VOL. 002

IRCYS 2024

ABSTRACT COLLECTIVE *of* IRCYS

United in Ideas, Diverse in Perspectives

Organized by:

BCS
BANDUNG CREATIVE SOCIETY
member of Amikaz

OCTOBER 10th - 13th, 2024

BALI, INDONESIA

Welcome Message

Dear Participants,

On behalf of the Bandung Creative Society, it is my great pleasure to welcome you to the *Abstract Collective of IRYCS 2024*. This gathering represents not only the creativity and dedication of young researchers, but also the spirit of collaboration and innovation that drives the future of science and knowledge-sharing.

Through your abstracts, ideas, and perspectives, we celebrate diversity in thought, discipline, and culture. We believe this collection will inspire meaningful dialogue, foster cross-border connections, and spark fresh opportunities for discovery.

Thank you for contributing your work to IRYCS 2024. May this collective be a source of learning, pride, and inspiration for us all.

Warm regards,
Rahadian Sri Pamungkas
Project Manager of IRCYS 2024

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About IRCYS 2024

The International Research Competition for Young Scientists (IRCYS) 2024 is a global platform dedicated to showcasing the creativity, innovation, and research excellence of young minds from around the world. Organized by Bandung Creative Society, the competition brings together students and early-career researchers between the ages of 10 and 24, providing a stage for presenting scientific ideas, prototypes, and solutions that address real-world challenges.

Held in Bali, Indonesia, IRCYS 2024 gathered participants across disciplines such as science, technology, engineering, and social innovation. The event encouraged participants not only to compete, but also to learn from one another, exchange perspectives, and experience the richness of cross-cultural collaboration. Through exhibitions, presentations, and dialogues, young scientists had the opportunity to sharpen their communication skills, expand their networks, and gain international recognition.

At its core, IRCYS 2024 reflects a commitment to nurturing future leaders in research and innovation. By celebrating diversity of thought and fostering a spirit of inquiry, the competition empowers youth to become problem-solvers and change-makers in their communities. The achievements of this year's participants serve as a powerful reminder that with curiosity, collaboration, and perseverance, young researchers can drive meaningful progress for a better world.

People of Excellence

Steering Committee

Prof. Goib Wiranto., B.S El.Eng.	:	Badan Riset dan Inovasi Nasional
Prof. Dr. Lilik Hasanah, S.Si, M Si.	:	Universitas Pendidikan Indonesia
Dr. Indrawati	:	SEAMEO QITEP in Science

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Prof. Goib Wiranto., B.S El.Eng.	:	Badan Riset dan Inovasi Nasional
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Dr. Indrawati	:	SEAMEO QITEP in Science
Kullawat Inthaud	:	Yupparaj Wittayalai School

Editor

Ahmad Yusuf S.Si., M.T.
Rofiq Fadillah Awal S.Si.

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SMA Cita Hati Christian School	Innovative Food Waste Management: Utilizing Eggshells as Nutrient-Rich Fertilizer in Aquaponics Systems	SAS-I24-71	Neilsen Griffin Alexander Kenneth Heinrichardo Jasin
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Humanity Studies

School	Title	Participants Code	Author
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THEORETICAL STUDIES

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BANDUNG CREATIVE SOCIETY

Atropine on Myopia: How Can a Drug Affect the Disease?

Tanuwijaya, L.A.
sse_laetitia.tanuwijaya@bchati.sch.id
SMP Cita Hati Christian School, Indonesia

Myopia is a condition where the eye's imperfect shape causes light rays to bend incorrectly, focusing images in front of the retina rather than on it. According to the USDA Agricultural Marketing Service (2002), Atropine is a drug hypothesized to slow Myopia progression by relaxing the eye's focusing mechanism. The aim of this research is to show a possible way to dampen the effects of it: Can Atropine really affect Myopia? This research hypothesizes that the eyedrop dampens the effects. The method of this research paper is as follows: (1) Search for different resources related to the effects of Atropine to Myopia, (2) Create the graph and analyse the needed information. In 2024, the hypothesis was tested by JAMA Ophthalmology. The study included 187 children, with an average age of around 10 years. Of these, the independent variable was formed: 125 children were treated with Atropine that had a concentration of 0.01%, while 62 out of the total children received a placebo. After 24 months, the change in Myopia (measured in dioptres, D) was very similar between the atropine and placebo groups, with a tiny difference of 0.02 D. The placebo group experienced a difference of -0.82 D from the previous starting point 24 months ago, while the Atropine group experienced a difference of -0.80 D, which wasn't statistically significant. The results suggested that atropine had little to no significant impact compared to the placebo. In conclusion, Atropine with a concentration of 0.01% would not affect the outward shift of the cornea, leading to Myopia.

Keywords: myopia, atropine, extending cornea, strained eye muscles

Human Imagination Generating Limit and The Maximum Probability of Image Generated in Some Sort of Time Using Combinatorics and Summation

Rafie Aditya Rezha
adityaopaque@gmail.com,
SMA Negeri 8 Pekanbaru,
Indonesia

Introduction/Summary Human imagination is limited by the capacity of the brain and personal experiences accumulated throughout life. Since the brain compresses memories into simpler forms, defining these imaginations in specific variables is challenging. However, by considering an individual's lifetime and subtracting inactive brain activity, we can estimate the total amount of stored memory, particularly in terms of images and sounds. These memories can be quantified into variables, where different combinations of image and sound memory can be paired, requiring combinatorial and summation techniques to calculate the total possible number of pairings. The goal is to approximate the probability of how many images and sounds can be generated by the human brain at any given time, based on factors like the number of visual frames a person captures per second and the maximum distinct sounds a person can perceive. This is an estimation that attempts to model a highly complex brain system. Conclusion The formula presented offers a rough approximation of the limits of human imagination, focusing on memory capacity for images and sounds. While the calculation incorporates factors such as lifetime, inactive brain periods, and combinatorial pairings of image and sound memories, it does not account for the full complexity of human cognition. Memory loss, brain defense mechanisms, and individual differences in experiences and genetics all play roles in determining the brain's memory capacity. Therefore, this model is merely an estimate and does not fully capture the intricate nature of human imagination or the brain's maximum potential for generating imagery and sound at a single moment.

Keywords: Human imagination, Brain capacity, Memory storage, Combinatorics, Summation operation

Utilization of Microalgae-Based Biofuel in Hybrid Power Systems for Carbon Emission Reduction

[1]Sarah Namira Humaida, [2]Nardiin Fathiyyah Sunyoto, [3]Lazuardi Darma [4]William Philip Sembiring Meliala.
*Sarah Namira Humaida
1222310308@sman2tangsel.sch.id
SMAN 2 South Tangerang, Indonesia

Global warming is a major issue that society needs to address, as it directly affects human survival. This phenomenon involves the rise in the Earth's average temperature across land, sea, and atmosphere, mainly due to human activities such as industrial processes and transportation, which release excessive carbon emissions. To deal with this, governments are working to reduce greenhouse gas emissions by implementing strategic measures in the energy and transportation sectors. This research looks into using microalgae-based biofuels in hybrid power systems as an alternative way to reduce carbon emissions. Hybrid power systems combine renewable energy sources with conventional ones to reduce the use of fossil fuels. Microalgae biofuels are promising because they produce energy more efficiently and emit less carbon than fossil fuels. Additionally, microalgae proliferate, need less land and water, and help reduce deforestation, making them a sustainable fuel option. From a social perspective, using microalgae biofuels could create new job opportunities and promote a fairer distribution of resources. Economically, although the initial cost of producing microalgae biofuels is high, it can lead to long-term savings. This research uses a literature review method to explore the use of microalgae biofuels in hybrid power systems, aiming to reduce carbon emissions from both social and economic viewpoints. The goal is that developing hybrid energy systems based on microalgae biofuels will help lower carbon emissions and decrease the Earth's average temperature. This study is expected to provide valuable insights into the development of sustainable energy in Indonesia.

Keywords: carbon emission, Microalgae biofuel, Hybrid power systems

Evaluating the Role of Paediatric Cancer Shelters in Improving Patient Care and Support Systems for Children from Underprivileged Environments

[1]Fadli Kamal, [2]*Riefy Ramadhani Irawanto, [3]Ahmad Haza Abdurrauf
*riefy.ri@gmail.com
Jakarta Islamic School, Indonesia

Cancer is a leading cause of death among children and adolescents worldwide. According to data published by the World Health Organization (WHO) in December 2021, it is estimated that each year, approximately 400,000 children and adolescents aged 0-19 are diagnosed with cancer. The types of cancer most commonly affecting this age group include leukemias, brain tumors, lymphomas, and solid tumors such as neuroblastomas and Wilms tumors. Cancer can affect individuals of any age, targeting various parts of the body. Beyond the physical impact of the disease, children with cancer face significant challenges in their education and psychosocial well-being, as the illness interrupts many aspects of their development and everyday lives. This is especially true for children living in poverty, where access to medical care, educational support, and psychosocial services may be severely limited. To address these challenges, this study employs a mixed-method approach, including both quantitative data analysis and qualitative observations from visits to pediatric cancer shelters in order to gain understanding of the effect of shelter environment on patient outcomes and overall quality of care. The purpose is to increase global awareness of pediatric cancer and promote more assistance and care, particularly for impoverished children. By emphasizing the convergence of health, education, and psychological aspects, this study aims to foster a more comprehensive knowledge of childhood cancer and encourage action to improve the lives of those impacted.

