

Part of **SPRINGER NATURE**

[PROCEEDINGS](#) | [JOURNALS](#) | [BOOKS](#)

Search



Series: [Advances in Engineering Research](#)

# Proceedings of the International Joint Conference on Science and Engineering (IJCSE 2020)

[HOME](#)

[PREFACE](#)

[ARTICLES](#)

[AUTHORS](#)

[SESSIONS](#)

[ORGANIZERS](#)

[PUBLISHING INFORMATION](#)



International Joint Conference on Science and Technology (IJCSE) 2020 was successfully held on October 3, 2020 at Universitas Negeri Surabaya, Surabaya, Indonesia. This conference features three international conferences organized by Universitas Negeri Surabaya including the 3rd International Conference on Vocation Education and Electrical Engineering (ICVEE), the 4th Mathematics, Informatics, Science and Education International Conference (MISEIC), and the 2nd International Conference on Research and Academic Community Services (ICRACOS). The joint conference was completely conducted online

using Zoom as a platform. This event was also broadcasted live via an official YouTube channel of Universitas Negeri Surabaya. Through this scientific forum, Universitas Negeri Surabaya invited scientists, education experts, practitioners, and students all over the world to share and discuss their ideas, research findings, and issues about relevant topics, as well as to build scientific networks. This event shows the the commitment of Universitas Negeri Surabaya in supporting research activities of the community.

Please click [here](#) for the conference website.

## Atlantis Press

Atlantis Press – now part of Springer Nature – is a professional publisher of scientific, technical & medical (STM) proceedings, journals and books. We offer world-class services, fast turnaround times and personalised communication. The proceedings and journals on our platform are Open Access and generate millions of downloads every month.

For more information, please contact us at: [contact@atlantis-press.com](mailto:contact@atlantis-press.com)

- ▶ PROCEEDINGS
- ▶ JOURNALS
- ▶ BOOKS
- ▶ POLICIES
- ▶ ABOUT
- ▶ NEWS
- ▶ CONTACT
- ▶ SEARCH

---

Home [Privacy Policy](#) [Terms of use](#)   

Copyright © 2006-2022 Atlantis Press – now part of Springer Nature

Part of **SPRINGER NATURE**

[PROCEEDINGS](#) | [JOURNALS](#) | [BOOKS](#)

Search



Series: [Advances in Engineering Research](#)

# Proceedings of the International Joint Conference on Science and Engineering (IJCSE 2020)

---

HOME

---

[PREFACE](#)

---

[ARTICLES](#)

---

[AUTHORS](#)

---

[SESSIONS](#)

---

[ORGANIZERS](#)

---

[PUBLISHING INFORMATION](#)

---

Preface International Joint Conference on Science and Technology (IJCSE) 2020 was successfully held on October 3, 2020 at Universitas Negeri Surabaya, Surabaya, Indonesia. This conference features three international conferences organized by Universitas Negeri Surabaya including the 3rd International Conference on Vocation Education and Electrical Engineering (ICVEE), the 4th Mathematics, Informatics, Science and Education International Conference (MISEIC), and the 2nd International Conference on Research and Academic Community Services (ICRACOS). The joint conference was completely conducted online using Zoom as a platform. This event was also broadcasted live via an official YouTube channel of Universitas Negeri Surabaya. Through this scientific forum, Universitas Negeri Surabaya invited scientists, education

experts, practitioners, and students all over the world to share and discuss their ideas, research findings, and issues about relevant topics, as well as to build scientific networks. This event shows the the commitment of Universitas Negeri Surabaya in supporting research activities of the community.

A total of 330 papers were submitted to IJCSE 2020. The papers have various topics including electrical, electronics, telecommunication, instrumentation and control, informatics engineering, pure and applied mathematics, science and technology, computer science, and education in mathematics, science, computer science, and engineering. After subsequent reviews on the content, format, and language, 77 papers were selected to be published in this proceeding. The authors of the selected papers came from three different countries, namely Pakistan, Taiwan, and Indonesia. The rest of the papers were selected to be published elsewhere or rejected.

We would like express our best gratitude to keynote and invited speakers for their invaluable contribution and worthwhile ideas shared in the conference. We would also thank to all authors for their contribution to this proceeding as well as our reviewers for their constructive comments and suggestions to improve the quality of the presented papers. The organizing and editorial committee of IJCSE 2020 hopes that the presented papers can serve a reference for the relevant topics and you can enjoy reading this volume of the proceeding.

## **Atlantis Press**

Atlantis Press – now part of Springer Nature – is a professional publisher of scientific, technical & medical (STM) proceedings, journals and books. We offer world-class services, fast turnaround times and personalised communication. The proceedings and journals on our platform are Open Access and generate millions of downloads every month.

For more information, please contact us at: [contact@atlantis-press.com](mailto:contact@atlantis-press.com)

▶ PROCEEDINGS

▶ ABOUT

▶ JOURNALS

▶ NEWS

▶ BOOKS

▶ CONTACT

▶ POLICIES

▶ SEARCH

---

[Home](#) [Privacy Policy](#) [Terms of use](#)



Copyright © 2006-2022 Atlantis Press – now part of Springer Nature

Part of **SPRINGER NATURE**

[PROCEEDINGS](#) | [JOURNALS](#) | [BOOKS](#)

Search



Series: [Advances in Engineering Research](#)

# Proceedings of the International Joint Conference on Science and Engineering (IJCSE 2020)

[HOME](#)

[PREFACE](#)

[ARTICLES](#)

[AUTHORS](#)

[SESSIONS](#)

[ORGANIZERS](#)

[PUBLISHING INFORMATION](#)

Search

[+ Advanced search](#)

SEARCH

77 articles

**Proceedings Article**

## Design and Implementation of Different Types of Smart Dustbins System in Smart Campus Environments

Arifin N. Asyikin, Aulia A. Syahidi, Subandi

In Indonesia, waste is still a very serious problem. Garbage causes bad odors, air pollution, disease, and even flooding. Whenever and wherever each individual produces waste, waste can come from households and industries which have various types and forms. Public awareness to dispose of trash in the...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

## Early Warning System for Flood Disasters Using the Internet of Things

Yuyun, Hamka Zulfaesa, Latief Arda Abdul

Floods are one of the most frequently occurring natural disasters in Indonesia. It is therefore of special concern to reduce the risk of flood fatalities and other damage. The purpose of this study is to design a flood early warning system based on the Internet of Things (IoT). In this work, we use an...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

## Deformation of 3D Object of Human Body Internal Organs Using Finite Element Method Approach Accelerated by GPU

Cakra Adipura Wicaksana, Wahyuni Martiningsih

Few years ago, there are some research or publication about 3D simulation especially virtual surgery that still continuous growing, that is 3D deformable

object. The 3D deformable object resembles or mimic some object. The purpose of the research is to continue or add previous research especially in...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

