzymes. Concentrations of rice straw substrate was made to 5%, 10%, 15%, and 20% (w/v) and also made 1:1, 1:2, and 1:3 volume ratio between substrate and enzymes. The results showed that the higest rate of bioethanol obtained from 10% (w/v) rice straw substrate and enzyme activity in consortium was 0.279 U/ml (xylanase), 0.329 U/ml (cellulase), and 0.024 U/ml (xylose isomerase). The hydrolysate was fermented by Saccharomyces cereviseae BJ1824 and the ethanol concentration analyzed by GC.

Keywords: bioethanol, cellulase, hydrolysis, rice straw, xylanase, xylose isomerase

Characterization of Excelzyme in Oil Palm Empty Fruit Bunches (OPEFB) Degradation

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Abstract. Utilization and renewable of agriculture by product based on polysaccharide as material of alternative raw energy by converting into monosaccharide. Degrading of polysaccharide can be proceed by enzymatically or chemically. Excelzyme is one way of enzymatically degrading the cell wall components such as cellulose, hemicellulose, and lignin in oil palm empty fruit bunches (OPEFB). It is a consortium enzymes that have many functions in our daily life, such as bio-deinking, bio-fertilizer, fishery, ruminant's food, and reprocess of agriculture by product especially OPEFB. The analysis of excelzyme activity to degrade hemicellulose, cellulose, and lignin are 3.05 units/mL, 0.176 unit/mL, and 0.014, respectively. The optimum time of excelzyme to degrade OPEFB was 6 hours and the reduction sugar product is 620 μg/mL (excelzyme 5.1) and 2530 μg/mL (excelzyme 5.2). This enzyme was also proven can degrade the cellulose and lignin components by incubating in their optimum degradation condition. the number of cellulose and lignin degradation is 4,25% and 6,84%, respectively. The degradation ability analysis was also supported by Scanning Electron Microscope (SEM) to observe the damage of the raw materials before and after excelzyme treatment. The results of SEM analysis showed that there were several differences of OPEFB surface's structure. It showed that excelzyme as bio-degraded is better than chemical reaction of NH_4OH in OPEFB degradation.

Keywords: Excelzyme, Oil Palm Empty Fruit Bunches (OPEFB), Hemicellulose, Cellulose, Lignin, SEM.

Optimalization of Enzymatic Degradation on Oil Palm Leaves Hemicellulose

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Abstract. The aim of this research was to optimize enzymatic degradation reaction from oil palm leaves. Hemicellulose from oil palm leaves was isolated by sodium hydroxide solution (NaOH) extraction. Optimization of hemicellulose extraction was done by various concentrations of NaOH and reflux times. Variation of concentration NaOH were 2 M; 2.5 M; 3 M; 3.5 M and 4 M then the reflux time were 2 hours, 4 hours, and 6 hours. The optimum condition of hemicellulose extraction was 3 M NaOH and reflux time was 6 hours. The yield at that condition was 48.94 %(w/w). The extracted hemicellulose was then hydrolyzed by xylanolytic enzyme from E. coli DH5⬚ recombinant (pTP510) with variation of incubation temperature 50ºC, 60ºC, 70ºC, and 80ºC for 24 hours at pH 6. The hydrolysis result was analyzed using HPLC. Xylose was produced at optimum temperature of 60ºC (120.231 ppm), arabinose at 50ºC (26.265 ppm) whereas xilo-oligosaccharide at 50ºC (280.465 ppm).

Density and Orientation of Collagen Related to Body Shape Changes in Sea Cucumbers Acaudina rosettis and Colochirus quadrangularis

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Abstract. Sea cucumbers are marine invertebrate which have a flexible body. The ability to change their body shape is species spesific. Collagen is the main component of the body wall of sea cucumbers. The objective of this research was to find out that the density of collagen and orientation of collagen bundles in the body wall of sea cucumbers are important factors related to the ability for change their body shape. For this purpose, 2 species of sea cucumber, namely Acaudina rosettis and Colochirus quadrangularis, were collected from Madura Strait, Indonesia. The body walls (dorsal anterior, dorsal median, dorsal posterior, ventral anterior, ventral median, and ventral posterior parts of the body) of the five samples of each species were preserved in 10% NBF, decalcified in EDTA solution 12% for 4-6 weeks, processed histologically by paraffin method and stained by van Gieson to visualize collagen in cross sectioned body wall tissues. Microscopic observations were carried out at a magnification of 100x. Collagen density was determined by software ImageJ whereas collagen bundles orientation was observed by PicsArt application. Data of collagen densities were analyzed by same subject Anova at ⍺=0.05. The result showed that collagen density of the body wall insignificantly different between parts of the body wall in each species, but C. quadrangularis have a significantly higher density of collagen than A. rosettis. C. quadrangularis had a stiffer body and better restriction ability due to the higher density of collagen and uniform orientation of the collagen bundles, whereas A. rosettis had a limited ability to change its body shape due to the lower density of collagen and random orientation of the collagen bundles..