Keyword: Pediatric cancer, Psychosocial services

Micro-scale VAWT Wind Turbine Design with Wooden Blades for Remote Areas

Alif Syauqi, B., Kemas Rayhan, N. *Alif, S., B.
*a.bagaskara@kbs.sch.id
Kharisma Bangsa School, Indonesia

Currently, there are approximately 2 to 3 million Indonesians without access to electricity, excluding those with limited access. To generate electricity, they often rely on gas or diesel-powered generators, which are not only harmful to the environment but also costly to maintain. Wind turbines present a viable alternative due to their simplicity, affordability, and ease of construction. The Vertical Axis Wind Turbine (VAWT) is particularly suitable because of its ability to operate at low wind speeds and its ease of manufacturing. The analysis focuses on the airfoil design of the VAWT, which optimizes rotational efficiency by utilizing Newton's 3rd Law and the Bernoulli effect. NACA 0021 is the recommended airfoil design as it works best with VAWT turbines. Using the Formula $P = Cp(½\ \rho Av^3)$ and the ideal Power Coefficient vs Tip Speed Ratio graph we can set a target on the Qblade airfoil program, having different Polar ranges of the formula $Re = (vl)/Nu$ helps in the trial-and-error process of finding the ideal dimensions. The dimensions that have been finalized are simulated on the SolidWorks model design program to complete the overall turbine design and find the Mass and Moment of Inertia; the result of the design process is a turbine weighing 5-6 kilograms with a maximum moment of Inertia of 3 and an overall turbine design of 1.2x1.4x1.2 meters.

Keywords: Turbine, VAWT, Airfoil, Polar Range, Moment of Inertia

The Simulation of Spiral Microchannel for Detection of Bacteria Contamination in Contact Lenses Leading to Keratitis

*Punnasirin Kawilo, Suwichak Chomthin, Unnada Kongmongkol, Supanat Mulbunjong, Peerawit Kitchalarat, Kullawat Inthaud
*bomeli879@gmail.com
Yupparaj Wittayalai School, Thailand

The objective of this project is to design a microchannel that increases the number of bacteria per volume. In the early stages of the disease there are not many infections, aiming to reduce the solovance by using a small flow tube based on microfluidics. Effect of physical properties of the microchannel to separate bacteria were studied by varying size and shape of the cross-sectional area of the spiral microchannel. The 10,000 18-micron particles suspended in Dean flow will be used to simulate with Comsol Multiphysics software, in order to investigate the alignment of particle trajectory. Then analyse the behaviour of particles in such a situation and calculate the separate efficiency of the microchannel. The study shows that particles suspended in the solvent, a horizontal rectangular cross-section, is the most effective due to uniform Dean vortices and more helical turns, which enhance alignment. The increased radius balances Dean and lifting forces, while the 1:4 outlet ratio reduces shear stress, minimizing the difference of particle trajectory. At a flow rate of 0.5 mL/min, particle trajectory did not align due to low Reynolds number, with an S.D. of 0.0300. As the flow rate increased, the alignment improved with S.D. values of 0.4896, 0.0723, and 0.0518 at 1, 1.5, and 2 mL/min. Testing the device with contact lens solution at 2 mL/min and 10,000 particles in a 500x130 µm microchannel with 4 helical turns and 2 outlet channels (1:4 ratio) grants a 94.6% separation efficiency. The outlets are 100 µm wide, with water introduced 5 mm from the center. The experiment determined that the 18-micron particles are utilized as bacteria for testing. Conclusion, the helical microchannel with a rectangular cross-section of 500x130 micrometres, 4 helical turns, and a 1:4 outlet ratio is recommended for particle separation, which has an efficiency of 94.6%.

Keywords: microchannel, comsol multyphysics software

Harnessing Innovation in Solar Paint with Machine Learning Algorithms for Next-Generation Energy Harvesting

Isabelle, G. T, *Charlene, A. J.
*sse_charlene.jahja@bchati.sch.id,
SMA Cita Hati Christian School, Indonesia

According to Indonesia's Directorate General of Electricity, as of the end of 2023, 185,662 households in 140 villages which are mainly in Papua (excluding west of Papua), still lack electricity. These areas face below-standard living conditions without electricity. Instead of utilizing fossil fuels for electricity, solar energy could be utilized as a substitute in order to help meet the government's goal of 23% renewable energy by 2025, said Syamsul Huda, PLN's Director of Regional Business for Papua. A usual method for optimizing solar energy would be to set up a solar panel. Yet its price and investment make it unobtainable for most people. Hence, a promising alternative is to use a newly developed technology called solar paint. Solar paint, also known as "photovoltaic paint" is just like regular paint, except it utilizes photoactive components to absorb sunlight that will be converted to an electric current. By painting this on the surfaces of already existing buildings, roofs, and vehicles, they can be transformed into solar energy harvesting-units through a cheaper medium. However, while its cost is cheaper, it falls behind in efficiency with only 3-8% power retrieval. One of the possible reasons for this are non-strategic locations of the paint. The utilization of Artificial Intelligence (AI) in the realm of energy production presents a promising avenue for enhancing efficiency and ensuring optimal. The flowchart above is the concept that is promoted in this research. We suggest using a thermal camera integrated with Machine Learning (ML) AI in order to detect specific areas where the paint could absorb most sunlight. A thermal image of the building is captured and analysed by an ML algorithm to identify optimal spots for solar paint. This method ensures efficient and cost-effective use of solar paint, making it a promising solution for renewable energy in resource-limited areas.

Keywords: solar paint, Machine Learning, thermal imaging, renewable energy, strategic location.

The Analysis of Suitable Provinces to Locate Solar Cells for Economic Usage

*Melanie Fuangphian, Kanyapat Klannurak, Phachara Chaithum, Yanopat Boonterm, Woraphon Tharat
*55464@yupparaj.ac.th
Yupparaj Wittayalai School, Thailand

Solar energy forecasting currently relies on solar irradiance as a primary factor, without considering the impact of solar cell temperature on their performance. The studies aim to develop a method for forecasting solar energy production by integrating the effects of solar cell temperature on their operational efficiency. The forecasting method facilitates precise prediction of solar energy using solar irradiance, regression value and working hours of the solar cells. The data of each province from the past decade were collected and analysed for the forecast of the next decade temperature in order to calculate the regression value in the change of solar cells temperature. Afterward, the amount of solar energy in the next decade was calculated by a construct formula which consists of solar irradiance, regression value, solar cell type and working hours of the solar cells. In order to find the most suitable province to locate the solar cells for economic usage. The study shows that the forecasting method can forecast the future temperature. The temperature could be used to calculate regression value therefore could calculate solar energy in a construct formula. As verification, the method could accurately calculate back the air temperature in the past decade. As a result, the annual revenue forecasting indicates that Nan, Lampang, and Nakhonsawan are the most promising provinces for solar energy deployment, with projected annual revenues of 39,658 THB, 38,553 THB, and 37,339 THB, respectively. Nan has the most annual revenue due to the average solar irradiance of 18.265 MJ/m*2-day, the efficient temperature of 26.26-degree Celsius and the average working hours of 11 hours and 54 minutes per day. This method could identify the most suitable provinces which emerge annual revenue from electricity sales over the next decade in an efficient way therefore impact the decision making of solar cell economic investment such as solar farms.

Keywords: Solar energy forecasting, Solar irradiance, Operational efficiency, Temperature regression value, Economic investment

Bioengineered Algae for Microplastic Removal from Water

Hermanto,F.A, Oscar,G.A, *Thio,K.T
*sse_karen.thio@bchati.sch.id
SMA Cita Hati Christian School, Indonesia

In a study published on April 24 2024, researchers found that Indonesians consume approximately 15 grams of microplastics per month. Which is much higher than most countries. This consumption mainly comes from water, including seafood. Current methods for addressing this issue are often inefficient and unsustainable. To address this problem, we propose a bioengineering solution utilizing genetically modified microalgae to capture microplastics from water. We develop novel microalgae strains, such as C. vulgaris which has a high nutritional value, rapid growth and is environmentally friendly, making it suitable for large-scale production. Engineered C. vulgaris express high-affinity binding proteins on their cell walls. These proteins are designed to interact and bind various types of microplastics. (1) Use the walne's medium, to ensure nitrogen (100g/1) and phosphorus (20g/l) for protein production. (2) Grow the C. vulgaris at room temperature under optimal light conditions (12-16 hours) and for 14 days for rapid growth. (3) Once the C. vulgaris reaches sufficient biomass (50 mg/l) and protein levels, harvest the biomass through centrifugation at around 5000 rpm for 10 mins, and dried at 60°C 24 h (4) Obtain 10 mg/l of biomass for use as a coagulant. (5) Introduce the C. vulgaris to the contaminated water, then allow the C. vulgaris to bind with the microplastics for 2 days. (6) Once the microplastics have bound to the C. vulgaris, separate the coagulated material using centrifugation at around 5000 rpm for 10 minutes. This will allow both the C. vulgaris and the microplastics to separate from the water. (7) After centrifugation, the pellet which consists of the biomass bound with microplastic, is collected and separated from the supernatant. (8) Then the supernatant that consist of water can be tested for the remaining microplastic to determine the efficiency of the coagulation process, by using the Raman spectroscopy dual-wavelength laser excitation at 784 nm/785 nm used to detect the initial and remaining microplastics. From this theory, we can expect that by using genetically modified C. vulgaris could be used as an environmentally friendly way to effectively remove microplastics from the water.