### New Smart Virtual Content for Hanzi Characters in Mandarin Laboratories

S Sunarti, Tiksno Widyatmoko, Lukluk Ul Muyassaroh, Dewi Kartika Ardiyani, Edy Hidayat, Maria Mintowati

Industrial technology is developing rapidly accompanied by learning technology, especially in some virtual applications. Virtual Laboratory is one of the virtual learning applications that is currently being developed in the 4.0 industrial revolution. The use of virtual laboratories in Revolution 4.0...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

### Design of Sea Wave Power Hybrid Power Generation Through Utilization of Wave and Wind Energy as Renewable Electric Energy Sources for Leading, Outermost and Disadvantaged Areas

Masus Subekti, Parjiman, Nur Hanifah

This study conducts the design of sea wave hybrid power plants by combining wave energy with wind energy. Vertical energy of ocean waves is converted into pressurized water energy to rotate turbines connected to direct current generators, while wind energy uses wind turbines connected to direct

current...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

### Automatic Control Based on Voice Commands and Arduino

Alfiantin Noor Azhiimah, Khusnul Khotimah, Meini Sondang Sumbawati,  
Agus Budi Santosa

Control that is widely used today was control by voice commands. This study aimed to determine the application of voice and Arduino-based control automation which had been developed from 2014-2020 based on 25 journals that would be studied. Journal assessments were carried out by taking into account...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

### The Relationship Problem Solving Skills to Critical Thinking Skills in Aircraft Maintenance: A Conceptual Study

Bayu Dwi Cahyo, Luthfiyah Nurlaela, Meini Sondang Sumbawati

Aircraft safety and security is a major factor in aviation. Therefore, ensure the aircraft maintenance and repairs carried out correctly, effectively, and efficiency needed to support these factors. This study aims to explain the importance of an aircraft mechanic to have critical thinking skills and...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

**Proceedings Article**

## Application of Retrieval Information on Android-Based Online Music Course Application

Albertus Dera Andika, Farid Baskoro, Eppy Yundra

This research was conducted to develop a basic design of an android-based online music course application, and to implement an Information Retrieval system to search and find data located on the online music course application. This application was designed using Android Studio software, and thus can...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

**Proceedings Article**

## Analysis of Online Learning Implementation in Undergraduate Students of Building Construction Education in the Pandemic COVID-19

Kusnan, Suparji, Gde Agus Yudha Prawira Adistana, Muhammad Imaduddin, Wahyu Dwi Mulyono, Heri Suryaman

Surabaya State University (Unesa) as an educational actor limits physical distance by implementing online learning activities to break the spread of COVID-19. Online learning is usually carried out at a maximum of three meetings and combined with face-to-face. However, in the even semester 2019/2020...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

**Proceedings Article**

## Effectiveness of Online Learning of Construction Equipment Courses During the COVID-19 Pandemic

Hasan Dani, Puguh Novi Prasetyono, Suryanto HS Mas, Danayanti Azmi Dewi, Nusantara, Amanda Ristriana Pattisinai, Feriza Nadiar

The whole society is affected by the pandemic of coronavirus or COVID-19, even in Indonesia's education sector. One of the government's policies to constrict the spread of COVID-19 is by physical distancing. The education sector's impact is which must be using an online learning platform, which is also...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Automatic Hand Sanitizer Container to Prevent the Spread of Corona Virus Disease

Puput Wanarti Rusimamto, Nurhayati Nurhayati, Eppy Yundra, Reza Rahmadian, Arif Widodo, Much Ade Dermawan

COVID pandemic has influenced human life in various sectors. Various attempts were made to reduce the virus transferring by work from home, social distancing, and also including hand hygiene. So far, most of the available hand sanitizers do not operate automatically. This article aims to make an automatic...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Analysis of the Use of Virtual Meeting in the Implementation

## of Proposal/Thesis Examination During Covid-19 Pandemic

Dodik Arwin Dermawan, Rindu Puspita Wibawa, Martini D E Susanti

In the early 2020s, Indonesia was shocked by the Coronavirus Disease (Covid-19) outbreak which struck almost all parts of the world. The Indonesian government spontaneously implemented a policy of learning from home, working from home, and worship at home. All face-to-face activities are diverted online....

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Curriculum Development is Conducted to Improve Competencies of Air Transportation Management Study Program for Cadets of Aviation Polytechnique Surabaya

Ariyono Setiawan, Luthfiyah Nurlaela, Munoto, I Gusti Putu Asto Buditjahjanto, Bambang Suprianto, Yuyun Suprpto, I Gede Susrama Mas Diyasa, Dama Yanti Hilda

The purpose of this study is to provide an analysis of the effect of curriculum development on air transportation management competencies by contributing to cadets at Surabaya Aviation Polytechnic. The design of this study uses quantitative research methods that emphasize numerical data analysis such...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Implementation of Google Classroom-Based Learning

## Management System on the Subject Digital Signal Processing and Propagation Antennas as One of the Effective Learning Media in the Middle of Pandemic COVID-19

Farid Baskoro, Miftahur Rohman, Fendi Achmad

Effective learning is quality learning in relation to the effectiveness of the learning process interaction itself to achieve the expected goals. This study aims to determine the effectiveness of lectures in the middle of the Covid 19 pandemic, where learning by face-to-face method is vulnerable to the...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Diverse Forms of V-learning Students' Acceptability During the Pandemic Covid-19

Ita Fatkhur Romadhoni, Dwi Kiristiasuti, Luthfiyah Nurlaela, Any Sutiadiningsih, Nugrahani Astuti, Lucia Tri Pangesthi, Sri Handajani, Niken Purwidiani, Suhartiningsih, Asrul Bahar

Covid-19 pandemic encourages online learning to prevent wider spread. Various types of learning platforms were implemented, but there needs to be an evaluation of student acceptance of the platforms. This study aims to assess the impact of v-learning on student acceptance during a pandemic. The v-learning...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Schoology and Slido: The Perfect Platform Combination for

## Distance Learning During the Covid-19 Pandemic

Vania Zulfa, Prastiti Laras

The Covid-19 pandemic that occurred worldwide caused a social policy for all citizens to break this Covid-19 chain. However, this policy impacts all aspects of life, including the field of education in Indonesia. The government decided to move the learning process from face-to-face learning to online...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## The Design and Implementation of Web Crawler Distributed News Domain Detection System

I Gusti Lanang Putra Eka Prisma, Dedy Rahman Prehanto, I Kadek Dwi Nuryana

Spreading data or info through internet to increase the chances of success in a business through analysis of market trends is very common today. Web Crawl is one important thing, so that the incomplete data will not be appeared, and the data received is the most recent data. Exploration Web crawler technology...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## The Implementation of Project Based Learning Model Towards the Learning Outcome of Subject Wood Structure I

