

# ITEX '23

34<sup>th</sup> INTERNATIONAL INVENTION, INNOVATION  
& TECHNOLOGY EXHIBITION, MALAYSIA

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# METVERSE SECURITY: A BLOCKCHAIN- BASED SYSTEM FOR PROTECTING INTELLECTUAL PROPERTY IN VIRTUAL WORLDS (METAIPTSEC)

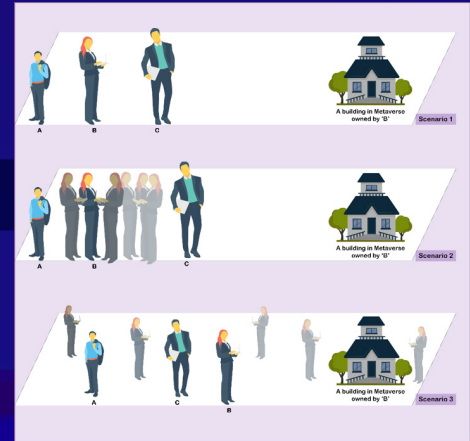


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## Descriptions

With the growing popularity of virtual worlds like metaverses, there is a need for a system to protect the intellectual property of creators. This project proposes a blockchain-based system that provides a secure way to store and manage information about virtual structures created in a metaverse. MetalPsec generates a unique ID for each structure and adds it to the blockchain, along with the creator's information. When someone tries to create a new structure, MetalPsec checks the blockchain to see if a structure with the same ID already exists, preventing duplication. Additionally, MetalPsec provides a way for creators to request temporary copyrights for their structures, further protecting their intellectual property. MetalPsec provides a simple, effective way to ensure that creators' work remains unique and valuable in a metaverse setting.

## Novelty

- MetalPsec is designed to provide a security feature for a virtual world, specifically a metaverse where people build structures. The goal is to prevent others from copying the designs of the structures that have been created.

- MetalPsec uses a Python implementation of a blockchain to store information about the structures that have been created. Each time a new structure is built, a unique ID is generated for it, and this ID is added to the blockchain along with the creator's information.
- When someone tries to build a new structure, the program first checks the blockchain to see if a structure with the same design already exists. If it does, the program will prevent the new structure from being built.
- MetalPsec also includes a system for granting temporary copyrights to the creators of the structures. These copyrights can be requested by the creators and are granted for a specific period of time. During this time, others are not allowed to create structures with the same design.

## 'ECO BRICK'

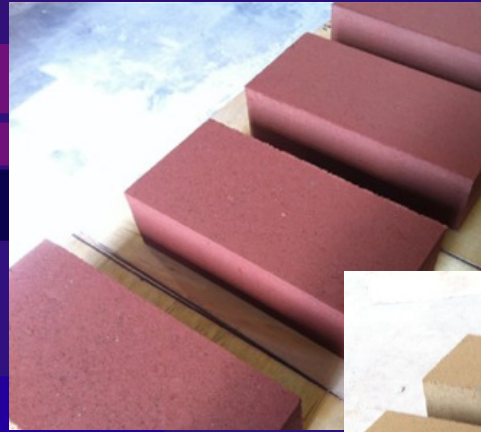


### Ts. Dr. Ean Lee Woen

Project Leader

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### Descriptions

The Eco brick was developed in collaboration between UNITEN and TNBR to solve the excessive dredged sediment in Cameron Highlands hydroelectric reservoirs in Pahang, Malaysia. Dredging is the priority of environmental recovery for the hydropower owner. However, landfill areas are limited and approaching their lifespan. This has imposed high costs, and the sediment cannot be utilized in concrete or highway construction. Therefore, special considerations have been considered to maximize the use of sediments for brick production with no secondary pollution. The Bricks are manufactured with a low carbon footprint method to produce metal-free Eco Bricks. It uses the high-pressure pressing (unfired) method that is cheaper and reduces CO<sub>2</sub> production. The brick conforms to ASTM C129 and MS 76: 1972, are comparable to clay bricks at affordable cost. It also has good sound-insulating properties and a high sound absorption rate for the low-frequency range. It passes the toxicity leaching procedure (TCLP) specified by Environmental Protection Agency (EPA) and is compatible with cement-lime-mortar and cement-mortar. It is SIRIM certified

as a 2-hour fire-rated brick and approved by the Malaysian Fire and Rescue Department (BOMBA).