Keywords: microplastic, microplastic pollution, environmental pollution, C. vulgaris, microplastics removal, sustainable technologies

Innovative Approaches to Overcoming Environmental Challenges in Solar Cells: A Theoretical Study

*Willson Limyan, Gregorio Mackenzie Salim, Ethan Arthasuya Tjahja, Sabio Yanenggar Caestariono, Timothy Marcelino Siahaan, Devita Marlina Venessa
*willsonlimyan@reginapacis-jkt.sch.id,
SMA Regina Pacis Jakarta, Indonesia

The theoretical study will discuss various strategies for improving efficiency and sustainability in solar cells, representing a renewable energy solution for solving the global energy crisis. Being eco-friendly, solar cells bear great potential for minimizing environmental pollution; however, their efficiencies are often degraded by various contaminants such as dust, dirt, and industrial pollutants, which usually settle on the surface, reducing efficiency. By reviewing existing research, this study proposes innovative approaches to enhance the durability and functionality of solar cells under various environmental conditions. Key strategies to be developed/enhanced will include the following: (1) the advance of contamination- and pollution-resistant material development capable of reducing surface degradation and enhancing longevity; (2) device structure engineering advances that would enhance stability and durability, and better heat management mechanisms to protect against climate-related challenges; (3) lead-free materials from an ecological perspective are foreseen to help reduce the ecological footprint of production and waste, improving the performance in the long term; and (4) integration of solar cells with energy storage technologies, like batteries, allows uninterrupted feeding of power even under less favourable conditions. Therefore, these findings point to the need for further research and development in material innovations and system integrations that will improve performance and sustainability in solar cells. Though the solutions are theoretical, they provide a sound basis for future experimental research and deployment of more efficient and sustainable solar energy technologies. The present study completes the previously mentioned shortcomings in the general effort of rendering solar energy a more viable and long-term alternative to globally needed energy that would only have a minimal environmental impact.

Keywords: solar cells, renewable energy, materials, environmental, mitigation strategies.

LITHIN: Lipid And Chitin-Based Black Soldier Fly Larvae Multifunctional Serum

Sofia, R., *Nugroho, A.R., Simarmata, A.G.S.
[1]Raihani Sofia
[1]0raihani.sofia0@gmail.com
SMAN 68 Jakarta, Indonesia

In today's industry, developing eco-friendly materials with minimal environmental and health impacts is crucial. Global policies, guided by the UN's 2030 sustainable development goals, now emphasize reducing waste through resource valorization. This shift has driven the pharmaceutical and cosmetic industries to seek natural, renewable, and cost-effective ingredients. One promising source of valuable compounds is the black soldier fly (Hermetia illucens, BSFL), known for its efficient conversion of organic matter into useful substrates. This not only makes black soldier fly larvae products environmentally friendly but also beneficial for cosmetic products such as skincare. Black soldier fly larvae are notable for their lipid content, which ranges from 15–49% of total dry weight, with lauric acid being the most abundant fatty acid. Additionally, black soldier fly larvae contain chitin, a valuable biopolymer with various applications in pharmaceuticals and cosmetics. Combining black soldier fly larvae lipids and chitin, Lithin Serum can be developed as a lightweight skincare product designed to deliver concentrated active ingredients and enhance overall skin health and appearance. Lithin Serum provides profound hydration by maintaining the skin's moisture barrier, keeping it plump and smooth. The lipids in the serum help soften the skin, reduce blemishes, and enhance brightness. Chitin offers anti-aging benefits and protects the skin from external hazards, improving functions such as heat regulation, protection, secretion, excretion, sensation, and absorption. Lithin Serum aims to revolutionize the cosmetics industry with products that are beneficial for both consumers and the planet. Its biocompatibility with the skin ensures it is not only effective but also eco-friendly. Utilizing black soldier fly larvae contributes to a circular economy by converting waste into valuable resources, thereby minimizing environmental impact and ensuring product sustainability.

Keywords: Black Soldier Fly, Chitin, Cosmetic, Lipid, Serum, Sustainable.

Plastic Waste Accountability: Assessing the Potential and Pitfalls of Credit Systems

[1]Raudhahtul, I.M., [1]*Syabil, F.S.
*syabils159@gmail.com
[1]Universiti Tenaga Nasional, Malaysia

Plastic waste production has doubled since the beginning of the century, totalling to a staggering amount of 430 million metric tonnes per year according to the Sustainable Development Summit. This is due to the extensive use and reliance on products that are made from plastic material in our daily lives. This number accounted for 4 categories: i) 46% of plastic waste ends up in landfills, ii) 22% is uncollected or mismanaged, iii) 17% ends up being incinerated, and iv) less than 9% of it is being recycled. This paper explores plastic credits as a global initiative to reduce plastic waste, focusing on its flaws and potential improvements. A plastic credit represents the collection and recycling of a specific weight (e.g., one metric ton) of plastic waste, which is then repurposed and sold to producing companies. While intended to foster a circular economy, the system currently fails to hold primary producers (those generating plastic waste) accountable, limiting the cycle to recycling companies and sustainable producers (those using recycled plastic in production). Issues like transparency and inefficiency in connecting responsibility to original producers are major concerns. To address this, the paper suggests adopting a "cap-and-trade" mechanism from carbon credits, where primary producers are given a quota for plastic waste production. Once exceeded, they must purchase additional credits or contribute to waste management. This would make producers more accountable and expand the system to include all stakeholders. Through a literature review, this study will examine the gaps in the current plastic credit model and assess the potential of the proposed mechanism.

Keywords: Plastic waste, plastic credit, circular economy, carbon credit, sustainable

Upholding Human Rights on X: A Digital Dignity Framework for Cyberbullying Detection in Indonesia

[1]*Muna, Fazhaliani. [2]Shariffatul., Munada, Wina., & [3]Rahmah, Ainur.
[1]fazhaliani.muna@student.aiu.edu.my
Albukhary International University, Malaysia

This study investigates the pressing issue of cyberbullying on X, recognized as the most aggressive social media platform in Indonesia. The research aims to propose an ethical AI-driven content moderation framework including developing a moderation system that balances content control with users' rights and exploring the concept of digital dignity as it relates to human rights as a very important component in the digital realm. Methodologically, the study employs a comprehensive literature review of existing cases of digital rights violations and X implemented policy in Indonesia. By looking further into how Indonesia can implement Pancasila and the Electronic Information and Transactions Law (UU ITE) as the basis of the state that protects the rights of every citizen. The research includes a performance comparison of various machine learning algorithms—Logistic Regression, Random Forest, Support Vector Machine, and Naive Bayes—for detecting cyberbullying on X. The proposed ethical framework includes a tiered system of content warnings, an appeals process with human review for complex cases, and regular audits of AI decisions to mitigate bias. The findings reveal that the Naive Bayes algorithm outperformed others, receiving an accuracy rate of 86.15% in detecting cyberbullying. This result highlights the algorithm's effectiveness within an ethically grounded moderation system. To conclude, this research emphasizes the critical need to integrate human rights considerations into AI-driven content moderation on platforms like X. The proposed framework aims to effectively combat cyberbullying while safeguarding users' rights in Indonesia's challenging social media environment.

Keywords: cyberbullying, content moderation, human rights, Naive Bayes, machine learning

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BANDUNG CREATIVE SOCIETY

Development of Natural Hydrogel for Wound Healing Using Pectin from Orange Peels and Nanocellulose from Sugarcane Bagasse

*Wang, K. A.,Siswanto, K. A.
sse_kenzie.wang@bchati.sch.id
SMP Cita Hati Christian School, Indonesia

Current wound dressing options emphasize maintaining the wound in a moist and isolated environment, which has proven effective in promoting healing. Hydrogels are among the most popular wound dressing options due to their capacity to absorb exudates and maintain stability under varying pH conditions. However, most commercially available hydrogels are made from non-recyclable materials, which pose environmental challenges. This research aims to develop a flexible and eco-friendly natural hydrogel derived from agricultural waste in Indonesia, specifically orange peels and sugarcane husks, to enhance tissue repair while reducing environmental impact. Nanocellulose, known for its mechanical strength, water retention ability, and antimicrobial properties, was extracted from sugarcane bagasse through bleaching, delignification, and acid hydrolysis. After that, the mixture was centrifuged and neutralized, followed by drying and grinding. Pectin, which has gelling properties and the potential to support tissue healing, was extracted from orange peels through acid hydrolysis and ethanol precipitation before being neutralized, dried, and grounded. Hydrogels were then synthesized by blending nanocellulose and pectin at various ratios (25:75, 50:50, 75:25), followed by cross-linking with calcium ions. The independent variable in the study is the nanocellulose-to-pectin ratio, whereas the dependent variables included the gel's antimicrobial properties, consistency, wound healing diameter, and scab formation. The wound closure rate and scab development will be assessed through in vivo testing on mice. Results showed that the 50:50 nanocellulose-to-pectin ratio produced the most optimal hydrogel, demonstrating balanced turbidity (11-20 NTU), ideal water solubility, and superior antimicrobial retention. Hydrogels with higher nanocellulose content were too viscous and showed reduced antibacterial properties, while those with more pectin lacked structural ability. In conclusion, the 50:50 hydrogel formulation presents a promising, eco-friendly wound dressing alternative, effectively balancing mechanical strength and antimicrobial protection while contributing to the reduction of agricultural waste.

