INCITEST 2020

The 3rd International Conference on Informatics, Engineering, Sciences & Technology

UNIVERSITAS KOMPUTER INDONESIA
UNIKOM

"Humanized Technology : The Digital To Win Competition"

PROCEEDING

UNIKOM International Conference on Informatics, Engineering, Sciences & Technology (INCITEST) 2020

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Preface

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PREFACE

It is our great honor and pleasure to introduce the Proceedings of the 3rd International Conference on Informatics, Engineering, Science, and Technology (INCITEST 2020). The event is valuable and meaningful since it brings together scientists, engineers, researchers, practitioners, students, and civil society organization representatives to nurture research networks between universities and industries. With its main theme on "Humanized Technology, the Digital Journey to Win Competition", this event is expected to serve as a platform of gathering for anyone interested in exploring potential solutions and answering issues and challenges to enter the 5.0 society. Amid the worldwide spread of the novel coronavirus (COVID-19) and the uncertainty surrounding the end of this pandemic, there are several issues we should describe as follows:

1. Universitas Komputer Indonesia (UNIKOM) as the organizer of INCITEST 2020 will hold the conference on 11th June 2020 in an online or virtual format. The organizing committee will manage the conference from our campus which is located in Bandung, West Java Province, Indonesia.
2. In this correlation, we should adhere to the regulation of the government of West Java Province and the government of the Republic of Indonesia which currently is implementing Large-Scale Social Restrictions to reduce the risk of virus transmission. Therefore, the online conference is considered the best way we can do to serve our participants concerning the fact that people safety is second to none. In this condition, there is no specific date deemed safe to which we could postpone the conference until either worldwide travel or crowd-gathering is safe again. We have all put so much effort in preparing the papers, organizing the event, as well as conducting the review process, working on the program, and everything surrounding it that we feel very motivated to pull this through
3. The conference is divided into two sessions: plenary and parallel sessions. In the plenary session, we will use zoom as the media. Besides, to assure the dissemination of the conference to all participants, we will also broadcast the plenary session live using Open Broadcaster Software (OBS) connected to

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YouTube live streaming and IG TV. Moreover, we will use live chat on YouTube and Google forms for the discussion session.

4. The plenary session will be chaired by one moderator who will not only be critically summarizing the keynote presentations but also handling participants' enthusiasm in asking any possible questions. In doing so, the participants will be following the conference at their respective personal corners through YouTube live streaming and IG TV.
5. The plenary session will be presented by our keynote speakers in online format (via Zoom) from each country such as Prof. Abdulkareem from Malaysia, Prof. Yuto Lim from Japan, and Irfan Dwi Sumitra, Ph.D. from Indonesia. Each keynote has 45 minutes duration including the discussion session.
6. Following the success of INCITEST 2018 and 2019, the enthusiastic responses to the call-for-papers in the third INCITEST were increasing. More than 450 papers were submitted to the organizing committee from both local and foreign participants. A peer-review process has been conducted to all the articles based on their originality and quality, resulting in 347 accepted papers to be presented.
7. Of 347 accepted papers, 216 of them will be presented via Zoom in the duration of 10 minutes for each paper. Additionally, 129 papers will be displayed in the poster session (the link of the posters will be available on the INCITEST website).
8. The parallel session will be divided into 10 classes; each class will be participated by around 21 to 22 presenters. A parallel session chair will manage the presentation time and discussion session in each class. Each presenter should present their paper within 5 minutes via Zoom. 5 minutes after the presentation will be given to each of them for the discussion session.

We hope that with the above arrangement, we can serve our participants in the best way we could. The conference's success is also due to the hard work of all involved parties. Therefore, the organizing committee would like to express appreciation to all supporters, sponsors, and participants for a great contribution to

the conference's success. Many thanks go as well to all of the reviewers who helped us maintain the quality of manuscripts included in the Proceedings published by IOP. We also express our sincere thanks to the members of the organizing team for their hard work.

Finally, our continuing success of this conference series can be one of indicator that we have through our right pathway to realign technology with the best interests of humanity. We hope this first time experience of the online conference in the 3rd INCITEST will bring fruitful outcomes as well as give the participants great experience in an online conference.

Thank you

Best Regards,

Dr. Poni Sukaesih Kurniati, S.IP, M.Si.
The Chief of the Conference

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Table of contents

Volume 879

2020

Previous issue Next issue

3rd International Conference on Informatics, Engineering, Science, and Technology (INCITEST 2020) 11 June 2020, Bandung, Indonesia

Accepted papers received: 11 June 2020
Published online: 05 August 2020

Open all abstracts

Preface

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011001

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011002

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011003

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Informatics and Information System