Keywords: Marine invertebrate, sea cucumber, collagen density, orientation of collagen, bundles, body wall, body shape

Anticancer Activity through Inhibiton of Bcl-6BTB of Chalcone – Thiourea Hybrid Compounds: A Molecular Docking Study

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Abstract. Disturbance of homeostatic balance of cell growth and cell death can lead to cancerogenesis as designated by over-expression of anti-apoptotic genes observed in lymphomas. B-cell lymphoma 6 at BTB domain (BCL6BTB) is an oncoprotein upregulated in leukemia, amplified in breast cancer cell and plays in a broad spectrum in oncogenic various types of cancer. Therefore in this article we report a molecular docking research of a series of chalcone-thiourea hybrid molecules which further can be used as candidate of anticancer agent under inhibition of BCL6BTB mechanism. Program DOCK 6 was used for docking experiment, molecular structure of protein BCL6BTB was used as target protein (PDB: 6CQ1). Charge of standard residues were calculated according to force field ff4SB method, while non-standard residues according to Gasteiger method. The docking experiment revealed that compound (E)-1-(4-(3-oxo-3-(3,4,5-trimethoxyphenyl)prop-1-en-1-yl)phenyl)thiourea showed better property can be used as anti-cancer candidate for para thiourea isomer, whereas compound (E)-1-(3-(3-oxo-3-phenylprop-1-en-1-yl)phenyl)thiourea is the candidate foe meta thiourean isomer. In brief, para thiourea isomer exhibited better anticancer activity than meta thiourea isomer..

Keywords: anticancer, B cell lymphoma, inhibitor of BCL6BTG, chalcone-thiourea hybrid compounds

Analysis of the Level of Suitability of the Average-Based Fuzzy Time Series Method for Predicting National Salt Production.

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Abstract. Based on data obtained from the Ministry of Maritime Affairs and Fisheries reported by kompas.com, in 2021, Indonesia will import 3.07 million tons of salt. This is because the stock from local salt farmers is insufficient and does not meet the quality for industrial salt standards. Variables that affect the amount of salt production and quality in Indonesia are Nino 3.4, negative Indian Ocean Dipole (IOD). These two variables will affect the dry season that will occur in the form of wet or dry drought. If the dry season is wet, the national salt production will decrease which will result in crop failure. The Ministry of Maritime Affairs and Fisheries (KKP) has predicted national salt using several methods. However, the results of the salt prediction are still not able to approach the number of predictions of national salt accurately. Thus, in this study, the Average-Based Fuzzy Time Series method was used.

Innovation of Technology in Non-Contact Health Examination of The Body By Using The AMG8833 Thermal Sensor.

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Abstract. Since the COVID-19 pandemic conditions, non-contact physical examinations are urgently needed, this is because many people are exposed to COVID-19 through direct physical contact, including when doctors or nurses check the patient's body health condition. One of the first steps in examining physical conditions to detect whether a person is suspected of being exposed to COVID-19 or not is through measuring body temperature. Currently, body temperature checks are mostly carried out through the use of non-contact thermometers by measuring the temperature at one point of the object with a maximum distance of about 5 centimeters, making it susceptible to infection if used on people exposed to viruses or infectious diseases. Therefore, the AMG8833 thermal sensor is expected to be used as a solution because based on product specifications, the AMG8833 can be used up to a maximum distance of 7 meters with 64 measuring points with an 8 x 8 array pattern. The thermal camera has been successfully built using the AMG8833 thermal sensor, Arduino UNO Microcontroller, and a 2.4-inch TFT LCD touch screen. Based on the test results, the maximum effective distance of the AMG8833 thermal sensor to the object being measured is about 1 meter.

Keywords: *Innovation, Technology, Non-contact, Health, Examination, AMG8833, Thermal, Sensor*

Ordinal Logistic Nonparametric Regression Based On Multivariate Adaptive Regression Spline

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Abstract. One of the adaptive methods in nonparametric regression that is able to accommodate interactions between predictor variables is the Multivariate Adaptive Regression Spline (MARS) method. MARS modeling has been developed based on the types of response variables involved in regression modeling, one of which is categorical (qualitative) response variables. The MARS method with categorical responses (both binary and ordinal) can function as a modern statistical classification method, where the classification in MARS is based on a logistic regression approach. The link logit function in logistic regression is the MARS model, or is referred to as the MARS logit model. This study aims to estimate the ordinal logistic nonparametric regression model with the MARS estimator. The study begins by defining the distribution of the ordinal scale response variable with three categories in the MARS model, so that the log-likelihood function of the ordinal response random variable will be maximized to obtain the parameter value. Newton-Raphson iteration method is used to get the parameter estimation. The results show that the ordinal MARS logit model with three categories is

$$\hat{g}_1(x) = \ln \frac{P(Y \le 1)}{P(Y > 1)} = \beta_{01} + \sum_{m=1}^{M} \beta_m \prod_{k=1}^{K_M} \left[s_{km} \cdot \left(x_{v(k,m)} - t_{km} \right) \right]$$ and

$$\hat{g}_2(x) = \ln \frac{P(Y \le 2)}{P(Y > 2)} = \beta_{02} + \sum_{m=1}^{M} \beta_m \prod_{k=1}^{K_M} \left[s_{km} \cdot \left(x_{v(k,m)} - t_{km} \right) \right].$$ The ordinal MARS log-likelihood

function is $l(\beta) = \ln L(\beta) = \ln\left(\prod_{i=1}^{n} \pi_{22}^{y22} \pi_{21}^{y21} \pi_{20}^{y20} \pi_{12}^{y12} \pi_{11}^{y11} \pi_{10}^{y10} \pi_{02}^{y02} \pi_{01}^{y01} \pi_{00}^{y00} \right).$