Tuti Iriani, M. Agphin Ramadhan, Nurul Anisa

This study aims to compare student learning outcomes using two different

tasks in the Project Based Learning (PBL) learning model in a wooden structure course 1. The research method used is Quasi Experiment with pretest-posttest design conducted in 4 meetings. The subjects of this study were 36 UNJ Civil...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Blood Donor Matching Information Systems and Determining Tools for Blood Cluster and Human Rhesus Based on IoT

Aditya Chandra Hermawan, Ita Mubarokah, Farid Baskoro

Until now, the process of testing human blood groups is still done manually by mixing blood and antisera. Testing is done by observing the agglutination reaction of blood samples. Then the testing process takes a long time, without storing donor data. this is less effective if the blood is tested a lot...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Home Monitoring and Control Using Smartphone and Speech Processing

Mochamad Mobed Bachtiar, Bima Sena Bayu Dewantara, Dwi Prastyo

Monitoring and control of home electronic equipment in general is still done manually, this is less efficient if we are not at home but want to monitor the condition of the electronic equipment. With the remote control using a smartphone can be a solution to simplify the control system and monitoring...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Design and Development of Chatbot Using Dialog Flowin Surya Sembada PDAM Surabaya City

Ariyono Setiawan, Yuyun Suprpto, I Gede Susrama Mas Diyasa, Chilyatun Nisa, Maulana Idris, Feronika Nur Maghfiro, Yuri Setiawan, Dama Yanti Hilda

Surya Sembada City Surabaya Water Supply Company is a company that provides clean water production. In its service, many complaints are obtained from customers. During this time complaints are carried out manually, of course, less effective. With the development of information technology, the chatbot...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## The Development of the Sub Instruments of Digital Literacy on the Subjects of Electronics Circuit in Vocational School

Nur Kholis

In this study has the objective to develop sub instruments digital literacy of subjects of electronics circuit in vocational school students. The resulting sub instrument is used to measure the competency of students with the three domains such as affective, cognitive, and psychomotor. This study uses...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## The Effect of Project-Based Learning Model (PjBL) and Direct Instruction (DI) on Result Learning of the Basics Building Construction and Survey Engineering From Student Learning Motivation

Tri Rijanto, Kusnan Evany Iqrammah

This study aims to: (1) obtain information on differences in result learning, students who use the project based learning model and the direct instruction model in DKTB, (2) answer the differences in result learning of participants students who have high motivation to learn, and students who have low...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## The Effects of Self-Efficacy on the Competency of Cadets in Aviation Polytechnic of Surabaya

Ariyono Setiawan, Munoto, Eko Hariadi, Luthfiyah Nurlalela, Yuyun Suprpto, I Gede Susrama Mas Diyasa, Dama Yanti Hilda

This research purposes to analyze the effects of self-efficacy on the Competency of Cadets in Surabaya Aviation Polytechnic. This study uses the quantitative approach. The researcher decided to use a polytechnic institution located in Surabaya namely Surabaya Aviation Polytechnic which has competence...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Design Automatic Hand Sanitizer Microcontroller Based using

## Arduino Nano and Ultrasonic Sensors as an Effort to Prevent the Spread of Covid-19

Meini Sondang Sumbawati, H Aditya Chandra, Tri Wrahatnolo, Ibrohim, L. Endah Cahya Ningrum, Khusnul Khotimah, Ali Nur Fathoni

The government through the Ministry of Education and Culture (Kemendikbud) has made a decision to suspend teaching and learning activities in schools. The learning process that starts face to face directly in the classroom turns into distance learning /brave. However, the government decided to reopen...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Work Analysis of Constant Current Regulator BF 1200 With Current Loop and Gauss Jordan Method as Learning Media for Cadets

Hartono, I.S. Rifdian, H. Slamet

Runway lights at the airport are 1-5 km in length, which always connected in series so the pilots look the same bright lights from the beginning of runway until the end of runway. The same bright lights will be on if runway lights connected in series and every lamp obtains the same current flow. The...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Technology Compatibility Factors in the Implementation of the Ovo Digital Payment Application

Rahadian Bisma, Yuanita Puspita, Endang Sulistiyani

Digital developments are increasingly reaching the financial world, leading to a variety of new payment service innovations, one of which is OVO. The emergence of digital payment technology is not necessarily in accordance with the habits of users in using digital payments using mobile devices. Therefore,...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

## Comparison of Machine Learning Algorithms for Autism Spectrum Disorder Classification

Erina S. Dewi, Elly M. Imah

Autism Spectrum Disorder is one of the fastest-growing neurodevelopmental disorders in the world. These neurodevelopmental disorders often attack children, affecting social development and behavior. Effective early detection of ASD is needed to reduce the risk of ASD in children. This study classified...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

## Worksheet of Entrepreneurship Students to Train Ecopreneurship Characters

Tutut Nurita, An Nuril M. Fauziah, Siti N. Hidayati

Entrepreneurship is one of the courses in science education study programs that examine the development of products in the form of finished goods, services, learning resources and learning media for science and services that

begin from analyzing market needs, testing the feasibility of products, producing...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

### Training Science Literacy Skills Through Article Writing on Local Wisdom in East Java

Firas Khaleyla, Dwi Anggorowati, Pramita Yakub, Fida Rachmadiarti

Science literacy is one of main skills students should have in the 21st century. One method to train science literacy is by writing scientific article. The purpose of the study was to improve science literacy of students through scientific writing in exploration of local wisdom in East Java on Conservation...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

### Contribution of Housewives to Increase the Immunity of Family Members During Covid-19 Pandemic

Dwi A. Rahayu, Reni Ambarwati, Rinie P. Puspitawati, Isnawati, Nur Kuswanti

Currently we are battling with the outbreak of a new type of infectious disease known as coronavirus disease 2019 (COVID-19). This virus causes severe acute respiratory coronavirus 2 syndrome (SARS-CoV-2). The spread of SARS-CoV-2 from human to human becomes the main transmission source; hence the rate...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## The Effect of Chemiclife Media on Chemical Bond Material Based on Completeness and Student Learning Outcomes

Fawzia Aulia Praptiwi, Rivaldi Dwi Kurniawan, Rusly Hidayah

The aim of the research is to obtain the validity of Chemic-life media on chemical bond material. This research use 4D model (Define, Design, Develop and Disseminate) modified by Ibrahim, for this research the stages of dissemination have not been carried out. Chemic-life Media was tested on 12 students...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Biology Online Classes During Covid-19 Pandemic in Indonesia

Eva Kristinawati Putri, Wisanti, Reni Ambarwati, Dwi Anggorowati Rahayu, Firas Khaleyra

Indonesia reduces the spreading of COVID-19 infection by physical distancing. There is no argue that this policy affects all aspects, including education. Online learning has replaced the ordinary procedure of learning, whether we are ready or not. Organizing an online learning becomes an evitable challenge,...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Description of Knowledge, Attitude, and Consumption Behavior of Supplements Drink for the Elderly to Improve the Immunity Systems