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012001

Digital Wallet as a Transaction Media in The Community

T Handayani and A Novitasari

Open abstract View article PDF

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012002

Smart City and Its Application

I Prayoga and R M Ramadhan

Open abstract View article PDF

OPEN ACCESS

012003

Smart Campus with A Learning Management System

E S Soegoto and M F Rinaldy

Open abstract View article PDF

OPEN ACCESS

012004

The Influence of Information Technology on Public Transportation

T Rohmawati and I Kartiwan

Open abstract View article PDF

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012005

Android Based Livestock Sales Application Information System

T Rohmawati and F Ramadhani

Open abstract View article PDF

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012006

Artificial Intelligence and New Level of Fake News

S Nazar and M R Bustam

Open abstract View article PDF

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012007

Design of Web-based Online Sales Information System

H D Yulianto and R Fauzi

Open abstract View article PDF

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012008

Information Technology on Employee's Daily Evaluation System Software

D W Firdaus and R Lie

Open abstract View article PDF

OPEN ACCESS

012009

Web Service for Academic Information Systems

A R Kurniawan and L Warlina

Open abstract View article PDF

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012010

Design of Information System Vehicle Rental Based Web

B Kurniawan, S Alviana and A M B Prasetyo

Open abstract View article PDF

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012011

Utilization of Technology for Early Warning of Natural Disasters in Indonesia

W H Pratama and I D Sumitra

Open abstract View article PDF

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012012

Technology of Health Services in Industrial Revolution 4.0 Era

V V Vauzia and I D Sumitra

Open abstract View article PDF

OPEN ACCESS

012013

The Effect of Using a Digital Wallet for Small Business

S M Putri and I D Sumitra

Open abstract View article PDF

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012014

Application Information System Smart Parking Based on Smartphone

R Wahdiniwaty and A Nugraha

Open abstract View article PDF

OPEN ACCESS

012015

Web-Based Information Systems: Developing a Design Theory

I B S Nusa and F M Faisal

Open abstract View article PDF

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012016

Design of Application for Students Attendance Checking in Islamic Boarding School

M D Aulia and R Hendriawan

Open abstract View article PDF

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012017

Comparative Analysis of 4G Network Internet Data Connectivity Based on Quality of Service (QoS) Method (Case Study West Bandung Regency Tourism Area)

T Ernawati and B D Pratama

Open abstract View article PDF

OPEN ACCESS

012018

Study of Risk Assessment and Business Continuity Management of Analog to Digital Archiving Process in order to Guarantee Reliable System

Yeffry Handoko Putra and Rahma Wahdiniwaty

Open abstract View article PDF

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012019

Model of Autonomous Unmanned On-Road and Aerial Vehicle Carriers For Precision Agricultural Transport 4.0 : A Literature Review

I Afrianto, A Khumaidi and Adriyendi

Open abstract View article PDF

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012020

Location Search Application for Refuelling Stations on Android Based Mobile Devices

S Nurhayati, N Milal and A P Sujana

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012021

Web-Based Honorary Teacher Payroll Information System

N Hasti, D Dekiki, I Gustiana, W Wahyuni and T Hartono

Open abstract View article PDF

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012022

Raspberry Pi-Based Solar System Learning Media

M F Wicaksono, Syahrul, M D Rahmatya and M A F Rahman

Open abstract View article PDF

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012023

Design of Reservation Information System

M D Rahmatya, M F Wicaksono, D P Sari and M N Mubarok

Open abstract View article PDF

OPEN ACCESS

012024

Application of Web-Based in Product Distribution using Unified Modelling Language

L Melian and F N Fauzan

Open abstract View article PDF

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012025

Information System of Roof Tiles Production and Distribution

R F Syafariani, E N Hayati and F A Muttasir

Open abstract View article PDF

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012026

Implementation of the Failure Mode and Effects Analysis (FMEA) Method to Determine Project Risk Priority

S Atin and R Lubis

Open abstract View article PDF

OPEN ACCESS

012027

Design Securing Online Payment Transactions Using Stegblock Through Network Layers

E Ardhianto, A Trisetyarso, W Suparta, B S Abbas and C H Kang

Open abstract View article PDF

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012028

Protecting Data By Socket Programming Steganography

WT Handoko, E Ardhianto, K Hadiono and FA Sutanto

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012029

Integration of TOGAF 9.1 ADM in Enterprise Architecture Smart City Design in the Tourism Domain with ISO 27001

P Subakti and Y H Putra

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012030

Acquisition, Modeling, and Evaluating Method of Driving Behavior Based on OBD-II: A Literature Survey

Galih Hermawan and Emir Husni

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012031

Web Application Vulnerability Detection Using Taint Analysis and Black-box Testing

Heribertus Yulianton, Agung Trisetyarso, Wayan Suparta, Bahtiar Saleh Abbas and Chul Ho Kang

Open abstract View article PDF

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012032

Sales Promotion System Design with Customer Relationship Management approach at Hotel

G T Mardiani and T Faturrahman

Open abstract View article PDF

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012033

Development of Expert System for Dental and Oral Diseases Diagnose in Certainty Condition