### Novelty

- The sediment is classified and utilized as a new material for brick production.
- The Eco Bricks are composited with cement-lime mortar in masonry, causing lateral expansion under axial compression, which improves the compressive strength of the Eco Brick masonry wall.

# POWERING PUBLIC SPACES WITH INNOVATIVE FOOTSTEP TECHNOLOGY: HARNESSING MAGNETIC REPULSION FOR SUSTAINABLE ENERGY GENERATION



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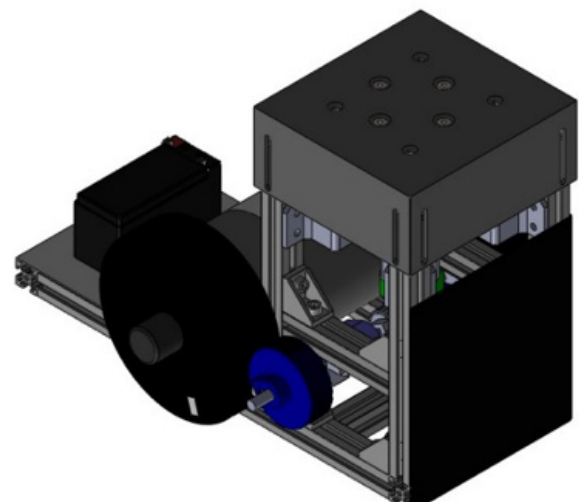
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### Descriptions

The novel power generation design presented in this project harnesses the kinetic energy of human footsteps, offering a sustainable and renewable alternative to the heavily exploited fossil fuels that are rapidly depleting. With the negative environmental impact of fossil fuels becoming increasingly apparent, the need for renewable energy has never been more pressing. However, renewable energy sources such as wind and solar power are often subject to the vagaries of nature and cannot always be relied upon. Walking is a ubiquitous human activity, and by capturing the energy dissipated through impact, vibrations, sounds, and body weight transfer, this innovative system converts the mechanical energy from footsteps into electrical power. It has the potential to be particularly effective in busy public areas such as railway stations, airports, and shopping complexes, where it can provide a reliable and cost-free source of renewable energy. By implementing this footstep power generation system, we can not only reduce our dependence on fossil fuels but also contribute towards a sustainable future.

### Novelty

The project presents a new power generation design that uses human footsteps to produce electricity, providing a sustainable and reliable alternative to fossil fuels. This innovative system can be implemented in busy public areas to reduce our dependence on non-renewable energy sources and contribute towards a sustainable future.



# AI VOICE CHATBOT FOR MALAY LANGUAGE: AN EFFICIENT CUSTOMER SERVICE SOLUTION



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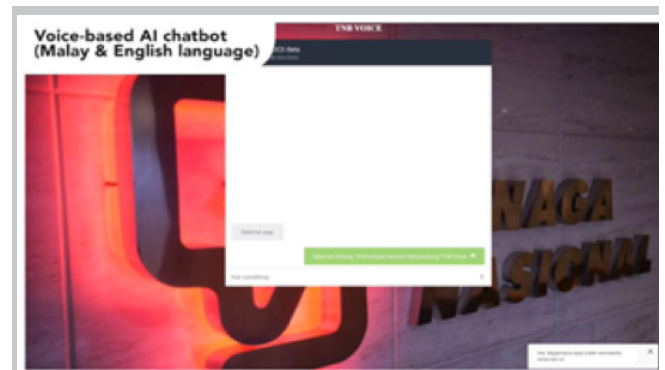
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### Descriptions

AI Voice Chatbot stands out for its ability to understand and process conversational Bahasa Malaysia, making it a unique and innovative solution for serving Retail customers who speak the language. This will enable it to make changes based on patterns and adapt to new situations. The AI chatbot can be used for a range of purposes, including sentiment and emotion analysis, as well as making predictions and analytics about customer behavior. The AI chatbot has been designed to simulate human conversation through voice commands and can be integrated into various platforms such as websites, mobile apps, and telephone systems. The AI chatbot will be able to understand natural language and continue learning based on the inputs or queries it receives, thus, becoming more intelligent over time. In this invention, Malay audio has been categorized by the sample of topics, keyword cloud, sentiment by topics (in percentage of sentiment each topic), and sentiment overtime.