Tukiran, Mauren Gita Miranti

At the end of March, Indonesia was shaken by a plague that attacks the respiratory system resulting in death. The virus is known as Covid-19 from Wuhan, China. Until May, cases of the spread of Covid-19 have increased in Indonesia with a mortality rate of 6.61%. Some areas have been identified as red...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Teaching Strategy in Effective Science Learning Based on Classroom Discourse and Empirical Research

Taufik Muhtarom

The purpose of this article is to explain the results of a study of effective teaching strategies in learning science in the classroom based on classroom discourse and relevant research. The method used is the literature review by collecting and reviewing the results of scientific studies about learning...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## The Development of Optical Module Based on Science Process Skills

Wahyudi, Nurhayati, Dwi F. Saputri

The optical concept is an important concept that must be mastered by pre-service teacher. The concept is not only obtained theoretically but also through scientific process skills. This requires an optical module based on process skills to assist students in mastering optical concepts. This study aims...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Improvement of Self-Efficacy and Student Learning Outcomes on Acid Base Material Using 9E Learning Cycle Model

Tukiran, Fitroh A. Mubarokah, Harun Nasrudin

The aim of the research was to find the effectiveness of developed teaching materials to increase students' self-efficacy and learning outcomes using 9E learning cycle on acid base matter. The teaching materials was applied in SMAN 7 Surabaya toward 36 students of grade XI-6. This research used 4D model...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Students' Reasoning With Logical Mathematical and Visual Spatial Intelligence in Geometry Problem Solving

Jafar A. Aziz, Dwi Juniati, Pradnyo Wijayanti

Reasoning in solving geometry problem used by students to recognize shapes, identify properties and analyze relationships between geometric objects. This study aimed at investigating the students' reasoning in geometric problem solving with predominance of different intelligence types. This research...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Tomini Bay as a Source of Chemistry Learning

Sandy A. Kusumah, Sri Atun, Hari Sutrisno

This study aims to identify the potential of Tomini Bay resources that can be utilized as a source of chemistry learning. This is a qualitative research using primary data and secondary data. Data collection were conducted through the combination of field research and literature studies. All data were...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## The Effect of OPPEMEI Model on Students' Creative Thinking Skill and Cognitive Learning Achievement

I Gusti Ayu Tri Agustiana, Rudiana Agustini, Muslimin Ibrahim, I Nyoman Tika

The study was conducted to find out the effect of OPPEMEI model on creative thinking skill and cognitive learning achievement and their correlation in the third semester students of the Elementary School Education Department, Faculty of Education Science of Universitas Pendidikan Ganesha. This study...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Developing Android-Based Comic for Learning Quadrilateral to Improve Seventh-graders' Geometric Thinking

Dany Samsurya Kurniawan, Mega Teguh Budiarto, Atik Wintarti

This research was conducted to develop android-based comic learning media and describe the increase in geometric thinking skills after learning to use android-based comic learning media. This comic development process uses the Gall and Borg development model. The stages were needs analysis; product planning...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Applying of Search, Solve, Create, and Share (SSCS) Learning Model to Improve Students' Mathematical Quantitative Reasoning

Sugiarti, Mega T. Budiarto, Tatag Y.E. Siswono

The purpose of this study was to determine whether the application of the search, solve, create, and share (SSCS) learning model can improve students' quantitative mathematical reasoning. This study was a pre-experimental research with one group pretest-posttest design. The population in this study were...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Vandemicum of Nanogold and Nanosilver to Improve Quality Life of Cancer Patients

Titik Taufikurohmah, Najlatun Naqiyah, Sumarlik, Muhammad F. Ilhamuddin, Ananto Sidohutomo

The purpose of this study was to examine the success of the nanogold and nanosilver drug vandemicum in improving the quality of life of cancer patients. Vandemicum can be interpreted as a guide to treatment in the health sector. The quality of life of cancer patients is influenced by the individual's...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

### 3D Blender Animation Media as Self-Assessment Implementation in Corrosion Engineering Course

Aisyah E. Palupi, Arya M. Sakti, Bellina Yunitasari, Suparji, Setya C. Wibawa

In the midst of an increasingly widespread coronavirus (COVID-19), online lectures are a solution to keep running teaching and learning activities instead of class meetings. The purpose of this study was to create learning media using a 3D blender animation media and a self-assessment platform as well...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

### Production of Herbal Mixes (Jamulacang) Instant as an Effort to Increase Immune to Prevent Covid 19

Any Sutiadiningsih, Niken Purwidiani, Agung Prijo Budijono, Yunus, Veni Indrawati, Meda Wahini

This program of activities was carried out in an effort to help prevent the

spread of the epidemic and prevent the transmission of the Covid-19 virus. This prevention effort was carried out by the PKM implementation team by making instant herbal mix herbs made from raw ginger, ginger, secang, cardamom,...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Self Concept in Social Behavior Based Android to Boost Family's Immunity in Preventing Covid-19 Spread

Ari Wahyudi, Sugeng Harianto, Agus M Fauzi, Refti H Listyani, Farid Pribadi

The purpose of this study is to develop self concept in social behavior based Android to boost the immunity of family members as the prevention of Covid-19 spread. The developments are (a) self-concept in physical terms including family, school, and children's play environment, (b) self-concept in social...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Effect of Cross Section Dimensions to Stiffness and Deflection on Reinforced Concrete Beams

Berkat Cipta Zega, Hakas Prayuda, Dimas Putra Mulia

The strength of reinforced concrete can be planned in various ways, either doing manual calculations, compressive strength testing, or testing using applications. Therefore, an accurate result approach can be obtained, one of which is by using the Response-2000 application program. This research aims...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Issues on Academic Writing Consultation: Alternative Online Platforms for Graduate Students

Eppy Yundra, Utama Alan Deta, Yetty Septiani Mustar, Muhammad Abdul Ghofur, Sueb

During the global pandemic, academics have experienced a challenging transition period that affects the learning process, leading to disruption in adjusting the existing learning modes. More specific problems faced by graduate students upon the research consultation and writing scientific reports from...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Sugar and Cooking Oil Consumption in Surabaya

Amalia Ruhana, Choirul Anna Nur Afifah

The consumption patterns of urban communities has been shifted and leading to fast foods. Fast foods contained high sugar and fat so they tasted delicious and became favorite for many people. Excessive consumption of sugar and fat might lead to overweight and obesity, which increased the risk of coronary...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

**Proceedings Article**

## Fruktooligosaccharides of Yacon Tubers (*Smallanthus sonchifolia*) on Variation in Height of Planting Area, Harvest Time and Storage with Natural Inhibitors

Leny Yuanita, Wahyu Budi Sabtiawan, Prima Retno Wikandari, Dhita Ayu Permata Sari