R Sidik, M A Fadlurrahman and M B Winanti

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012034

Design of Recyclable Waste Mapping Information System for Waste Pickers

Leonardi Paris Hasugian, Satria Indra Praja Persada and Triana Mugia Rahayu

Open abstract View article PDF

OPEN ACCESS

012035

The Waqf Cemetery Information System

R Komalasari

Open abstract View article PDF

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012036

Private Cloud Development in West Java Cooperative and Entrepreneurship Education and Training Center

A Setiyadi and E B Setiawan

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012037

Spatial Information System Development in Bintan Regency

J C Wibawa, M E Utomo and M R Fachrizal

Open abstract View article PDF

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012038

Product Development Analysis using Quality Function Deployment

R Susanto and A D Andriana

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012039

The Application of Fuzzy Logic Method in the Debtors Eligibility Assessment System of Microfinance Institution

S L B Ginting, M R M Rizky, Y R Ginting and Sutono

Open abstract View article PDF

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012040

Security Value Issues on eHealth Implementation in Indonesia

P K Sari, P W Handayani and A N Hidayanto

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012041

Innovation Development of Web-Based Dormitory Information System at Boarding School SMA Terpadu Krida Nusantara

Jafrudin and Yeffry Handoko Putra

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012042

Prototype of E-Document Application Based on Digital Signatures to Support Digital Document Authentication

I Afrianto, A Heryandi, A Finandhita and S Atin

Open abstract View article PDF

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012043

Cyber Security in IoT communication (Internet of Things) on Smart Home

Herman Heriadi and Geraldi Catur Pamuji

Open abstract View article PDF

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012044

Design of Furniture Production Monitoring Information System

R P Dhaniawaty, A P Fadillah and D Lubis

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012045

Benefit of Using Cloud Services in IT Infrastructure in the Capability, Strategy and Cost Efficiency Aspects: detikNetwork Case Study

R A Putra, G D Putra, N F Arifin, B Haryanto, M R Shihab and B Ranti

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012046

A Brief Look at Software Defined Network (SDN) Implementation: Gaining Benefits and Coping with the Challenges at a Telecommunication Company

M R Adrian, D H Kurniawan, A Faza, J Maulina and M R Shihab

Open abstract View article PDF

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012047
Information System Security Analysis of XYZ Company Using COBIT 5 Framework and ISO 27001:2013
G G Prapenan and G C Pamuji
Open abstract View article PDF

OPEN ACCESS
012048
Raw Material Supplier Selection With Analytics Hierarchy Process (AHP) Method
H Irmayanti
Open abstract View article PDF

OPEN ACCESS
012049
Developing Chatbot For Academic Record Monitoring in Higher Education Institution
A Heryandi
Open abstract View article PDF

OPEN ACCESS
012050
User Care Level Audit of Information Data Security at PT XYZ Using Guttman Scale
S Alviana
Open abstract View article PDF

OPEN ACCESS
012051
Strategies for Improving the Quality of Logistics Courier Services Through Priority Problem-solving Based on Multiclass Classification
R Hendayani and M C Dharmawan
Open abstract View article PDF

OPEN ACCESS
012052
Optimization of Forest Plant Seeding Based On the Internet of Things
D Hirawan and D Mahendra
Open abstract View article PDF

OPEN ACCESS
012053
Information System Services Wenow Clean Franchise
I Pangaribuan, M H Ali and S Mauluddin
Open abstract View article PDF

OPEN ACCESS

012054

The Designing of Warehouse Management Information System

R Fauzan, M F Shiddiq and N R Raddlya

Open abstract View article PDF

OPEN ACCESS

012055

Forward Engineering in Student Mark Recapitulation Application

S Mauluddin and R Sidik

Open abstract View article PDF

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012056

The Impact of Implementation of Angklung Learning Application for SLB Part B Deaf using Multimedia-Based Coloring Method on User Satisfaction

D Effendi, L Lestary, B Noviansyah and B Hardiyana

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012057

A Comparison study of DBScan and K-Means Clustering in Jakarta rainfall based on the Tropical Rainfall Measuring Mission (TRMM) 1998-2007

G C Pamuji and H Rongtao

Open abstract View article PDF

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012058

Design and Development of Coffee Production Information System to Support Coffee Production Productivity in Farmers Group

D Effendi and M I Rismaya

Open abstract View article PDF

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012059

Analysis of Road and Bridge Conditions by Utilizing WEBGIS Technology to Support The road and Bridge Maintenance Program in Indonesia

Y Afrizal

Open abstract View article PDF

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012060

Forecasting the Number of Outpatient Patient Visits Using the ARIMA, SES And Holt-Winters Methods at XYZ Community

Health Center

I D Sumitra and I Basri

Open abstract View article PDF

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012061

Application of Supply Chain Management Information System of Inventory at Computer Shop in Jambi City