### Novelty

This application has significance novelty in developing the Malay AI chatbot with an accuracy of 86%.





# PENINSULAR MALAYSIA CORROSION HAZARD VISUALIZATION SYSTEM (P-CORS)



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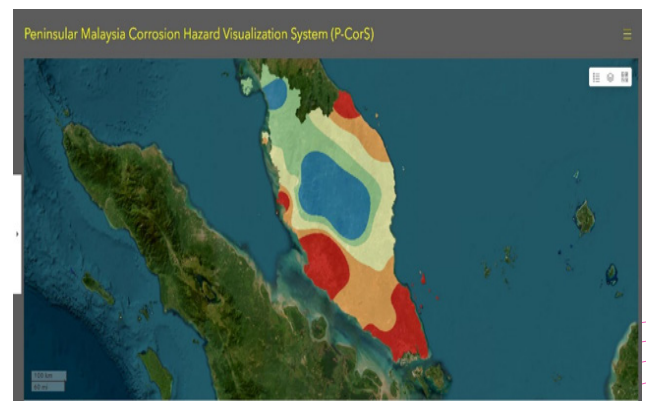
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### Descriptions

The Peninsular Malaysia Corrosion Hazard Visualization System (P-CorS) is developed to present the corrosion hazard information of Peninsular Malaysia. The system consists of the corrosion hazard map, together with various feature layers to maximize the visualization of corrosion levels. The information provided by P-CorS is very useful for companies that owned steel structures to plan for maintenance, and predict the serviceability of their assets, which indirectly will affect profits and revenue. Furthermore, the information is also valuable for product enhancement technology, covering various sectors, such as building painting, coating industries, automotive sectors, and others. The information advantages could be extended to local authorities to identify suitable development areas since the corrosion map is made by considering 10 years of atmospheric pollutant agents. Zones with high corrosion levels should be avoided for residential and the air should be treated for better atmospheric quality. Therefore, this map shall be beneficial in providing corrosion information for both current and future planning.

### Novelty

Corrosion level for Peninsular Malaysia.



# 3D UX OF AUGMENTED REALITY GEAR MECHANISMS



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Project Leader

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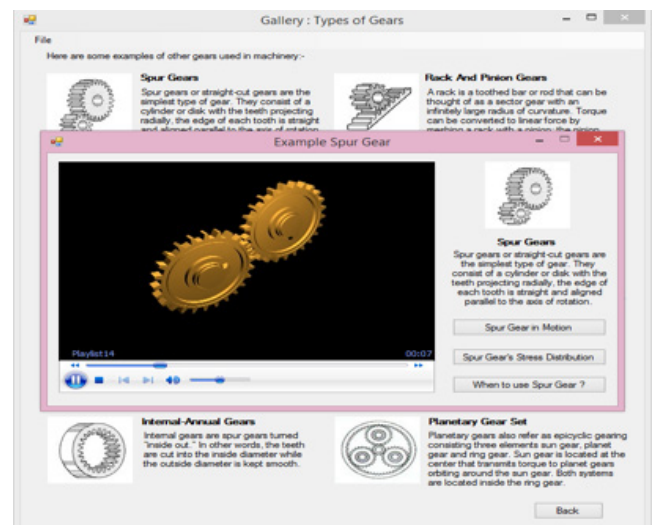
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## Descriptions

The innovation is created for mechanical engineering students to visualize engineering gear mechanisms which is crucial to understand how they function in machines. This equips them to use their knowledge in associated activities in a virtual environment to successfully solve design problems. It might be challenging to comprehend the gear mechanisms and problem-solving steps from the static images and theory found in textbooks. The user experiences (UX) of actual gears that are directly mimicked and displayed on the screen with animated and interactive features are the main novel aspect of this invention. This innovation was created to address the flaws in the commercial visualisation and problem-solving software currently available for engineering students.