Yacon (*Smallanthus sonchifolia*) was a potential plant to be developed: its tubers were as antidiabetic sweetener, anti hypercholesterolemic, contains antioxidant polyphenols especially chlorogenic acid and cancer prevention; the leaves contain high protein and as an anti-fungal. The main bioactive compounds...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

**Proceedings Article**

## Designing and Developing Electric Squeezer Machine for Mangrove Syrup Production

Lila Yuwana, Suyatno, Susilo Indrawati, Alfi Tranggono Agus Salim, Sudarsono, Niniet Indah Arvitrida

Generally, syrup production requires press machine to minimise time production. This paper reports detail design and construction of mangrove fruit press for syrup production purpose. The previous survey of syrup production in Wonorejo Rungkut Surabaya indicated that time production took a long duration...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

**Proceedings Article**

## Internet of Things-Based Monitoring System of Patients Using W1209 Digital Thermostat and Pulse Sensor

Lilik Anifah, Puput Wanarti Rusimamto, Nurhayati, Subuh Isnur Haryudo, Warju, Haryanto

Some diseases are transmitted through droplets or touch and contact with patients. Transmission can also occur with objects that are often touched by patients. This contact is impossible to avoid for medical personnel who care for patients, therefore the effort made is to minimize contact with patients...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

**Proceedings Article**

## The Effect of the Addition of *Turmeric* and *Temulawak* on the Hedonic Value of Starfruit Syrup

Luthfiyah Nurlaela, Eppy Yundra, Ita F. Romadhoni

One of the efforts that can be made to prevent the spread of Covid-19 is to increase the body's immunity, especially for residents who are affected. The purpose of this study was to determine the results of the starfruit syrup made with the addition of the herbal ingredients of turmeric (*Curcuma longa*)...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

**Proceedings Article**

## Nutridrink TOGA as an Alternative to Maintain Body Immunity Against Covid

Aghus Sifaq, Ananda P. Bakti, Mauren G. Miranti, Siti S. Wulandari, Retno M. Dewi

Family medicinal plants have played an important role since ancient times in maintaining health, maintaining stamina and treating diseases. Therefore, the TOGA plant has become part of local wisdom in the life of Indonesian society until now. This study aims to determine the level of acceptance of family...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

### Development of Codeigniter-Based Tracer Study Application

Mohammad Syahidul Haq, Vicky D. Wicaksono, Kartika R. Adhe, Ahmad A. Zawawi

Tracer study provides important information on the relationship between higher education and professional work, it assesses the relevance of higher education by comparing aim of learning and data of alumnae, it informs stakeholders about the information of alumnae, and the most importantly, The Tracer...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

### Coconut Milk as an Alternative of Cosmetic Material for Thinning Hyperpigmentation on the Face Skin

Nia Kusstianti, Sri Usodoningtyas

Coconut milk is a milk-white liquid and comes from grated coconut meat

which is moistened and then squeezed and filtered. Coconut milk can be used to soften the skin, and can eliminate black spots on the face, because it is rich in natural fatty acids and contains antiseptics. Hyperpigmentation is a...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

### UNESA Physical Test – An Alternative Way to Measure Fitness Using Step and Chair-Based Test

Oce Wiriawan, Donny A. Kusuma, Nurhasan, Abdul Hafidz, Arifah Kaharina

Fitness indicators have a close relationship with several health indicators. Besides, that has a function to find out the people's fitness indicators, and it also has the potential to gain the fitness targets that can be achieved by doing physical exercise. However, the high variation in fitness assessments...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

### Design and Implementation of Thermal Body System Employing Thermal Sensor MLX 90614 for Covid-19 Symptoms Early Detector

Puput W. Rusimamto, Rina Harimurti, Endryansyah, Yeni Anistyasari, Lilik Anifah

Researchers designed and implementation of thermal body measurement system for Unesa residents when they entered the building. The system design is made using engineering methods. Before body temperature is measured, the object will occupy a position at a predetermined point. At that point installed...

[+ Article details](#)[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Weather Monitoring Telemetry System Based on Arduino Pro Mini With Antenna Tracker Using Transceiver Module SV651 and SV611

Rifqi Firmansyah, Muhammad Badruddin A. Mustofa, Muhammad Eko Prasetya, Pressa P. Surya Saputra

The progress of space technology in various countries is increasing rapidly. In Indonesia, there is a Non-Government Organization Ministry of Indonesia who carries out government duties in the field of aerospace research, development and utilization. The institute is known as LAPAN (National Institute...

[+ Article details](#)[+ Download article \(PDF\)](#)

---

### Proceedings Article

## The Study of Amylase's Reaction Kinetics From Soybean Sprouts (*Glycine max L.*) in Hydrolyzing Starch

Rudiana Agustini, Nuniek Herdyastuti

Amylase is an enzyme that has a role in hydrolyzing starch. This enzyme can be obtained from germinated seeds, one of them is soybean seed sprouts. The research aimed at studying the reaction kinetics in hydrolyzing the substrate, which is called starch, has been done. The research was conducted in three...

[+ Article details](#)[+ Download article \(PDF\)](#)

---

**Proceedings Article**

## Synthesis Hydroxyapatite/Collagen/Chitosan Composite as Bone Graft for Bone Fracture Repair

Sari E. Cahyaningrum, Amaria, Muhammad I. F. Ramadhan, Nuniek Herdyastuti

Composite hydroxyapatite-collagen-chitosan as bone graft materials for bone fracture has been synthesized using ex-situ method. Combining the advantages of hydroxyapatite with chitosan and collagen as composites bone material that it show good biocompatibility and can bond with surrounding host tissues...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

**Proceedings Article**

## Student Learning Independence in Online Learning Depends on Motivation

Meini Sondang Sumbawati, Munoto, Ismet Basuki, Euis Ismayati, Tri Rijanto

Online learning requires high internal motivation and learning independence to achieve satisfying results. Student learning independence is a internal ability to study independently, and can overcome its own problems related to the internet and the use of applications, so as to be able to motivate themselves...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

**Proceedings Article**

## Cypirus Rotundus L: As Antiseptic Soap Materials

Sri Dwiyanti, Siti Sulandjari, Dindy S. Megasari, Nia Kusstanti, Mutimmatul Faidah, Sri Usodoningtyas

Solid bath soap is a product that is used as a body cleansing agent or certain parts of the body. A good soap serves to cleanse, not damage the skin and can protect the skin from disease by microorganisms. In addition to the main ingredients, soap can be added natural ingredients that contain compounds...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Failure Analysis on Reheater Tube Boiler Furnace Base on Tensile and Impact Test

Novi Sukma Drastiawati, R. Soekrisno

Failure on reheater tube was rupture. Scale latched on the outer surface and progressively thinning thickness with a minimum thickness of tube rupture at the nearest corner. An analysis of this research is to find the cause fracture mechanism and prevent similar failure. The mechanical analysis used...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Development of Physical Distancing Detector (PDD) Integrated Smartphone to Help Reduce the Spread of Covid-19