Ade Indra Saputra and Rahma Wahdiniwaty

Open abstract View article PDF

OPEN ACCESS

012062

Realtime Notifications On Visitor Tracking Systems Using Android and Arduino

R F Rahman and I D Sumitra

Open abstract View article PDF

OPEN ACCESS

012063

Designing Enterprise Architecture for Distributor of Consumer Product Using TOGAF ADM

M I Mutakin

Open abstract View article PDF

OPEN ACCESS

012064

Web-Based Project Management Information System in Construction Projects

M R Fachrizal, J C Wibawa and Z Afifah

Open abstract View article PDF

OPEN ACCESS

012065

Analysis of Expert System Lung Disease Diagnosis System of Web-Based Disease in Cihaur Puskesmas

A S Sitanggang, A D Damarullah and Wartika

Open abstract View article PDF

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012066

Designing Enterprise Architecture for Academics Information System Platform using the Open Group Architecture Framework Architecture Development Method

N Zulfarian and I D Rosiyadi

Open abstract View article PDF

OPEN ACCESS

Implementation of OLAP and K-Medoids Clustering for Accreditation Data Analysis of Study Programs

012067

Ghufron, B Surarso and R Gernowo

Open abstract View article PDF

OPEN ACCESS

Personality Prediction System Based on Signatures Using Machine Learning

012068

I Maliki and M A Sidik

Open abstract View article PDF

OPEN ACCESS

Document Image Extraction System Design

012069

N I Widiastuti and K E Dewi

Open abstract View article PDF

OPEN ACCESS

High Availability Aspects of SDN-IP Reactive Routing

012070

A Friyanto

Open abstract View article PDF

OPEN ACCESS

Relay Streaming System Model to Social Media Platform for Indoor Activity Broadcasting

012071

R D Agustia and M K Wibawa

Open abstract View article PDF

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Decision Tree Method with C4.5 Algorithm for Students Classification Who is Entitled to Receive Indonesian Smart Card (KIP)

012072

E Afrianto, J E Suseno and B Warsito

Open abstract View article PDF

OPEN ACCESS

Enterprise Architecture Planning for Enterprise University Information System Using the TOGAF Architecture Development Method

012073

U Ulmi, A P G Putra, Y D P Ginting, I L Laily, F Humani and Y Ruldeviyani

Open abstract View article PDF

OPEN ACCESS

ISO 27001:2013 for Laboratory Management Information System at School of Applied Science Telkom University

012074

Alit Yuniargan Eskaluspita

Open abstract View article PDF

OPEN ACCESS

The Dual-Protocol of the Internet of Things (IoT) Platform for Environment Monitoring System

012075

A Mulyana and JA Ualubun

Open abstract View article PDF

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Performance Comparison of Anti-Spam Technology Using Confusion Matrix Classification

012076

F Rahmad, Y Suryanto and K Ramli

Open abstract View article PDF

OPEN ACCESS

Building Serverless Website on GitHub Pages

012077

Prayudi Utomo and Falahah

Open abstract View article PDF

OPEN ACCESS

Redundancy Detection Of Sentence Pairs In The Software Requirements Specification Documents With Semantic Approach

012078

E D Oktaviyani and Licantik

Open abstract View article PDF

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Design of Learning Media for Web-Based Subjects Geography. (Case study: Class XI majoring in social studies at Citra Nusa Senior High School)

012079

W Wahyuni, R S W Ahmad, N Hasti, I Gustiana and Afifah P Pratiwi

Open abstract View article PDF

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Geographical Information System of Slums Area in Tangerang Selatan City

012080

N R Radliya, R Fauzan and A R Rabbi

Open abstract View article PDF

OPEN ACCESS

The Designing of User Acceptance Measurement Tool for Web-Based Application Interface Using Combination from Nielsen's Method and Questionnaire Technique

012081

Yusup Maruli and Yusrila Kerlooza

Open abstract View article PDF

OPEN ACCESS

Work Accident Analysis on the project at PT. X based on the Failure Mode & Effect Analysis (FMEA) Method

012082

N Santiara and D Rosiyadi

Open abstract View article PDF

OPEN ACCESS

The Open Group Architecture Framework for Designing the Enterprise Architecture of ALIT

012083

A Y Eskaluspita and I D Sumitra

Open abstract View article PDF

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Analysis of Knowledge Management System in Pamulang University Library Based on SUMI (Software Usability Measurement Inventory)

012084

T Thoyyibah, Agung Trisetyarso, Wayan Saputra, Chul Ho Kang and Bahtiar Saleh Abbas

Open abstract View article PDF

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Development of Precision Agriculture Models for Medium and Small-Scale Agriculture in Indonesia

012085

H Maulana and H Kanai

Open abstract View article PDF

OPEN ACCESS

Implementation of Scrum Framework on Web Development of Mapping Salted Egg Production

012086

Ginanjar Wiro Sasmito and La Ode Mohamad Zulfiqar

Open abstract View article PDF

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Application of Linked List Algorithm Based on Multimedia