## Novelty

Simulates visual of gears friction – predicts the type and size of gear to be used.



# AN INNOVATIVE WAY OF HANDS-ON GAMIFICATION LEARNING USING VIRTUAL REALITY AND HAND MOTION TRACKING TO EXPLORING STEM EDUCATION



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### Descriptions

Gamification is a growing trend in Science, Technology, Engineering and Mathematic (STEM) education that tries to boost student engagement and motivation in engineering disciplines. The purpose of this module is to provide an overview and hand-ons of the notion of gamification and its benefits in STEM education by using the Nintendo Switch Labo and Leap Motion. It investigates different gamification strategies used such as game-based learning, simulations, and serious games, and presents examples of effective implementation. The module also discusses the results on impact of gamification on student learning outcomes for gamification effectively in STEM education. Overall, gamification using virtual reality and hand tracking motion has shown significant potential in increasing student engagement and accomplishment towards to the STEM learning.

principles. Gamification for Stem Education in Engineering module (EduGineer© Module) allows engineering students to learn, practise, and apply physics and engineering concepts in an immersive and interactive virtual environment with hand gestures and motion. The EduGineer© module includes a range of engineering simulations and exercises that require students to use hand gestures and virtual reality to manipulate virtual objects related to engineering understanding. By using hand gesture recognition, students can engage in hands-on learning and develop their spatial awareness, problem-solving, and critical thinking skills in a way that traditional classroom methods cannot provide. The main novelty in this module is the way and means to conduct a gamification module using a standard console gaming device.

### Novelty

A gamification module on virtual reality (VR) and hand motion tracking for the engineering field is an innovative technology that integrates the benefits of virtual reality and hand gesture recognition with engineering concepts and

# PASSING MARK TEMPLATE (PMTEM) MONITORING SYSTEM



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## Descriptions

Referring to the 3rd and 4th Business Studies Programme Standards; whereby

- PASS/FAIL requirement for continuous & final assessment must be define by HEPs
- The HEP must have clear marking guidelines for continuous & final assessments to indicate the achievement of course learning outcomes.

The template is designed to signify students' status based on assessment in meeting the specific requirement of the MQA.

- Pass/Fail continuous assessment.
- Pass/Fail the final exam.
- Fulfill/not all the Course Learning Outcomes.
- Passing a course depends on the total marks earned and a grade will be awarded accordingly.

## Novelty

- Introduce PMTem as a tool for monitoring the passing mark.
- This PMTem monitoring system is user-friendly and easy to monitor.
- The PMTem monitoring system provides mark and grade automatically.

Date	Name	Matric No.	COURSE INFORMATION												TOTAL MARK	GRADE	STATUS	REMARKS																																																																																				
			UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9	UNIT 10	UNIT 11	UNIT 12																																																																																								
			001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017	018	019	020	021	022	023	024	025	026	027	028	029	030	031	032	033	034	035	036	037	038	039	040	041	042	043	044	045	046	047	048	049	050	051	052	053	054	055	056	057	058	059	060	061	062	063	064	065	066	067	068	069	070	071	072	073	074	075	076	077	078	079	080	081	082	083	084	085	086	087	088	089	090	091	092	093	094	095	096	097	098	099	100

# CONSUMER LIFESTYLE ENERGY CALCULATOR (CLEC)



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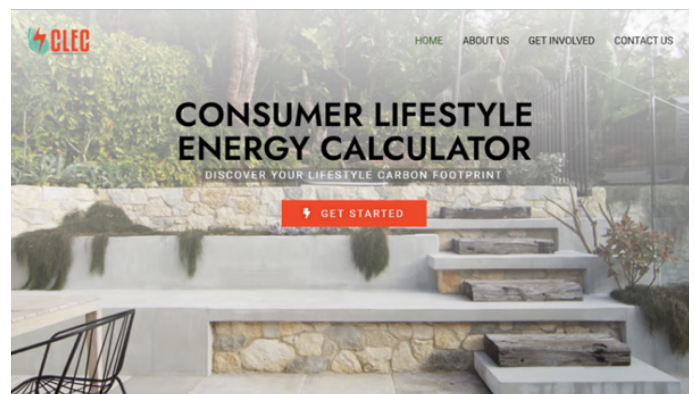
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### Descriptions