Suryanti, HP Paksi, VD Wicaksono, W Widodo, I Sucahyo

The Government of Indonesia has issued rules on how to avoid covid-19 transmission, namely through various means including social distancing (SD)

and physical distancing (PD), at least 1 meter. Until now to run the PD protocol based only on estimates, there has been no safe distance detection tool between...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## The Effectiveness of the Addition of EM4 and Molasses in Increasing Levels of N, P and K in Environmentally Friendly Liquid Fertilizers Made From Banana Pseudostem

Susilo Indrawati, Diky Anggoro, Heru Sukamto, Nurrisma Puspitasari, Sungkono, B. Indarto, Suyatno, Gontjang Prajitno, Niniet I. Arvitrida, Lila Yuwana

According to the statistics agency in 2017, banana production had the largest portion in Indonesia. Furthermore, banana production increased from 6.28 million tons to 7.04 million tons. Consequently, this tremendous production lead to an increasing of pseudostem waste. Through a research-based community...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Provision of Health in Rural Areas of Pakistan Through Community Health Centers

Muhammad Saud, Marwa Aymen, Shah Faisal, Meliana Handayani, Muhammad Anns

The role of Community Health centers apart from the traditional hospital setting is meant to provide and promote the health care needs of the

community. Community health centers are nonprofit organizations providing a wide range of health services in the local community to people of all ages and sex...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Performance of an Accelerometer-Based Wireless Body Area Network in Indoor Environment: A Preliminary Study

P. Puspitaningayu, N. Funabiki, R.W. Sudibyoy, H. Briantoro, Nurhayati, T. Wrahatnolo

The promising purpose of wireless body area networks have brought a new paradigm in many aspects such as healthcare, lifestyle, and entertainment. One of the most popular sensors is the accelerometer which meant to monitor movements of its user. With the help of MEMS technology, an integrated chip which...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## RFE and Chi-Square Based Feature Selection Approach for Detection of Diabetic Retinopathy

Alifah, Titin Siswantining, Devvi Sarwinda, Alhadi Bustamam

Diabetic retinopathy, which is one of the complications in diabetes, is an eye disease that can lead to blindness. The damage happens in retina as result of a long period of diabetic mellitus. People usually do research using image data in diabetic patients. This paper presents the idea of using feature...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Mamdani Fuzzy Inference System (FIS) for Early Diagnosis of Diabetes Mellitus (DM) and Calorie Needs

Humaidillah Kurniadi Wardana, Imamatul Ummah, Lina Arifah Fitriyah

Diabetes Mellitus (DM) is a frightening type of disease because DM causes complications for the patients if it is not treated quickly. From year to year DM in Indonesia undergone a significant increase and was ranked 6th in the world. In this study, a fuzzy logic system was created for the early diagnosis...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Prototype Design of Transmission Trainer as Learning Media to Support Student's Learning Interest

Mohammad Munib Rosadi, Retno Eka Pramitasari, Ali Hasbi Ramadani

Based on observations, there were some students who felt sleepy or were not interested in the materials being taught, even though the presenter had prepared good presentation and explained it coherently, especially in engineering subjects. Therefore, tools in the form of learning media are needed. This...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## IoT Based Temperature Control System Using Node MCU ESP 8266

Rifqi Firmansyah, Muhamad Yusuf, Pressa P. Surya Saputra, Muhammad Eko Prasetyo, Fahmi Mahardi Mochtar, Fandik Agung Kurniawan

Water heaters are currently needed especially in the industrial world. This heater is used to maintain the temperature of the liquid so that the products produced are appropriate with standard specifications. Along with technological developments in recent years, circulating water heaters still use conventional...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## Centrifugal Pump Bearing Analysis With Amplitude Indicator Using Vibration Meter

Juan Ardi Kusuma, Firman Yasa Utama

Centrifugal pumps In this company serve to distribute plant waste to wastewater treatment installations in order to reduce waste levels. One component of centrifugal pump on wastewater treatment plant to be aware of is bearing. The treatment has been used corrective maintenance which is when the machine...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

### Proceedings Article

## The Effect of Google Classroom as A Tool in Chemistry Learning

Maria Paristiowati, Zulmanelis, U Dessy Indira, K Novita Lutfi

The development of information and communication technology in the 21st century has had an impact in the field of education. One of them is the development in the learning model that uses a lot of information and communication technology-based media. One of the technologies in learning that is currently...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

### Application of K-Means Algorithm for Clustering Student's Computer Programming Performance in Automatic Programming Assessment Tool

Anita Qoiriah, Rina Harimurti, Andi Iwan Nurhidayat, Asmunin

Programming is a course that is considered quite difficult for most students. Students are required to have abilities in all processes. Computer programming skills require a lot of practice through lab work assignments. Managing and assessing results of a student's lab work assignment is complex and...

[+ Article details](#)

[+ Download article \(PDF\)](#)

---

#### Proceedings Article

### The Development of Students' Learning Material on Arithmetic Sequence Using PMRI Approach

Ichdar Domu, Navel Oktaviandy Mangelep

The aim of the learning process in this study was to help students find

concepts on arithmetic sequence materials using the approach of Pendidikan Matematika Realistik Indonesia (PMRI) as well as produce a path of arithmetic sequence learning using PMRI approach. This research method was design research...

+ Article details

+ Download article (PDF)

### Proceedings Article

## Atlantis Press The Effect of Participation in Academic Achievement Activities on Vocational Teachers Competence

Atlantis Press – now part of Springer Nature – is a professional publisher of scientific, technical & medical (STM) proceedings, journals and books.

We offer world-class services, fast turnaround times and personalised

documentation. The proceedings and journals in our guide, made Open

Access and generate millions of downloads every month. Professional educators, teachers need to have competence according to

standard. This study was aimed to uncover a variable related to the

competence of vocational high school teachers, specifically in academic achievement....  
For more information, please contact us at: [contact@atlantispress.com](mailto:contact@atlantispress.com).