012087

B Hardiyana, L Fadilah and D Effendi

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012088

Development of Software Quality Assessment Model for Mobile-based Elderly Fall Detection Software

A Finandhita

Open abstract View article PDF

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012089

Designing Self-healing Software Using Role-Based Multi Agent System Approach

Falahah, Kridanto Surendro and Wikan Danar Sunindyo

Open abstract View article PDF

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012090

Sequential Feature Selection in Customer Churn Prediction Based on Naive Bayes

Y Yulianti and A Saifudin

Open abstract View article PDF

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012091

Feature Selection Based on Naive Bayes for Caesarean Section Prediction

T Desyani, A Saifudin and Y Yulianti

Open abstract View article PDF

OPEN ACCESS

012092

Hospital Quality Control System Development

R. Lubis, S Atin and Y A Tambunan

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012093

Model Design of Accounting Information Systems for Village Owned Enterprises (BUMDes)

Supriyati and Ramadhan S. Bahri

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012094

A Predictive Analytic on Data Online Digital News using Systematic Literature Review

Razief Perucha Fauzie Afidh and Zainal A. Hasibuan

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012095

Design of Enterprise Architecture Information System Practicum Scheduling in Computer Laboratory STMIK WIDYA CIPTA DHARMA Samarinda using TOGAF ADM Method

R G Rahmadani and I D Sumitra

Open abstract View article PDF

Electrical and Computer Engineering

OPEN ACCESS

012096

Android Based Information System Design

A Darmayadi and Y M Izmazatnika

Open abstract View article PDF

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012097

Temperature and Humidity Monitoring System using Wireless Based Xbee on Hydroponic Plants

A B Emge, I Afrianto and S Atin

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012098

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T H Suwito and M Aria

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012099

Portable Farming

Sutono and BR Ginting Selvia Lorena

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012100

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R Hartono, T N Nizar, I Robani and D A Jatmiko

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012101

Design and Application of a Portable Fingerprint System for Student Attendance Web-Based and Telegram Using Raspberry Pi

Syahrul, M F Wicaksono and Sumarsono

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012102

The Selection of the Correct Accuracy Level Using The Optimal Precision and Accuracy Method

Y Kerlooza

Open abstract View article PDF

OPEN ACCESS 012103

Human Detection and Avoidance Control Systems of an Autonomous Vehicle

T N Nizar, R Hartono and D Meidina

Open abstract View article PDF

OPEN ACCESS 012104

General Remote Control Based on Hand Patterns Detection Using Convolutional Neural Network

J Utama and H Y Biu

Open abstract View article PDF

OPEN ACCESS 012105

Design and Implementation of Doorcam in Home System using Raspberry Pi

S I Lestariningati

Open abstract View article PDF

OPEN ACCESS 012106

Maximally Stable Extremal Regions and Naïve Bayes to Detect Scene Text

E Rainarli

Open abstract View article PDF

OPEN ACCESS 012107

Build a Microcontroller Based Interactive Module as A Learning Medium in Vocational Secondary Schools

B Kurniawan

Open abstract View article PDF

OPEN ACCESS 012108

Virtual Simulation System with Various Examples and Analysis Tools for Programmable Logic Controller Training

M Aria, J Utama, F Fauzia, M Rizal, M Fahmi and M Yudha

Open abstract View article PDF

OPEN ACCESS

Fingerprint Matching Using Bozorth3 Algorithm and Parallel Computation on NVIDIA Compute Unified Device Architecture

012109

S Supatmi and I D Sumitra

Open abstract View article PDF

OPEN ACCESS

Design and Implementation of Sembako-ATM using IoT based on Microcontroller and Web Application

012110

H Hidayat, Y F Rahmatulah and M F Wicaksono

Open abstract View article PDF

OPEN ACCESS

Study and Performance Evaluation Binary Robust Invariant Scalable Keypoints (BRISK) for Underwater Image Stitching

012111

D A Jatmiko and S U Prini

Open abstract View article PDF

OPEN ACCESS

Support Vector Regression for GPA Prediction

012112

K E Dewi and N I Widiastuti

Open abstract View article PDF

OPEN ACCESS

Development of Automatic Health Testing Measurement Model for High School Students in West Java

012113

B Herdiana and A Ridwan

Open abstract View article PDF

OPEN ACCESS

Cropping Method on Grayscale Images for Periapical Radiographs of Human Teeth

012114

Linda Wahyu Widianti, Sunny Arief Sudiro, Sarifuddin Madenda and Johan Harlan

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Groundwater Potential Investigation Using Geoelectric Method with Schlumberger Electrode Configuration in Catur Rahayu Village, Dendang District, Tanjung Jabung Timur Regency, Jambi Province