Keywords: nanocellulose, pectin, hydrogel, wound dressing, agricultural waste

GLEAN: Green and Eco-Friendly Straws from Leftover Rice and Beans

[1]*Jeanne d'Arc Orizia Raelene Loviella, Mikaela Nathania Naibaho, Clara Dhisa Sumunaring Ratna, S.Si.
[1]jeannedarcoriziaraelene@gmail.com
SMP Montessori, Indonesia

Plastic waste has been an environmental problem. Plastic waste production in Yogyakarta 2023 reached 153.662,14 tons/year or 27.94% from the total production of 1.231,55 tons/year (The Ministry of Environment and Forestry, 2023). Most plastic is unrecyclable and takes 300- 500 years to degrade perfectly, Putri and Falah (2021) stated. Plastic straws contribute to the pollution caused by microplastics (Roy et al., 2021). Everything can get contaminated and damaged the environment, like decreasing minerals in soil (Aragaw, 2023). Biodegradable straw is one of the solutions (Lestari et al, 2022). Polysaccharides is used as the main ingredients to make biodegradable straw. Green bean and unused rice, natural glycerin as plasticizer and extract of butterfly pea flower will create a biodegradable straw (Lestari et al, 2022) and (Putri et al, 2021). This research uses the ratio variance of unused rice and green bean starch. The analyzed parameters are organoleptic, diameter and thickness, water absorbance, and biodegradability using One Way ANOVA. Based on the result, the straw is blue-purplish, smooth texture, and has unique smell. They have a diameter of 12.46 ± 2.30 mm, the thickness of 1.63 ± 0.36 mm, and length of 13.29 ± 0.28 cm. The water absorbance test showed a result of 1.40 ± 0.65 % and biodegradation in seven days showed a result of 90.37 ± 1.40 %. Using the One Way ANOVA and significance of 95%, the biodegradable test showed significance of 0.014 lead to conclusion that variance concentration of unused rice and green bean affects towards the biodegradability of the straw.

Keywords: biodegradable straw, unused rice, green bean, butterfly pea flower extract

Fly Repellent Oil

[1]Nur Damia binti Mohd Hafiz, *Khaireen Balqis binti Khairul, Raina binti Roslee & Rifqa Hilorra Binti Husin
[1]ndamia.mhafiz@gmail.com
Seri Puteri Science Secondary School, Malaysia

People nowadays have distractions while eating or while doing some outdoor activities. The bug that is distracting us is fly. Flies can cause many types of diseases because they carry germs and bacteria from dirty places such as garbage, feces, and food waste. Among the diseases we can get from flies include diarrhea, cholera, typhoid and others. This can interfere with our daily activities and harm us. That is why we created a fly repellent that is effective, easy to carry, does not contain harmful substances and can solve our problem. The materials that we use to make the liquid are vinegar and dishwashing soap, peppermint oil, lemongrass oil and vanilla extract. The material that we use for the packaging is a sponge and a small iron container to store it. Our innovation can solve the problem by using ingredients that can repel flies in our liquid production. This innovation complies Sustainable Development Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss (SDG 15). (a fundamental shift in humanity's relationship with nature is nature is essential escalating such as forest losses, land degradation, species extinction)

Keywords: Repellent, fly, portable, essential oil, eco system, sound, liquid, daily life.

Peeling Back Immunity: Orange Peel Extract as a Potential Natural Immunomodulator for Systemic Lupus Erythematosus

Adilah, A
adilahassegaf123@gmail.com
Junior High School 02 Semarang, Indonesia

Systemic Lupus Erythematosus (SLE) is a complex autoimmune disease characterized by chronic inflammation and dysregulation of the immune system. Current treatments for SLE often involve general immunosuppressants and antimalarial medications, which can have significant side effects and may not be effective for all patients. This has led researchers to explore alternative therapeutic options, including natural compounds with anti-inflammatory and immunomodulatory properties. Orange peel extract has emerged as a promising candidate for SLE treatment due to its rich content of bioactive compounds, particularly polyphenols. These compounds have been shown to possess potent anti-inflammatory and immunomodulatory effects in various studies. This study investigated the anti-inflammatory and immunomodulatory effects of orange peel extract on peripheral blood mononuclear cells (PBMCs) from SLE patients. PBMCs from ANA-positive SLE patients were treated with orange peel extract at 25, 50, and 100 µg/mL. Flow cytometry was used to analyze Th1 (CD4+IFNγ+), Th17 (CD4+IL17A+), and Treg (CD4+CD25+Foxp3+) cell populations. Orange peel extract significantly decreased Th1 and Th17 cells while increasing Treg cells in a dose-dependent manner through inducing of interleukin-10 anti-inflammatory cytokine. At 100 µg/mL, the extract reduced Th1 cells from 12.70% to 7.83% and Th17 cells from 18.47% to 11.67%, while increasing Treg cells from 0.14% to 3.67%. Phytochemical screening revealed the presence of flavonoids, which likely mediate these immunomodulatory effects through suppression of inflammatory cytokines and transcription factors. These results suggest orange peel extract can help restore immune balance in SLE by suppressing pathogenic Th1/Th17 responses and promoting regulatory T cells and IL-10. The extract shows promise as a potential natural immunomodulatory adjuvant therapy for autoimmune conditions like SLE. Further research is needed to elucidate the molecular mechanisms involved and evaluate clinical efficacy.

Keywords: Orange peel extract, immunomodulator, anti-inflammation, SLE.

Toraja Coffee Grounds Content Flavonoids to Fight Acne

[1]Nur Insaniah Zahirah Darwis, Nurul Izzah Idham Khalid, Ellyna Widya Dariyanti, Maitsa Atsila Harun, Dedi Rimantho
[1]sanizahirah@gmail.com
MAN 2 Kota Makassar

The flavonoid content in coffee, especially in green coffee beans, coffee bean extract, and coffee grounds, has antioxidant properties that can be beneficial for the skin (Bothiraj et al. 2020). This study aims to evaluate the flavonoid content in Toraja Arabica coffee grounds and its potential in deflates acne in teenagers. In this study, Toraja Arabica coffee grounds were tested for the anti-inflammatory activity of coffee grounds extract in skin cell cultures to assess its ability to reduce inflammation associated with acne. The research was conducted for 3 months at MAN 2 Makassar City. The effects of using coffee grounds were observed and compared with conditions before use. The results showed that Toraja Arabica coffee grounds contain flavonoids (1.6%2.4%,) and the extract shows anti-inflammatory effects which can contribute to reducing acne symptoms. Respondents agreed (42%) that 7 days is the optimal for reducing acne. These findings support the potential use of coffee grounds as a natural ingredient in skincare, especially for teenagers who experience acne.

Keywords: Acne, coffee grounds, face mask, natural treatment.

Development of a CO2 Absorbing Robot with an Artificial Photosynthesis System for Chlorella Vulgaris Microalgae Based on IoT

[1]*Anindhita Dea Shafira, [2]Cheelsy Ameylia Lubis, & [3]Fairuz Khairah Arisandi
admin@ickendari.sch.id,
[123]MAN Insan Cendekia Kota Kendari, Indonesia

The increase in carbon dioxide (CO2) concentrations in the atmosphere is a global concern. The United Nations Framework Convention on Climate Change (UNFCCC) was established in 1992; the agreement of several countries is the first global treaty that focuses on climate change. But the transition to clean energy cannot be entirely fuelled by renewable energy technologies, because the transition to green energy is hampered in many developing countries due to low investment costs. This robot development aims to help reduce carbon emissions on a household scale at a relatively low cost; the development of artificial photosynthetic robots could be a solution to climate change. By utilizing artificial photosynthesis with the microalgae chlorella vulgaris as an efficient CO2 bio-adsorbent agent. This robot is equipped with robotics components such as Arduino ESP 32 by integrating IoT (Internet of Things) as a control system and artificial light and pollution sensors, the microalgae artificial photosynthesis process can be controlled via devices to maximize CO2 absorption. The results of this research will be detected on the pollution sensor and can be seen on devices connected to the IoT control. Thus, it is hoped that this system can be an effective solution for reducing CO2 levels in the air and contributing to climate change mitigation efforts.

Keywords: Climate Change, Robot, Artificial Photosynthesis, Microalgae, Internet of Things (IoT).