+ PROCEEDINGS  
+ Article details

+ JOURNALS  
+ Download article (PDF)

▶ BOOKS

▶ POLICIES

▶ ABOUT

▶ NEWS

▶ CONTACT

▶ SEARCH

1

Home Privacy Policy Terms of use



Copyright © 2006-2022 Atlantis Press – now part of Springer Nature

Part of **SPRINGER NATURE**

[PROCEEDINGS](#) | [JOURNALS](#) | [BOOKS](#)

---

Search



Series: **Advances in Engineering Research**

# Proceedings of the International Joint Conference on Science and Engineering (IJCSE 2020)

---

[HOME](#)

[PREFACE](#)

[ARTICLES](#)

**[AUTHORS](#)**

[SESSIONS](#)

[ORGANIZERS](#)

[PUBLISHING INFORMATION](#)

---

**313 authors**

**Abdul, Latief Arda**

Early Warning System for Flood Disasters Using the Internet of Things

**Achmad, Fendi**

Implementation of Google Classroom-Based Learning Management System on the Subject Digital Signal Processing and Propagation Antennas as One of the Effective Learning Media in the Middle of Pandemic COVID-19

**Adhe, Kartika R.**

Development of Codeigniter-Based Tracer Study Application

**Adistana, Gde Agus Yudha Prawira**

Analysis of Online Learning Implementation in Undergraduate Students of Building Construction Education in the Pandemic COVID-19

**Aditya Chandra, H**

Design Automatic Hand Sanitizer Microcontroller Based using Arduino Nano and Ultrasonic Sensors as an Effort to Prevent the Spread of Covid-19

**Afifah, Choirul Anna Nur**

Sugar and Cooking Oil Consumption in Surabaya

**Agustiana, I Gusti Ayu Tri**

The Effect of OPPEMEI Model on Students' Creative Thinking Skill and Cognitive Learning Achievement

**Agustini, Rudiana**

The Effect of OPPEMEI Model on Students' Creative Thinking Skill and Cognitive Learning Achievement

**Agustini, Rudiana**

The Study of Amylase's Reaction Kinetics From Soybean Sprouts (*Glycine max L.*) in Hydrolyzing Starch

**Alifah**

RFE and Chi-Square Based Feature Selection Approach for Detection of Diabetic Retinopathy

**Amaria**

Synthesis Hydroxyapatite/Collagen/Chitosan Composite as Bone Graft for Bone

Fracture Repair

**Ambarwati, Reni**

Contribution of Housewives to Increase the Immunity of Family Members During Covid-19 Pandemic

**Ambarwati, Reni**

Biology Online Classes During Covid-19 Pandemic in Indonesia

**Andika, Albertus Dera**

Application of Retrieval Information on Android-Based Online Music Course Application

**Anggoro, Diky**

The Effectiveness of the Addition of EM4 and Molasses in Increasing Levels of N, P and K in Environmentally Friendly Liquid Fertilizers Made From Banana Pseudostem

**Anggorowati, Dwi**

Training Science Literacy Skills Through Article Writing on Local Wisdom in East Java

**Anifah, Lilik**

Internet of Things-Based Monitoring System of Patients Using W1209 Digital Thermostat and Pulse Sensor

**Anifah, Lilik**

Design and Implementation of Thermal Body System Employing Thermal Sensor MLX 90614 for Covid-19 Symptoms Early Detector

**Anisa, Nurul**

The Implementation of Project Based Learning Model Towards the Learning Outcome of Subject Wood Structure I

**Anistyasari, Yeni**

Design and Implementation of Thermal Body System Employing Thermal Sensor MLX 90614 for Covid-19 Symptoms Early Detector

**Anns, Muhammad**

Provision of Health in Rural Areas of Pakistan Through Community Health Centers

**Ardiyani, Dewi Kartika**

New Smart Virtual Content for Hanzi Characters in Mandarin Laboratories

**Arvitrida, Niniet I.**

The Effectiveness of the Addition of EM4 and Molasses in Increasing Levels of N, P and K in Environmentally Friendly Liquid Fertilizers Made From Banana Pseudostem

**Arvitrida, Niniet Indah**

Designing and Developing Electric Squeezer Machine for Mangrove Syrup Production

**Asmunin**

Application of K-Means Algorithm for Clustering Student's Computer Programming Performance in Automatic Programming Assessment Tool

**Astuti, Nugrahani**

Diverse Forms of V-learning Students' Acceptability During the Pandemic Covid-19

**Asyikin, Arifin N.**

Design and Implementation of Different Types of Smart Dustbins System in Smart Campus Environments

**Atun, Sri**

Tomini Bay as a Source of Chemistry Learning

**Aymen, Marwa**

Provision of Health in Rural Areas of Pakistan Through Community Health Centers

**Azhiimah, Alfiantin Noor**

Automatic Control Based on Voice Commands and Arduino

**Aziz, Jafar A.**

Students' Reasoning With Logical Mathematical and Visual Spatial Intelligence in Geometry Problem Solving

**Bachtiar, Mochamad Mobed**

Home Monitoring and Control Using Smartphone and Speech Processing

**Bahar, Asrul**

Diverse Forms of V-learning Students' Acceptability During the Pandemic Covid-19

**Bakti, Ananda P.**

Nutridrink TOGA as an Alternative to Maintain Body Immunity Against Covid

**Baskoro, Farid**

Application of Retrieval Information on Android-Based Online Music Course Application

**Baskoro, Farid**

Implementation of Google Classroom-Based Learning Management System on the Subject Digital Signal Processing and Propagation Antennas as One of the Effective Learning Media in the Middle of Pandemic COVID-19

**Baskoro, Farid**

Blood Donor Matching Information Systems and Determining Tools for Blood Cluster and Human Rhesus Based on IoT

**Basuki, Ismet**

Student Learning Independence in Online Learning Depends on Motivation

**Basuki, Ismet**

The Effect of Participation in Academic Achievement Activities on Vocational Teachers Competence

**Bisma, Rahadian**

Technology Compatibility Factors in the Implementation of the Ovo Digital Payment Application

**Briantoro, H.**

Performance of an Accelerometer-Based Wireless Body Area Network in Indoor Environment: A Preliminary Study

**Budiarto, Mega T.**

Applying of Search, Solve, Create, and Share (SSCS) Learning Model to Improve Students' Mathematical Quantitative Reasoning

**Budiarto, Mega Teguh**

Developing Android-Based Comic for Learning Quadrilateral to Improve Seventh-graders' Geometric Thinking

**Budijono, Agung Prijo**

Production of Herbal Mixes (Jamulacang) Instant as an Effort to Increase Immune to Prevent Covid 19

**Ruditiahianto, I Gusti Putu Asto**

Curriculum Development is Conducted to Improve Competencies of Air Transportation  
Managerial Study Program for Cadets of Aviation Polytechnique Surabaya

**Bustamam, Alhadi**

RFE and Chi-Square Based Feature Selection Approach for Detection of Diabetic  
Retinopathy

**Cahyaningrum, Sari E.**

Synthesis Hydroxyapatite/Collagen/Chitosan Composite as Bone Graft for Bone  
Fracture Repair

**Cahyo, Bayu Dwi**

The Relationship Problem Solving Skills to Critical Thinking Skills in Aircraft  
Maintenance: A Conceptual Study

**Dani, Hasan**

Effectiveness of Online Learning of Construction Equipment Courses During the  
COVID-19 Pandemic

**Dermawan, Dodik Arwin**

Analysis of the Use of Virtual Meeting in the Implementation of Proposal/Thesis  
Examination During Covid-19 Pandemic