012115

Tri Rahajoeningroem and Bagus Indrajana

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012116

Data Mining in Sales Data Grouping

Supriyati and S R Abdillah

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012117

E-Commerce for Agriculture

E S Soegoto and A Nugraha

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012118

Analysis on User Interfaces Readability: A Case Study of Instagram

A D Subarna and A S Arianti

Open abstract View article PDF

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012119

Designing Parking Lot Finder Application

E S Soegoto and M Indra

Open abstract View article PDF

OPEN ACCESS

012120

Designing Electronic Menu Applications for Restaurant Businesses

U Narimawati and A Pangestu

Open abstract View article PDF

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012121

E-Wallet Effects on Community Behavior

L Wulantika and S R Zein

Open abstract View article PDF

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012122

The Influence of Digital Wallet

E S Soegoto and M B R Sumantri

Open abstract View article PDF

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012123

Analysis of the Effect of Web-Based Information System

E S Soegoto and L F Ma'wa

Open abstract View article PDF

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012124

Analysis of Electronic Wallets Use Patterns among Students in Online Transportation Services

R D Santy and D Haninawati

Open abstract View article PDF

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012125

Web Based Online Inventory Information System

E S Soegoto and A F Palalungan

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012126

Design of Information System Human Resource Management

W Novianti and F Qadri

Open abstract View article PDF

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012127

Electronic Wallet as a Payment Transaction Instrument

A Rizaldi and F A Faruqi

Open abstract View article PDF

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012128

Pavement Design using Environmentally Friendly Porous Concrete

B S Sir and S M Setiana

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012129

Information Technology for Coffee Industry

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M A T Pratama and A T Cahyadi

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Application of Hec-Ras Technology to Irrigation and Water Building in Agricultural Businesses

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Developments of Information Technology and Digital Startup Sector of Agriculture in Indonesia

D S Soegoto and M Faridh

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012138

Desktop Based Application for Inventory Management

D S Soegoto and R F Nugraha

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012139

E-Wallet as a Payment Instrument in the Millennial Era

D S Soegoto and M P Tampubolon

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Agribusiness Information System of Dragon Fruit Planation

Y P Sihaloho and A Febriansyah

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Development of Enterprise Resource Planning using Blockchain

A R Komala and I Gunanda

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012142

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Utilization of Information and Communication Technology in Agriculture

T V L Gaol and M R Gustira

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012144

The Effect of Computer-Based 3D Visualization

D M Ramadhanty and T Handayani

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012145

Utilizing Technology of Dynamic Faces on Buildings

D P M Fattah and D Kurniasih

Open abstract View article PDF

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012146

Sustainable Building Materials

D A Suhamad and S P Martana

Open abstract View article PDF

OPEN ACCESS
012147
Use of 3D Animation Software in Visualizing Architectural Works
W Hadiyatna and Andi Harapan S
Open abstract View article PDF

OPEN ACCESS
012148
The Efficiency of Steel Material as Buildings Construction
S O Putri and Firmansyah
Open abstract View article PDF

OPEN ACCESS
012149
The Influence of Technology on Architecture Design 4.0
M Fadjri and Y A Ekawardhani
Open abstract View article PDF

OPEN ACCESS
012150
Architecture and Design in the Digital Age
R A Robinson and I Tarmawan
Open abstract View article PDF

OPEN ACCESS
012151
Recycled Wood Technology for Wall
H Hafilda and A B Hardoyo
Open abstract View article PDF

OPEN ACCESS
012152
Energy Utilization of Kinetic Paving Technology
I Ansori and Wanita Subadra Abioso
Open abstract View article PDF

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012153
Smart Bike Sharing System as Sustainable Transportation
L Warlina and Y A Hermawan
Open abstract View article PDF

OPEN ACCESS
012154
Air Quality Monitoring System in Urban Areas
S Suhendar and L Warlina
Open abstract View article PDF

OPEN ACCESS
012155
Design of Smart Trash Bin

R P Chandra and T Tawami

Open abstract View article PDF

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012156

Green Architectural Design Factors for Residential Environment and Lifestyle

D Fatimah and B Z Syaifudin

Open abstract View article PDF

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012157

Utilization of Sawdust as Interior Acoustic

F Maharlika and Aida

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012158

Designing Friendly Environment for Pedestrian by Visual Perception

A Pelayati and D Andriani

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012159

Synomorph of Behaviour Setting in Architecture Enhance the Green Design

Wanita Subadra Abioso

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012160

Kampong KB Public Open Space Design Based on a Participatory

N C Aditya, T W Natalia, L N Imaniar and S Astuti

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Land Use Change and Suitability Analysis in Coastal Area

L Warlina and A Ikhsan

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012162

Relationship between Farmer Characteristics and Gadget Using in Rural Area for Improving Regional Development

S S Aulia

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012163
Designing Enterprise Architecture for Public Health Center Based on TOGAF Architecture Development Method
Y P Putra and A Hadiana
Open abstract View article PDF

OPEN ACCESS
012164
Identification on Urban Planning Alteration Due to Regional Otonomous in Cimahi
R Adibowo and K Mahardika
Open abstract View article PDF