Innovation Of Herbal Mouthwash from A Mixture of Centella Asiatica Leaf Extract, A Solution to Maintain Oral Health from Medicinal Herbs

[1]*Syauqi Azka Putra, Naufal Keandre Rizqulloh, Shalaisya Nezzaluna K.
[1]sazkaputra@gmail.com
SMA Negeri 8 Jakarta, Indonesia

The oral cavity can be said to be the "window of the body" because through the mouth, the body gets the necessary nutrients. But the mouth can also be the beginning of various diseases. Oral problems such as mouth fungi, stomatitis, dental caries, and periodontal disease can be prevented or treated at an early stage. The 2022 WHO global oral health status report estimates that oral diseases affect almost 3.5 billion people worldwide. The increasing awareness of the importance of oral health among young generations who want fresh breath in daily activities encourages them to consume mouthwash. Long-term use of mouthwash containing fluoride, chlorhexidine, and alcohol causes damage to tooth enamel, dry mouth, mouth, and throat irritation, and oral cancer. Therefore, innovation is needed in developing mouthwash that can be used safely in the long run without inorganic chemicals that can trigger diseases related to the oral cavity. One innovation developed is herbal mouthwash with Centella asiatica leaf extract using the maceration method. Centella asiatica leaves are often used by the community as medicinal plants to improve blood circulation, reduce fever, stop bleeding, have antibacterial, anti-asthma, anti-inflammatory, anti-allergic,and others (Muchtaromah, 2011). The benefits of Centella asiatica leaves for the mouth include anti-inflammatory, antibacterial for oral infections, accelerating healing of stomatitis, refreshing breath, and nutrients in Centella asiatica leaves can also improve dental and gum health. From the experiments conducted, it was concluded that the Centella asiatica leaf extract method using the maceration method produces a good extract. This herbal mouthwash innovation offers a safe and effective solution to maintain long-term oral health. Because Centella asiatica has various benefits such as anti-inflammatory, antibacterial, and accelerating healing of stomatitis, it can be a more natural and safer alternative than chemical mouthwashes.

Keywords: Centella asiatica, oral health.

The Effectiveness of Starch-Based Biodegradable Plastic Cups as an Alternative to Conventional Plastic Cups in Reducing Plastic Waste

[1]*Falisha Aulia Mahrin, Aulia Fadhillatusyakirah A, Labib Muthahhar, Siti Fayruz Raodah, Dedi Rimantho
[1]*falisha.panpan@gmail.com
MAN 2 Makassar City, Indonesia.

The increasing use of single-use plastics has become a major environmental concern. According to the data from the Ministry of Environment and Forestry (KLHK), plastic waste production in Indonesia has increased significantly over the past decade, with projections indicating it will reach 9.9 million tons by 2025, accounting for 13.98% of total waste. Plastic cup also contributes to these negative impacts, so developing the biodegradable plastic cup can be one of the solutions to this problem. This research aims to identify a sustainable alternative to conventional plastic cup by developing a biodegradable plastic cup based from Amylum solanum (potato starch) and Amylum manihot (cassava starch). The product development process involved three stages: defining the problem, designing the solution, and developing the product. Data gathering methods including documentation review, experimentation for formulation, and validity testing for product assessment. The parameters are the tensile strength, elongation, water uptake, and the biodegradation. The resulting product, named BioCup, demonstrated favourable sensory attributes. The optimal formulation for the edible film consisted of 12.48% starch, 3.74% glycerin, 83.16% aquadest, and 0.62% acetic acid. This study hope to contributes to the development of sustainable materials that can help mitigate plastic waste in Indonesia.

Keywords: Plastic Waste, Biodegradable Plastic, Starch,

An Innovative Solution for Food Waste: Utilizing Eggshells as a Nutrient-Rich Fertilizer in Aquaponics System

Kenneth, H.J.; [1]*Neilsen, G.A.
[1]sse_neilsen.alexander@bchati.sch.id
SMA Cita Hati Christian School, Indonesia

Indonesia is currently the largest food waste contributor among ASEAN countries, with a staggering amount of 20.93 million tons of food wasted annually – 2% of it being eggshells. The aquaponics system is a form of agriculture or food production system that combines aquaculture (raising aquatic animals) with hydroponics (plants). This study believes eggshells as a fertilizer can be used in an aquaponics system as they are beneficial for both fish and plants. This study aims to measure the effectiveness of eggshells usage as a fertilizer for aquaponics, with the research question: "To what extent does the usage of grounded eggshells effectively improve the quality of an aquaponics system?" This study hypothesizes that there will be a significant increase in the effectiveness and quality of both plants and fish in the aquaponics system. The experiment procedure will be conducted as follows: (1) Produce the grounded eggshells by cleaning and drying them, followed by grinding them into fine powder using a blender, (2) Create the liquid fertilizer by adding 1 liter of water to 1 tablespoon of the grounded eggshells, followed by mixing the solution thoroughly, (3) Filter out any large particles of eggshells and obtain the filtrate, which serves as the liquid fertilizer, and (4) Pour the liquid fertilizer into the plant tank. The effectiveness of the aquaponics system will be evaluated through the comparison of the size of fishes and plants between the aquaponics with and without the addition of eggshells.

Keywords: food waste, eggshells, aquaponics, liquid fertilizer

Formulating Anti-Acne Face Toner from Trembesi Fruit (Samanea saman) and Kersen Leaves (Muntingia calabura): Organoleptic Test Results Using SOCA.I Application

Amma, H.H., *Maulida, T.R., Dewi, T.G.E., Rachmadhica, A.K. & Sudigdo, C.N.
tsabitarahma2007@gmail.com
SMA Muhammadiyah 2 Sidoarjo, Indonesia

Samanea saman (Trembesi) is one of the trees that acts as the lungs of the city with its ability to filter CO2 in tropical countries. However, this tree leaves behind municipal waste that needs to be processed. As exemplary students in implementing chemistry, this research seeks to solve the problem of Trembesi organic waste, Kersen Leaves, and Clove Flowers by making acne-preventing face toner products. The research was carried out from May 30, 2022 to August 23, 2024, through literature study and experimental methods with testing and practicum in it, such as; Fehling test as proof of the presence of hemicellulose in Trembesi Fruit Pulp, fermentation and distillation as alcohol extraction from Trembesi Fruit, flame test and alcohol content test with alcohol meter as a re-check of alcohol existence in distillation products, while maceration is soaking Kersen Leaves in pure 96% alcohol as well as soaking Clove Flowers in Canola Oil, then carrying out formula pH tests and organoleptic tests to 6 panellists as proof of product feasibility. In this study, Aloe vera was also added to the face toner formulation as a moisturizer and pH stabilizer for facial skin. In addition, there was an artificial intelligence-based test and an organoleptic test as a comparison medium with SOCA.I that showed more detailed results than the organoleptic test, although fewer variables were used. Both tests showed that toner provides utility in keeping the skin clean and nourished, although its use should be punctuated by limiting and controlling lifestyle. In addition, the diversity of the panellists' skin types caused some effects on the organoleptic test, such as; moisture stability, controlled oil production, pore cleansing and reduction of acne growth due to the sterile procedure with natural ingredients.

Keywords: face toner, trembesi fruit pulps, kersen leaves, clove flowers, SOCA.I.

Analysis Of the Economic Value of Utilizing Waste Oil in Aromatherapy Candles

[1]*Parsa Ghani Hasdiyanto, [2]Ali Rahman Hasdiyanto
[1]parsahasdi1@gmail.com
[1]SMAN 8 Jakarta, Indonesia
[2]SMA Metropolitan Bekasi, Indonesia

Waste cooking oil has the potential to cause negative impacts on the environment and health. Based on these problems, used cooking oil needs to be handled wisely so as not to cause ongoing side effects. This research aims to be the first step in reducing the disposal of used cooking oil waste by converting waste into products of economic value through reusing used cooking oil into aromatherapy. The transformation of the function of used cooking oil is expected to be useful, especially in reducing the use of used cooking oil and innovation to increase the income of the people. The method used in this research is non-probability sampling, namely purposive sampling. Research data was collected from people around the neighbourhood to provide more in-depth knowledge regarding the use of cooking oil as an economic product. So, it is hoped that this research can provide benefits to the local community in increasing the selling value of used cooking oil.