Keywords: MARS, Nonparametric Regression, Ordinal, Regresi Logistik

Development of Bank Indonesia Office In Kalimantan Island Using Factor Analysis

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Abstract. Bank Indonesia is the central bank in Indonesia, whose role is to fulfill the needs of rupiah worth circulated in the community. Distribution of rupiah conducted through a network of representative offices of Bank Indonesia. One of the challenges faced in the distribution of cash fit for circulation are the availability of regular transport modes and pathways limited natural and geographical conditions. Climate and weather conditions often change. In the remote, border and outer islands that are far from the reaching of the cash services of Bank Indonesia, the rupiah is very low quality or have a high level of damage so that it becomes unfit for transaction. Kalimantan is one of the regions in Indonesia is faced these problems and one of solution is expand or add new office representative. Factor analysis was conducted to determine the factors that shape the development of the Representative Office (KPwDN) and make policy to get out the formation of a new KPwDN in Kalimantan. The variables used in this study as many as 23 variables, divided into two factors in each province. From the results we concluded that the study needs to be the establishment of four new offices of KPwDN in Kotabaru, Kutai, Tarakan and Kotawaringin West.

Keywords: Bank Indonesia, Factor Analysis, Score Factors, Kalimantan

Poly (ε-Caprolactone) - Based Biomaterials for Meniscus Replacement

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Abstract. This review focuses on the meniscus and the biomaterials involved in meniscal repair and regeneration. The progress made in the field of regenerative medicine and biomaterials allowed to development of several meniscal substitutes with extracellular matrix materials (ECM), natural materials, synthetic or hybrids. These material choices lead to a myriad of options ranging from permanent implants to biodegradable scaffolds (with and without cells, binding ligands, and growth factors). Poly-ε-caprolactone (PCL) is a well-known polymer that has attracted enormous attention from both the research community and industry due to its biocompatibility, structural stability, and capacity to form blends with a large number of other polymers. PCL safely used in the biomedical field for more than 70 years, from sutures to tissue and organ replacement by 3D printing. The aim of the present manuscript is to systematically review the scientific evidence to understand the current state of research in this particular field and to identify the trends at the PCL-based meniscal scaffolds. Thirty papers were included in the present analysis 20 cases the meniscal scaffolds were used with cells to further stimulate tissue regeneration. The majority of the trials highlighted that PCL biomaterials and bio-engineered scaffolds are safe and could play a beneficial role in stimulating meniscal healing and in chondral protection. Finally, we review the latest and promising advances associated with bioprinted and electrospun meniscal implants and the drive toward more functional bioinks with the overall goal of achieving a patient-specific meniscal implant.

Keywords: *polycaprolactone, biomaterials, meniscal scaffold, biocomposite, polymer synthesis*

Modeling of Type II Diabetes Mellitus Risk Using Ordinal Logistic Regression Approach Based on Local Linear Estimator (Case Study at Surabaya Hajj General Hospital)

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Abstract. Diabetes mellitus is a degenerative disease with an increasing number of sufferers every year, characterized by hyperglycemia caused by insulin resistance and insulin secretion dysfunction. As many as 85-90% of people with diabetes mellitus in the world suffer from type II diabetes mellitus. Based on the results of the Basic Health Research, the prevalence of diabetes in Indonesia continues to increase every year. Factors thought to influence the incidence of diabetes mellitus include age, LDL cholesterol levels, Mean Arterial Pressure, and uric acid. This study aims to model and estimate the risk of type II diabetes mellitus at Haji General Hospital Surabaya. The data analysis used is an ordinal logistic regression approach based on a local linear estimator with programming on OSS-R. The linear local estimator is used because it has the advantage of being able to estimate the function at each point so that the modeling results obtained are close to the actual data pattern. Based on the results of the study, the deviance value was 47.28 and the p-value was 0.99994, so it can be concluded that the nonparametric ordinal logistic regression model was appropriate. The local linear estimator nonparametric ordinal logistic regression model produced an accuracy value of 90% and a sensitivity of 90%. Furthermore, the parametric ordinal logistic regression model which has a deviance value of 47.28, an accuracy of 46.67% and a sensitivity by 50%. It means that the nonparametric ordinal logistic regression model based on local linear estimator is better than the parametric ordinal logistic regression model based on global linear estimator for predicting risk of type II diabetes mellitus.

Keywords: *Risk of Type II Diabetes Mellitus, Ordinal Logistic Regression, Nonparametric Regression model, Local Linear Estimator*

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