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012165
Implementing the Shortest Time Route Search Algorithm in Semarang Using the Best First Search Method
N Wibowo, C E Widodo and K Adi
Open abstract View article PDF

OPEN ACCESS
012166
Potential of Sea Passenger Movement Post Ports Development in Kepulauan Seribu
K Mahardika
Open abstract View article PDF

OPEN ACCESS
012167
Flood Control Reduction Analysis using HEC-RAS due to Local Floods in Central Jakarta
V Pratiwi, B P Yakti and B E Widyanto
Open abstract View article PDF

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012168
Effect of Change in Land-use to High Pattern of Inundation on Sub-River System of Lowland Urban River
S. A. Hamim and F. Usman
Open abstract View article PDF

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012169
Experimental Study Improving The Friction in The Surface of Cold Form Steel Connections Using Adhesive
Y D Setiyarto
Open abstract View article PDF

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012170

Building Façade of the Architect Richard L.A. Schoemaker in Bandung

S P Martana, J C Yapsie, Abdurrahman, F S Prasetyo and I D N Syauqi

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012171

Maintenance Strategy Selection in Spinning Mills Industry Using Fuzzy AHP

Gabriel Sianturi, Agus Riyanto and Racka Maulana

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012172

Product Quality Improvement by Using the Waste Assessment Model and Kipling Method

Julian Robecca, I Made Aryantha Anthara, Monalisa Silaban and Maureena Ronahot Situmorang

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012173

Maintenance Policy for Korin Filling Machines Using Overall Equipment Effectiveness (OEE) and Markov Chain

D Andriani, A Santosa and D U M Depari

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012174

An Analysis of the Determining Factors of Mobile Banking Adoption in Islamic Banks

A Yussaivi, D Suhartanto and Moch. Edman Syarief

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012175

Improvement of System Production Based on Analysis of Quality Control

I M A Anthara, J Robecca and M L Lubis

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012176

Design Models for Estimating Customer Volume Based on Competitors

I Andriana, H Henny, C M Saputra and D Darmawan

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012177

Designing Universal Smartphone Case with Solar Powered Chargers

H Henny, D Purwadi, H Hardianto and O Widilestariningtyas

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012178

Design for Human Safety and Health in Manufacturing System

H Henny, A Jaelani, H Haryanto and I Andriana

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012179

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A Santosa, A M Rinaldy and D Andriani

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Energy Utilization of Kinetic Paving Technology

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Abstract. Nowadays, electricity has become a priority in daily life and can even be considered as a primary human need. On the other hand, the excessive use of electricity or energy and the increase in population is one of the factors that can increase energy requirements. In Indonesia, the use of electricity comes from very limited natural resources. Therefore, energy savings should be implemented, either by using as necessary or even making an update that can sustain existing electrical energy. Apart from saving energy, it would be better to create new energy with minimal effort. Like producing energy from daily human activities, one of it is walking. The result is the creation of Kinetic Paving material technology that when people step on it will produce electricity. The benefits of this technology can create electricity that can be used for the environment of this kinetic paving. As for lighting in paving as lighting art or as a source of energy for surrounding buildings. Kinetic Paving is applied in pedestrian traffic spaces. This energy is expected to help the community and the surrounding environment. This is an update that should have been implemented. When natural resources are getting low and energy prices are getting higher, we need all these reforms.

1. Introduction

The population in Indonesia is increasing each day. Therefore, the needs are also increasing. One of them is the need for electricity. Electricity is now a primary need in daily life because many things are done every day using electricity. The use of electricity in the house or other building functions is not effective where the excessive use of electrical energy. So that the energy spent is very much and not proportional to the energy produced. So that resources are increasingly depleting. Therefore, we need technology that can create its energy. [1] To produce electrical energy, the easiest method is the result of the transformation of kinetic energy. The kinetic energy that is easily obtained in the middle of the city is the movement of the human itself. It can be concluded that human energy in walking can be used as kinetic energy which will be a source of electrical energy. Indonesia is one of the countries with quite a large number of young people. Youth tend to have more outside activities than other groups. So that at some point the place is quite active with the activities of this young man . This can be an advantage in terms of creating electrical energy from kinetic energy.

Previous research has shown that excessive use of energy will lead to the extinction of natural resources and the possibility of fossil fuels and oil will be depleted around the 21st century. [2] What is needed in this research is kinetic paving which is connected to a USB port and street lights. The top surface of the paving uses materials from recycled mattresses, athletic tracks or tires where the material is flexible. Installation of kinetic paving is quite easy because there is no need for excavation and it must be in an area with a high pedestrian level. This kinetic paving works when the pedestrian

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walks on one of the paving blocks, the piezoelectric will receive a kinetic force and push down the electromagnetic generator and produce 2-4 watts / s of electrical energy per step. This electrical energy will be channelled to a USB port that serves to charger a cell phone and to a street lamp that becomes an aesthetic visualization of light. With the density of the urban population, every single square can get 50,000 steps a day and enough to turn on the lights at the bus stop all night long [3].