Keywords: Economic Value, Aromatherapy Used Cooking Oil, Strawberries (Fragaria choiloensis L.),

Plant Whisperer: Utilizing Sound Waves to Communicate with Plants

[1]*Eugene, M., Njoto, F.C., Tenggonatan, O.F., Lee, F.M & Foo, E.
[1]sse_maximillian.eugene@bchati.sch.id
SMA Cita Hati Christian School East Campus
Indonesia

Plants play a vital role in human life, providing essential nutrients, and as popularity rises for plant-based options, so does the need for freshly picked organic produce, resulting in a demand for self-sustaining gardening alternatives. This study tackles this by proposing the product "Plant Whisperer," aimed at increasing the accessibility of sustainable gardening by automating the need for monitoring and improving growth. Stressed plants produce frequent "ultrasonic clicks", which can be observed to monitor plant health, shown in tomato plants emitting sounds at 40,000-60,000 Hz when lacking water. The number of clicks is counted within an hour. When the count exceeds 10, the average frequency is fed to a convolutional neural network (CNN) to identify stressors such as dehydration or damage, as shown in Flowchart 01. Furthermore, research suggests that plants react to external noises, as depicted in Graph 01, which demonstrates that certain sound frequencies can impact the growth of crops, varying based on the species. In this case, the graph clearly shows that rock music affects bean plants negatively compared to classical music. This concept can be exploited to enhance plant growth measurements like height and yield. The "Plant Whisperer" connects to a mobile app that can alert and display real-time changes in the plants' status, enabling individuals to quickly address any problems. The prototype, developed with the help of the MIT App Inventor, uses Firebase for real time data transmission. A GUI prototype is shown in Figure 02. The device contains a microphone to detect sounds to monitor the plant's condition as shown in Figure 01. The product also uses an ultrasound speaker to emit growth inducing sounds that increase yield. In conclusion, by decreasing the time and attention required for gardening, this innovation can make plant care easier than ever.

Keywords: Plant Whisperer, sustainable gardening, ultrasound, communication, convolution neural network, stressor, plant yield

Development of Alternative Milk from Watermelon Seeds as a Substitute for Cow's Milk

[1]*Nabila Salsabila Taslim, Athalia Hyacintha R, Nur Ikhranawafa, Elfiani Rizki
[1]nabilasalsabilataslim@gmail.com,
MAN 2 Makassar City, Indonesia

This study aims to develop an alternative milk from watermelon seeds as a substitute for cow's milk, considering that some individuals have allergies or intolerances to cow's milk. To achieve this, watermelon seeds were extracted to produce watermelon seed milk, which was then analysed for its physicochemical properties, nutritional content, and organoleptic qualities. Physicochemical analysis included viscosity, color, and pH, showing that watermelon seed milk has satisfactory characteristics similar to cow's milk. The nutritional content of watermelon seed milk includes approximately 1.6 grams of protein, 0.5 grams of fat, 2-3 grams of carbohydrates per 100 grams, and minerals comparable to cow's milk. Organoleptic properties such as taste, aroma, and overall acceptance were also evaluated, revealing that watermelon seed milk is well accepted by children, although its taste is less appealing compared to cow's milk. Despite the significant nutritional benefits of watermelon seeds, the primary challenge is addressing the bland taste. The study suggests that to improve market acceptance, innovations in production and effective marketing strategies are necessary. With this approach, watermelon seed milk has the potential to be an attractive and sustainable plant-based solution for meeting consumer needs for healthy milk products. The study concludes that with further development, watermelon seed milk could become a widely accepted and viable milk alternative.

Keywords: alternative milk, watermelon seeds, cow's milk substitution, consumer acceptance.

Making Human's Mobility as Environmentally Friendly Clean Energy Source Through Piezoelectric Effect

Ernest Noell, [1]*Lionel Maxmillian Suryono, Novidwifina Lay
[1]mcinemaxx@gmail.com
SMA Katolik Mater Dei - Indonesia

Energy availability has been a global concern considering the supply of fossil energy sources keeps running low. Various types of clean renewable energy are always being the object of research and development with the goal to introduce better energy sources for a better energy utilisation in the future, like solar panel. Each day, the demand for energy grows along with the population rise and the increase in human mobility around the world. Reported from the Ministry of Energy and Mineral Resources (ESDM) of the Republic of Indonesia webpage, by 2030 world's demand for energy is predicted to increase 45% with an average increase of 1.6% annually. This enhancement will be driven by population growth rate and GDP, as well as economic growth in the Asian region which makes an important contribution to world economic growth. Human activity occurs almost constantly without stopping, raising the question of whether it is possible to utilise continuous human activity to create something more useful by converting it into electrical energy. Realisation of the innovation to utilise human activities such as walking and running can be implemented by adopting piezoelectric effect concept. Piezoelectric effect occurs on quartz crystal material (SiO_4) when mechanical pressure converted into electrical energy. Paving kinetic and piezoelectric speed bumps are technologies that have applied the concept of piezoelectricity to produce clean electrical energy. For this reason, different energy conversion principles are needed in an effort to create human-powered electricity generators. This revolutionary technology is suitable to be applied in urban and metropolitan areas, because these places have the potential for high intensity development in terms of mobility as a result of the high number of individuals moving. This can change life because the modern era that requires very intense mobility can also be a source of electricity.

Keywords: Piezoelectric, Paving Kinetics, Mobility, Clean Energy, Activities.

Simple Coding Development on a Wall Avoider Wheeled Robot System Using Ultrasonic Sensors

[1]*Razan Rahmat Darmawan, [2]Roqib Muhammad Ramadhan
[1]razanrahmatdarmawan@gmail.com, [2]roqibmuhammad01@gmail.com
Edu Global Bandung High School, Indonesia

The development of robotics technology has experienced rapid progress in the last decades. One of the important aspects of robot development is coding. Coding robots with complex functions often requires high-level programming skills and a deep understanding of algorithms. As a result, robot development is limited to experts. So, innovation from non-technical individuals is less explored. To overcome this problem, an approach is needed that simplifies the coding process for robots. This research aims to modify complex coding to be simpler so that it can be developed more easily. This simple coding implementation is carried out on the microcontroller and ultrasonic sensor so the robot can move to avoid obstacles. The method used in this research is R&D (research and development). Data collection techniques in this research included literature studies, hardware design, and software design. The results of this research are that the coding created in more simply can move the robot so that it can avoid obstacles in front, right, and left of the robot well by the specified limits.

Keywords: simple coding; wall avoider robot; ultrasonic sensors.

Meru Tani: Rice Field Pagoda

[1]*Hana Resti Angliany, [2]Dare Haqqu Moslem
[1]anglianyh07@gmail.com, SMAN 15 Bandung, Indonesia
[2]wenslaunsibiliny@gmail.com, SMAN 2 Bandung, Indonesia

Indonesia is heavily reliant on rice, with a high per capita consumption rate annually. However, rice production has declined due to constraints such as land limitations, El Niño-induced climate changes, and flooding. The disparity between high demand and low production necessitates rice imports to meet domestic needs. Consequently, any impediment hindering rice production may lead to adverse repercussions for Indonesian society, potentially precipitating an economic crisis. This study aims to develop a farming strategy for urban society as a solution to harvest failure and limitation of land, called Meru Tani. Meru Tani is a new farming technique that uses an indoor multilevel farming system which is combined with ultraviolet lightning to make a better quality of plant growing, plant of rice. Meru Tani adopted architecture of a Pagoda, Hindu culture in Indonesia since century ago. This research is still in the first phase of developing research. This research method used a descriptive strategy to aim the research purposes and illuminate how to build this innovation and how this prototype can theoretically increase rice plant production. The method involves journals, a review of literature, interviews with agricultural experts and finding the formula to improve the efficiency of the prototype.

Keywords: urban farming, ultraviolet, agriculture

Utilizing Butterfly Pea Flower (Clitoria ternatea) for Natural Blue Dye with a Focus on Custom Pigment-Making Machine Development

[1]*N.I. Ekoputri, L.M.D. Nur Zatna, A.M. Sumadiwangsa, S.P. Pratama, R.R.A. Prasetyo
[1]nafishainastasya@gmail.com
Kharisma Bangsa School of Global Education, Indonesia

This study investigates using the Butterfly Pea Flower (Clitoria ternatea) to produce a highly tinted natural dark blue-colored dye. We aim to create an eco-friendly dye as an affordable colorant less toxic than synthetic dye. Traditional dye production often relies on petrochemicals and harmful additives, leading to environmental pollution and health risks due to volatile organic compounds (VOCs). Our approach addresses these issues using a locally sourced, safer, and more sustainable resource. Synthetic blue dyes are primarily made in countries like Germany, the United States, and Japan using chemicals like phthalocyanine and other artificial compounds, which can be harmful and costly. However, the reliance on importing these dyes raises prices in countries like Indonesia. In contrast, the Butterfly Pea Flower, which grows readily in local gardens and along roadsides throughout Indonesia, provides a safer, cheaper, and more eco-friendly alternative. To produce the dye, we designed a machine with a container, a DC motor for an up-and-down motion for compression, and a filter to filter the extracted dye from the flowers. The machine was purposely built to integrate all the necessary functions for efficient dye extraction, combining heating, compressing, and filtering into one system. The container heats up, while the DC motor generates the motion needed for compression to apply pressure on the flowers. This helps us extract the dye efficiently. The liquid dye is filtered through the bottom by filter paper and collected using a syringe. Our results show that Butterfly Pea Flower dye is a good option for replacing synthetic dye. It provides both environmental and economic benefits century, a shift to synthetic blue dyes Here in this research, we proclaim to change the means of dye production into a more environmentally friendly procedure that conserves its quality and is vented at an affordable price. This research explores the development of natural blue dye derived from the butterfly pea flower (Clitoria Ternatea). One of the earliest known blue dyes is derived from Indigofera tinctoria and other similar plants. In the late 19th happened, starting with the development of synthetic indigo by German chemist Adolf von Baeyer (Bojer, 2018). Artificial dyes have a few advantages, such as predictable results and faster production.