The Consumer Lifestyle Energy Calculator (CLEC) is an online tool that helps users to evaluate their carbon footprint in four lifestyle categories: Housing, Leisure Activities, Mobility, and Food Consumption. By inputting information about their energy usage, transportation habits, and diet, users can identify areas to reduce carbon emissions and promote environmental sustainability. CLEC empowers users to take responsibility and make conscious choices to reduce their environmental impact.

### Novelty

The novelty and inventiveness of CLEC is its pioneering online calculator that quantifies residential consumers' annual carbon emissions in tonnes of CO<sub>2</sub>, based on their Housing, Leisure Activities, Mobility, and Food Consumption lifestyle. This innovative tool is the first of its kind in Malaysia and strongly advocates for zero carbon emission initiatives.



# MALAYSIAN BOTTOM ASH SELF-COMPACTING BRICKS (MYBASCO BRICK)



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### Descriptions

Malaysian bottom ash self-compacting bricks (MyBASCO Brick) is one of the bricks that does not require neither compaction, burning nor pressing process therefore its production cost is lesser. This supports the SDG 9 Industry, Innovation, and Infrastructure. It also supports the SDG 11 Sustainable Cities and Communities as MyBASCO Brick is targeted to be used as part of the building components (walls). Bottom ash (BA) is categorized as a scheduled waste that is abundantly found in power plants ash ponds from electricity generation. Its particles are coarse on the surface and angular in shape. The size of the BA particles from small gravel to fine sand is distributed (10–0.75 mm). The coal BA is lighter and brighter than fine aggregates which give an advantage in producing lighter bricks as a natural source of filler rather than laying waste in ash ponds, causing air and water pollution. This supports the SDG12 Responsible Consumption and Production. MyBASCO Brick consists of 50% bottom ash utilization which can be categorized as green materials. The strength achieves 10 MPa and lower thermal conductivity compared to normal bricks. The rheology properties that achieve the self-compacting requirement are in standard specification.

### Novelty

Bottom ash has a potential to be used as an energy-efficient material due to its characteristics, (Porous Material) that can exhibit good thermal insulation properties. To maximize energy saving, more attention should be paid for the selection of appropriate thermal envelope materials that exhibit good thermal efficiency.



# SENTIMENT ANALYSIS FOR MALAY LANGUAGE



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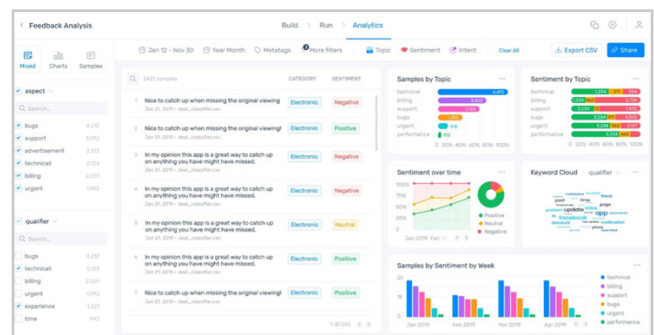
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### Descriptions

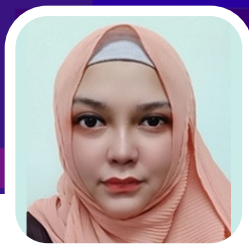
Voice-based AI Chatbot for Customer Experience. This chatbot can estimate customer emotions by analysing visual and auditory customer signals. This allows customer service reps to be more conscious of customer emotions and pay special attention to angry customers. Chatbots will listen in on agents' calls suggesting best practice answers to improve customer satisfaction and standardize customer experience. Chatbots can provide a single, streamlined interface and consistent information across all channels, which becomes more critical as consumers branch out into new support channels like chat and mobile apps. The ultimate objective of NLP is to read, understand, and make sense of the human languages in a manner that is valuable.