The existence of this research is expected to be able to help supply electricity for facilities to the surrounding buildings. And with the existence of kinetic paving, it is expected that young people will be more active in walking which will affect electricity energy income and as a science and invitation to apply the concept of future health for each individual. The research method used is the installation of kinetic paving in areas that have a high pedestrian level such as educational institutions, sidewalks, parking lots and commercial areas.

2. Method

This research method used a descriptive method as a description of the energy benefits of kinetic paving. To complete this research, literature studies from national and international reference books as well as journals are also used with related discussions on paving, energy, and energy saving.

3. Results and Discussion

3.1 Paving Block

Paving blocks or a type of brick but made of concrete that functions as a floor covering. Paving blocks have a variety of shapes, but with a lock when installed interlocking between 1 paving with other paving. The installation is quite easy and has aesthetic value so that the paving block is always an alternative to outdoor floor coverings [4].

3.2 Energy Saving

Energy-saving or energy saving is an effort that emphasizes to conserve energy use which mostly comes from non-renewable natural resources. Saving energy is also an effort to reduce the yield of waste energy in the form of CO2 which is quite dangerous for the surrounding environment. Usually, this energy-saving effort is by utilizing resources that can be renewed or which always exist indirectly or naturally [5].

3.3 Kinetic Energy

Kinetic energy is the energy possessed by an object or device whose movements affect the energy produced. The more movements, the greater the energy produced [6]. Kinetic energy movement can be vibration or displacement. However, it has a rhythm, strength, and speed of movement that takes many forms [7].

3.4 Piezoelektrik Material

Piezoelectric is a material in the form of crystals and consists of many chemical elements contained in it [8]. This material is gaining in popularity because it has a fairly high energy effect, high strength and is resistant to humidity and extreme temperatures which is above 100ºC [9]. The excess effectiveness of this material depends on its geometric shape, structure, and thickness [10].

3.5 Kinetic Paving

Kinetic Paving is an object or device that utilizes or collects pressure from footsteps and is transformed into energy. The energy is stored or directly channelled to something that requires energy around the kinetic paving. Paving kinetic will be placed in crowded centre such as in stations, malls, pedestrian ways or sports facilities that cover the floor using the pavement [6].

3.6 Utilization of Paving Kinetic

Paving kinetic when viewed on environmental aspects, there are many positive aspects. Starting from the energy source, namely the power from the footrest that previously did not mean anything, but after the existence of this paving kinetic technology, the power from the footing is very meaningful because of the source of kinetic energy for this technology (See Figure 1 and Figure 2).

Figure 1.Kinetic Paving in the street

Figure 2. Detail of Kinetic Paving

Paving kinetic is also a substitute for energy from non-renewable natural resources. Although not as a whole, minimizing will be better. So that CO2 emissions will be reduced and air pollution will be reduced. Transformed energy can also be additional energy for outdoor facilities or buildings. With the existence of kinetic paving, it becomes a source of public education to encourage people to walk more frequently instead of using vehicles ineffectively and producing more CO2 emissions. Kinetic paving is also a sustainable material so it can be used in a very long term as a technological marker of highly advanced kinetic paving (See Figure 3).

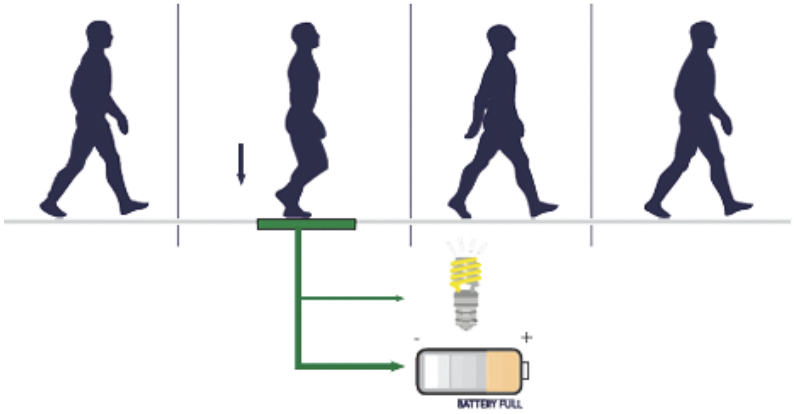

Figure 3. Diagram of Kinetic Paving

4. Conclusion

The results of this study are that energy can still be produced by humans as easily as possible by utilizing existing resources. The use of kinetic paving is very useful in producing electrical energy which is an alternative energy for facilities and buildings. This kinetic paving will become a material technology that will compete with the international market. Kinetic paving is also an educational medium for the cloud community regarding energy conversion and material technology. Kinetic Paving can be an alternative energy that helps outdoor facilities such as USB ports, street lights, and electricity supplies in buildings. Kinetic paving is also a progress in the field of materials technology with a sustainable and futuristic approach.

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