Keywords: Butterfly Pea Flower, Eco friendly,Natural dye, Dye extraction machine, Synthetic dye replacement

Use Of the Mall Website "Malaria Learning" As A Media for General Learning in Identifying Malaria

[1]Mamangkey Efendjelly Sharen, [2]Kanine Patricia Theophillia, [3]*Tondako Reynaldi
[3]reynalditondako@gmail.com
[1]D-III Medical Laboratory Technology Health Ministry of The Health Polytechnic Manado, Indonesia
[2]D-III Medical Laboratory Technology Health Ministry of The Health Polytechnic Manado, Indonesia
[3]D-III Medical Laboratory Technology Health Ministry of The Health Polytechnic Manado, Indonesia

Malaria is one type of disease that is still often a health problem and is also often a hot topic of conversation in Indonesia. Malaria can be transmitted to humans through 2 vectors of Malaria carrier agents, namely Malaria Parasites (often referred to as Plasmodium) and female Anopheles mosquitoes. In preventing the wider spread of Malaria, of course, follow-up is needed in enforcing the correct Laboratory Examination Results. The purpose of this study is to help the general public, especially ATLM in recognizing the type of Plasmodium that can spread Malaria. In addition, so that the diagnosis of the examination is carried out quickly and precisely, therefore a website with good technology is made so that it can identify Malaria quickly and precisely from the previous examination method, namely microscopy. This website can be used by the general public and also ATLMs who serve as Laboratory Officers, In this website there are features that can be accessed, namely the Let Me See Camera (LMS Cam) a camera feature that can be used when Website users upload images from the results of the LSM Cam examination can provide information related to the type of plasmodium that identifies the user besides that LSM Cam can also photograph images of red blood cells so that the LSM Cam can distinguish between red blood cells infected with Malaria and healthy red blood cells. The expected result of using this website is that it can help the general public, especially ATLM in providing information and diagnosis of malaria because this website can make it easier for users to identify malaria, of course this is driven by the LSM Cam feature which is a feature of the website so that LSM Cam quickly identifies the type of Plasmodium Malaria in the image.

Keywords: Malaria, Website, Plasmodium, LSM Cam

Trend HIV Care: Early Detection of HIV Diseases for Teenagers with Common Symptoms Using Detection Empowered Online Application with Personalized Education, Counselling, and Support

[1]*Anastasya P. Patau, [1]Julio C.E. Waney, [2]Ray M. Dewi.
[1]Anastasyapatau@gmail.com, Kemenkes Poltekkes Manado, Nursing Department, Indonesia.
[2]direktorat@poltekkes-manado.ac.id. Kemenkes Poltekkes Manado, Indonesia.

This research proposes a novel approach to early detection of HIV in adolescents using an artificial intelligence (AI)-based online application. By combining general symptom detection, personalized education, and counselling, this innovative platform aims to address the unique challenges faced by young people in accessing timely HIV prevention/treatment services. Through a series of interactive modules, users can assess their health, identify potential symptoms, and receive customized recommendations. By leveraging AI technology, the app provides personalized support, reduces negative stigma, and facilitates access to essential healthcare services. One of the key features of the app is its ability to offer personalized education and counselling. Users have access to a wealth of information on HIV prevention, transmission, and treatment, including topics such as safe sex practices, condom use, pre-exposure prophylaxis (PrEP), and post-exposure prophylaxis (PEP). In addition to education and counselling, the app also provides access to a network of healthcare providers and community resources. This allows adolescents to connect with individuals who can offer support, guidance, and additional assistance in accessing necessary services. We have conducted research on several groups of teenagers in Manado City, North Sulawesi, Indonesia. We assessed the extent of their knowledge about HIV/AIDS before being told this application, and the results are 100% that they know what HIV/AIDS stands for, what the virus attacks, and how the virus is transmitted, as well as how to prevent it. For treatment, 14.3% answered do not know, and 85.7 answered “Antiretroviral Therapy." 71.4% answered “take an HIV test” to the question “how to know if someone has HIV,” and 28.6% answered “look at the symptoms of HIV”. Some adolescents are told how to use the app and see how far it can help them learn about sexual health education, including HIV/AIDS. After using the app, a Google Form is provided to measure the success of the app's features. Our analysis shows how an app can provide early detection of HIV, reduce negative stigma, increase adherence to HIV treatment, and increase knowledge and awareness about HIV.

Keywords: HIV/AIDS, Application, Artificial Intelligence

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BANDUNG CREATIVE SOCIETY

Toponymy Of Petobo and Balaroa as A Reference to Liquifaction in Palu City

Ida Ayu Widhya Lestari, [1]*Aurelia Emily.
[1]aureliaemily3@gmail.com
SMAN 1 Palu, Indonesia

Toponymy is the scientific study of geographical names. The name of a place is closely related to the human experiences that occur in that place. The purpose of this study is to gain knowledge about regional toponymy patterns in Palu, particularly in Balaroa and Petobo, and to determine the relationship between regional toponyms and the liquefaction disasters that occurred in Palu. This research is qualitative and descriptive, as it takes place in a natural setting, uses humans as research tools, and prioritizes the process over the results. The data collection techniques used in this study include: 1) Recording techniques through recording devices/mobile phones and photographs; 2) Note-taking techniques to record observations made in the field; 3) Reviewing literature related to the research object; and 4) In-depth interview techniques, as this type of interview is considered more effective because researchers can gather more information without strictly following a guide. The analysis results indicate that the toponymy pattern in Palu City is dominated by geographical and biological factors in the Balaroa area and by folklore in the Petobo area. Furthermore, there is a connection between the toponymy of Balaroa and Petobo and the liquefaction disaster that occurred on September 28, 2018. It was found that Balaroa used to be a swamp or watery area, while Petobo was an irrigation area for the Kapopo River.

Keywords: Toponymy, Balaroa, Petobo

Bullying Never Ends

[1]*Anharil Hidayat, A. Ryan Athilla Naufal Yusuf, Muh. Rafi Nur Ramadhan Ali, Muhammad Naufal Rifqi Shafwan
[1]anharilhidayat@gmail.com
MAN 2 Kota Makassar

Bullying in Madrasah is an ongoing problem, even though various prevention and intervention efforts have been carried out. This research aims to examine the dynamics of bullying in Madrasah, identify the causal factors, and assess the effectiveness of the strategies implemented to overcome this problem. This research aims to understand the phenomenon of bullying in Madrasah Aliyah (MAN), the forms of bullying that occur, the factors that cause bullying, the impact of bullying on victims and perpetrators, efforts to prevent bullying, appropriate solutions to prevent and overcome bullying and how bullying works. can continue to occur despite various preventative efforts. It is hoped that this research can contribute to understanding the bullying phenomenon in MAN and assist in developing effective bullying prevention strategies. Data was collected through interviews with students, teachers and the staff of Madrasah and also observation. Using a qualitative approach with in-depth interviews and observations, this study found that bullying is often triggered by social dynamics, differences in status, and a lack of understanding of the values of tolerance. A qualitative approach was used in this study, with data collection methods through in-depth interviews and observations at three Madrasah Aliyah (MAN) in Makassar City. The conclusion of this research is that to reduce the bullying phenomenon significantly, a holistic approach is needed (an approach that looks at something holistically and considers all interrelated aspects or components in a system or phenomenon) that can actively involve students, teachers and parents, as well as strengthening an inclusive and supportive school culture. Tighter training and supervision programs are an important step to ensure that anti-bullying efforts are more effective and sustainable in Madrasah. The findings of this research show that bullying in Madrasah is often triggered by social dynamics, differences in socio-economic status, as well as a lack of understanding and appreciation for the values of tolerance and diversity. Common forms of bullying include verbal, physical and social bullying, which has a negative impact not only on the emotional and psychological well-being of the victim but also on the social dynamics in the Madrasah. This research found that success in overcoming bullying requires a holistic approach that actively involves students, teachers and parents, as well as strengthening an inclusive and supportive school culture. Although anti-bullying policies and educational programs have been widely implemented, their implementation is often hampered by a lack of resources and consistent support from the public.

Keywords: Bullying, Madrasah Aliyah, Case Study, Bullying Prevention

The Impact of Music Lyrics on Teenage Social Awareness

[1]*Lana Khalishah Alya P.D., Syifa Asyari N.
[1]darmatari.lana@gmail.com
SMA Negeri 4 Bandung, Indonesia

This research studies how music lyrics influence teenagers' social awareness and how different kinds of lyrics can impact on a teenagers' perceptions. Music could be one of big variable that has massive impact on teenagers, including the lyrics of the music itself. Therefore, it is very relevant to study how music lyrics can change perceptions and social life of teenagers. This research uses the method of survey and interviews to high schoolers and analyse how engagement with music lyrics containing themes of social justice, activism, and inequality affects their awareness and responsiveness to societal challenges. From most findings, music lyrics with themes such as social justice and activism lead to many teenagers having a sense and perceptions of social awareness and concern for social issues and threat. Music lyrics with themes of love and feelings lead to teenagers realizing their perceptions of their feelings and love towards someone. Another example, if the music lyrics have themes that include everyday life and reality, most student would mostly feel related to the lyrics and the music itself.