### Novelty

Sentiment analysis for Malay language.



# GREEN WASTE WAQF CRAWLER (GWWC)



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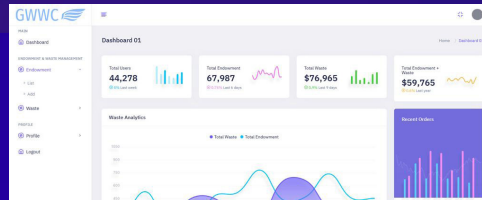
### Descriptions

GWWC is an electronic system specially developed for Waqf Departments, particularly throughout Malaysia, to finance Renewable Energy Projects. With the existence of the GWWC system, it provides an alternative option to finance Renewable Energy Projects instead of maximizing SUKUK instruments. The GWWC system was developed to maximize waste management, especially from the "Renewable Energy" project, where the results from the recycling of waste materials can be re-contributed to the approved waqf project that supports the "Renewable Energy" project. In addition, this system is able to convince the waqf endower regarding the transparent process applied by the Waqf Department in managing the entrusted Waqf Fund. GWWC also emphasizes the slogan "Anytime Everywhere" where this system can be accessed easily at anytime and anywhere. Thus, at the same time giving an advantage to the GWWC system in offering various benefits and advantages starting from the aspect of responding to the government's recommendations on green initiatives through reducing the use of paper until guaranteeing a network of complex systems and reaching the specified standard level. In terms of novelty value, GWWC is expected to be the first application system implemented

in Waqf Departments, especially throughout Malaysia, as soon as it becomes a model that can be used in every Waqf Department around the world. The GWWC system is also enhanced with an integrated system that at the same time guarantees a process that promises usability and is protected from all forms of fraud. The importance of GWWC to the community and community GWWC is very important and plays an important role and as an instrument to ensure transparency and integrity values that are practiced fairly especially in waqf fund management and waste management results as a new waqf fund instrument in every Waqf Department in Malaysia. This value will increase the value of reliability and enhance positive relationships not only in terms of the services offered but also towards the officers who are responsible for managing the processes involved.

### Novelty

- The first integrated system of Green Waste Waqf Management.
- The issuance of Green Waste Waqf Card.
- The issuance of GWWC sticker.
- Zero Waste Worries Society (ZWWC).





# SELF-HEALING CONCRETE MICROCAPSULES



## Ts. Dr.-Ing Zarina Itam

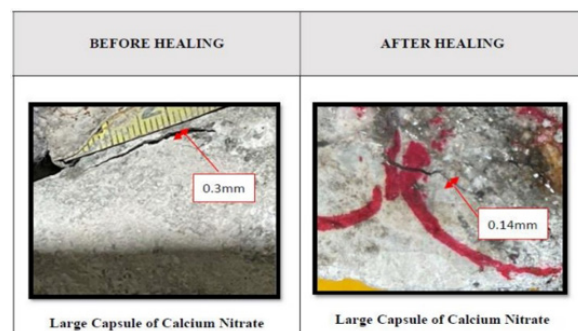
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### Descriptions

Due to the relatively low tensile strength, concrete fractures are a regular event. These fissures damage the durability of concrete since they are an easy way of transporting liquids and gases containing potentially dangerous compounds. When microcracks expand and grow, they not only harm, but also corrode the concrete itself. The crack width must thus be managed and cracked as soon as feasible. This study focuses on self-healing concrete development, given the customary high costs of maintaining and repairing concrete buildings. Autonomous concrete healing capsules is an intelligent material that has a selfgoverning nature to restore mechanical damage over time, closing up the cracks that occur in concrete without human intervention, saving time and manpower, and stopping any propagation of cracking from worsening.



### Novelty

Production of sustainable and lightweight tiles with high fire resistance, high mechanical properties, modulus of rupture, and deep abrasion, erosion, and corrosion resistant.



Creative, Innovative & Energetic.

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