Keywords: Music Lyrics, Social Awareness, Teenagers Perceptions, Lyrical Content, Music Influence

Wheelchair Tennis Athletes' Resilience: A Photovoice Study

[1]*Rafael Sadhu Titeksha Adji., [2]Aryobimo Nathanael Parwanto., [3]Lise Divya Sourice.
[1]titekshaadji@gmail.com, Olifant High School, Indonesia
[2]Kolese De Britto High School, Indonesia
[3]Budi Utama High School, Indonesia

People who have physical disabilities, including disabled tennis athletes, might feel that they are not capable enough to reach their true potential because of their physical limitations. What makes these athletes unique is their resilience, which is a significant part of their skill set, as it provides the drive for them to persevere through tough conditions during training and matches. Resilience is an important tool for athletes to help strengthen their minds and wield more confidence on and off the field. Therefore, this study aims to understand the resilience of wheelchair tennis athletes under the regional training of the National Paralympic Committee in Yogyakarta. This qualitative study used the Photovoice method in which nine wheelchair tennis athletes, ages 32-49, submitted photos and narratives depicting resilience via a questionnaire. Participants submitted photos taken during intense training or competitions and wrote stories of their efforts, self-motivation, as well as optimism paired with confidence. The researcher then conducted interviews using their photos to collect deeper insights into their experiences. The data was analysed using thematic analysis. Results show themes including (1) wheelchair tennis athletes show strong resilience, (2) character strengths lead to resilience (3) self-image as proportional and strong (4) wish for stronger support from outsiders, and (5) wish for stronger solidarity within the community. They aim to foster their resilient spirit among others and seek external support for recognition and better equipment. This will impact stronger solidarity amongst the members, as well as enlarge the community by attracting potential disabled players. The government and nondisabled community must provide this support so that the athlete's potential can be further strengthened and soar to great heights.

Keywords: Resilience, wheelchair tennis athlete, photovoice, disability

Focative Method As a Revolution Ini Parenting Children at An Early Age

[1]*Kalila Hijriyati, A., Azkia Fadhilah., Bunga Meri, F., Nazwa Kiranti, F.H.
[1]arlinakalila@gmail.com
SMAS Harapan 3 Deli Tua, Indonesia

Indonesia is one of the countries with the 5th highest number of bullying cases in the world and for crime it is ranked 8th in Asia. It is very sad when we see the news that currently cases of bullying and kidnapping of minors are rampant in Indonesia. The main factor in cases of kidnapping and bullying in Indonesia is the tendency of parents to ignore children when they are playing. Focative method comes from the words 'focused', 'caring', and 'creative', so that Focative Method means a method that helps someone to focus on thinking with sense of caring for environment and can develop creativity within oneself. The Focative Method is a parent's attempt to shape a child's personality so that the child can correctly determine the choices they want. The Focative Method is one method that can be used to anticipate cases of bullying and kidnapping of children so that parents can reduce their worry and fear regarding cases of bullying and kidnapping. As many as 170 people out of 200 people have implemented the Focative Method will become a parenting method that can guide children in a good life. The Focative Method was created with the hope of eliminating all forms of crime that occur in children's environments. Therefore, the Focative Method that we will introduce aims to enable parent to teach their children to focus on the surrounding environment.

Keywords: Bullying, Crime, Children, Focative Method, Parents

Patterns of Interaction that Occur in the Learning Environment Case Study of SMA Negeri 1 Sukatani

[1]Anindya Kharisma Putri, [2]Anggun Zulfa Qurrotul Aini, [2]Denisa
[1]anindyakharismaputri0304@gmail.com, SMA Negeri 1 Sukatani, Indonesia
[2]sman1_sukatani@yahoo.co.id, SMA Negeri 1 Sukatani, Indonesia

Patterns of student interaction in the learning environment. The research conducted aims to find out the factors that cause students who have difficulties in socializing and interacting in the school environment. This study uses a qualitative research method with case studies. Data was collected through interviews and observations in the SMAN 1 Sukatani environment and was complemented by supporting data obtained from articles and journals. The subject of the study is SMAN 1 Sukatani students, who have a tendency to have difficulty interacting in class with their peers, especially in learning and playing in class. The results of the study showed that the main factors of difficulties in interacting in the learning environment were: (1) unsupportive family conditions, (2) the existence of small groups in the classroom, (3) bullying or bullying, (4) internal or self-factors, these factors make some students feel uncomfortable and feel excluded. The impact of interaction patterns that do not go well will affect the mental state and learning process in the classroom, so that students tend to have shyness, quietness and withdraw from interacting with the surrounding environment.

Keywords: learning environment, pattern, social interaction.

Bullying as a Group Phenomenon: The Role of Peer-Pressure in Discriminative Behaviours Among High School Students and Possible Methods of Resolution

Arief M. A., Pribadi K., Rachman A. P., Rizky-Syarief A. S., 1*Kristiawan I. A.
[1]thebluediamond787@gmail.com
SMA Al-Falah Ketintang Surabaya, Indonesia

According to the Cambridge Dictionary, bullying is defined as the behaviour of a person who hurts or frightens someone smaller or less powerful, often forcing that person to do something they do not want to do. This study hypotheses that peer relationships may reinforce bullying behaviour, leading to a cycle of increased frequency and intensity (positive-feedback loop). Therefore, this study had gathered data from previously done studies, as well as surveys from high school students in both a qualitative and quantitative manner in order to formulate an analysis of this phenomenon while also creating a possible method of resolution. For the purpose of this research, so far, a total of 38 students from SMA Al-Falah Ketintang Surabaya were interviewed and questioned on their perspectives on bullying. With these responses, this study aims to analyse and understand what students consider to be 'bullying', what the term's definition shall be based upon, peer-pressure and its effects on peer-bullying, actions taken by the school board, and the frequency of such behaviour in their respective schools among others. Upon analysing the form, it was found that some students have a tendency to conform to influential figures and perceived norms within a school environment. This finding reinforces the belief that peer-pressure might play a significant role in bullying and an unhealthy school environment in general. In accordance with aforementioned findings, this research attempts to formulate a possible resolution method with the factor of peer-pressure in consideration.

Keywords: bullying, discriminative behaviour, peer-bullying, peer-pressure, social, students, victim

Managing Dermatillomania in High School: Psychological Roots and Recovery Approaches

Quaneisha Ainun Mahya
quaneishaainunmahya@gmail.com
Kharisma Bangsa School, Indonesia

High school students frequently experience anxiety and stress related to their academic schedules, anxiety, and they're own emotional state. This can cause emotional imbalances and feelings of reassurance resulting from things like academic validation or the fear of being left behind. The students are concerned that could lead them to indulge in self-harming, procrastinating, or other bad behaviours. One of the self-harming that is noticeable and disturbing is the picking skin behaviour which is Dermatillomania. Dermatillomania is a body-focused repetitive behavior (BFRB), where individuals engage in skin-picking to cope with emotional distress, anxiety, or boredom. The habit may start with picking at small imperfections such as pimples or scabs, over time, it can lead to significant damage to the skin. This condition can affect people of all ages and backgrounds, and while some are conscious of their picking, others may engage in the behaviour subconsciously. According to what I've personally seen, students typically act this way as a coping mechanism for their anxiety or emotional discomfort when they perceive environmental or personal triggers. Those who have the illness frequently find it difficult to control their unpleasant feelings, and they turn to skin-picking as a soothing technique. This may result in an infection of the skin tissues, interruption of their regular activities because of their actions, and shame and humiliation since they are unable to stop the behaviour. The approach to overcoming dermatillomania consists of three methodologies. The first method involves conducting interviews with several students, asking detailed questions about their behaviour and their levels of anxiety and awareness regarding dermatillomania. After gathering all the data, I will analyse it and draw conclusions. Following this, I will create a page that outlines helpful strategies and techniques that can assist them in overcoming this behaviour and stopping the urge to engage in skin-picking and other psychological awareness.

Keywords: Dermatillomania, Skin-picking, Anxiety, Stress, Psychological awareness

The utilization technology of the class arrangement at Junior high school of 1 Cibatu-Garut (SMPN 1 Cibatu) increases the streamlined and preciseness based on the student data

[1]*Vidru Adiru, Fadhel Muhamad Romdon, Moch. Erfan Fazriawan Z
[1]vidru.adiru@widyatama.ac.id
Widyatama University, Indonesia

The utilization of technology on the arrangement of the class election at Junior high school of 1 Cibatu-Garut (SMPN 1 Cibatu) aims to optimizing the manual process of the wasting time and error. The project leads to divided the students on the right class based on the data, such as academic score, gender and the achievement. This application uses an exclusive algorithm to ensure the fair distribution on the filling of manual compliance needed. Hopefully the implementation on this application will be on the higher streamlined of the redistribution on the class election. So that schools can focus more on the teaching and learning aspects. The utilization of this technology demonstrates the potential for solving complex class division problems and supports more effective education management at Junior high school of 1 Cibatu-Garut (SMPN 1 Cibatu).

Keywords: the class arrangement application, optimizing, education technology, Junior high school of 1 Cibatu-Garut (SMPN 1 Cibatu), and student data arrangement.

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