**Dermawan, Much Ade**

Automatic Hand Sanitizer Container to Prevent the Spread of Corona Virus Disease

**Dessy Indira, U**

The Effect of Google Classroom as A Tool in Chemistry Learning

**Deta, Utama Alan**

Issues on Academic Writing Consultation: Alternative Online Platforms for Graduate  
Students

**Dewantara, Bima Sena Bayu**

Home Monitoring and Control Using Smartphone and Speech Processing

**Dewi, Danayanti Azmi**

Effectiveness of Online Learning of Construction Equipment Courses During the  
COVID-19 Pandemic

**Dewi, Erlina S**

## Comparison of Machine Learning Algorithms for Autism Spectrum Disorder Classification

**Dewi, Retno M.**

Nutridrink TOGA as an Alternative to Maintain Body Immunity Against Covid

**Diyasa, I Gede Susrama Mas**

Curriculum Development is Conducted to Improve Competencies of Air Transportation Management Study Program for Cadets of Aviation Polytechnique Surabaya

**Diyasa, I Gede Susrama Mas**

Design and Development of Chatbot Using Dialog Flow in Surya Sembada PDAM Surabaya City

**Diyasa, I Gede Susrama Mas**

The Effects of Self-Efficacy on the Competency of Cadets in Aviation Polytechnic of Surabaya

**Domu, Ichdar**

The Development of Students' Learning Material on Arithmetic Sequence Using PMRI Approach

**Drastiawati, Novi Sukma**

Failure Analysis on Reheater Tube Boiler Furnace Base on Tensile and Impact Test

**Dwiyanti, Sri**

Cyprus Rotundus L: As Antiseptic Soap Materials

**Endryansyah**

Design and Implementation of Thermal Body System Employing Thermal Sensor MLX 90614 for Covid-19 Symptoms Early Detector

**Faidah, Mutimmatul**

Cyprus Rotundus L: As Antiseptic Soap Materials

**Faisal, Shah**

Provision of Health in Rural Areas of Pakistan Through Community Health Centers

**Fathoni, Ali Nur**

Design Automatic Hand Sanitizer Microcontroller Based using Arduino Nano and

Ultrasonic Sensors as an Effort to Prevent the Spread of Covid-19

**Fauzi, Agus M**

Self Concept in Social Behavior Based Android to Boost Family's Immunity in Preventing Covid-19 Spread

**Fauziah, An Nuril M.**

Worksheet of Entrepreneurship Students to Train Ecopreneurship Characters

**Firmansyah, Rifqi**

Weather Monitoring Telemetry System Based on Arduino Pro Mini With Antenna Tracker Using Transceiver Module SV651 and SV611

**Firmansyah, Rifqi**

IoT Based Temperature Control System Using Node MCU ESP 8266

**Fitriyah, Lina Arifah**

Mamdani Fuzzy Inference System (FIS) for Early Diagnosis of Diabetes Mellitus (DM) and Calorie Needs

**Funabiki, N.**

Performance of an Accelerometer-Based Wireless Body Area Network in Indoor Environment: A Preliminary Study

**Ghofur, Muhammad Abdul**

Issues on Academic Writing Consultation: Alternative Online Platforms for Graduate Students

**Hafidz, Abdul**

UNESA Physical Test – An Alternative Way to Measure Fitness Using Step and Chair-Based Test

**Handajani, Sri**

Diverse Forms of V-learning Students' Acceptability During the Pandemic Covid-19

**Handayani, Meliana**

Provision of Health in Rural Areas of Pakistan Through Community Health Centers

**Hanifah, Nur**

Design of Sea Wave Power Hybrid Power Generation Through Utilization of Wave and Wind Energy as Renewable Electric Energy Sources for Leading, Outermost and

## Disadvantaged Areas

**Haq, Mohammad Syahidul**

Development of Codeigniter-Based Tracer Study Application

**Hariadi, Eko**

The Effects of Self-Efficacy on the Competency of Cadets in Aviation Polytechnic of Surabaya

**Hariato, Sugeng**

Self Concept in Social Behavior Based Android to Boost Family's Immunity in Preventing Covid-19 Spread

**Harimurti, Rina**

Design and Implementation of Thermal Body System Employing Thermal Sensor MLX 90614 for Covid-19 Symptoms Early Detector

**Harimurti, Rina**

Application of K-Means Algorithm for Clustering Student's Computer Programming Performance in Automatic Programming Assessment Tool

**Hartono**

Work Analysis of Constant Current Regulator BF 1200 With Current Loop and Gauss Jordan Method as Learning Media for Cadets

**Haryanto**

Internet of Things-Based Monitoring System of Patients Using W1209 Digital Thermostat and Pulse Sensor

**Haryudo, Subuh Isnur**

Internet of Things-Based Monitoring System of Patients Using W1209 Digital Thermostat and Pulse Sensor

**Herdyastuti, Nuniek**

The Study of Amylase's Reaction Kinetics From Soybean Sprouts (*Glycine max L.*) in Hydrolyzing Starch

**Herdyastuti, Nuniek**

Synthesis Hydroxyapatite/Collagen/Chitosan Composite as Bone Graft for Bone Fracture Repair

**Hermawan, Aditus Chandra**

Blood Donor Matching Information Systems and Determining Tools for Blood Cluster and Human Rhesus Based on IoT

**Hidayah, Rusly**

The Effect of Chemiclife Media on Chemical Bond Material Based on Completeness and Student Learning Outcomes

**Hidayat, Edy**

New Smart Virtual Content for Hanzi Characters in Mandarin Laboratories

**Hidayati, Siti N.**

Worksheet of Entrepreneurship Students to Train Ecopreneurship Characters

**Hilda, Dama Yanti**

Curriculum Development is Conducted to Improve Competencies of Air Transportation Management Study Program for Cadets of Aviation Polytechnique Surabaya

**Hilda, Dama Yanti**

Design and Development of Chatbot Using Dialog Flowin Surya Sembada PDAM Surabaya City

**Hilda, Dama Yanti**

The Effects of Self-Efficacy on the Competency of Cadets in Aviation Polytechnic of Surabaya

**Ibrahim, Muslimin**

The Effect of OPPEMEI Model on Students' Creative Thinking Skill and Cognitive Learning Achievement

**Ibrohim**

Design Automatic Hand Sanitizer Microcontroller Based using Arduino Nano and Ultrasonic Sensors as an Effort to Prevent the Spread of Covid-19

**Idris, Maulana**

Design and Development of Chatbot Using Dialog Flowin Surya Sembada PDAM Surabaya City

**Ilhamuddin, Muhammad F.**

Atlantis Press  
Vanadium of Nanogold and Nanosilver to Improve Quality Life of Cancer Patients

**Ilhamuddin, Muhammad**

Analysis of Online Learning in Professional Students of Building  
 of scientific, technical & medical (STM) proceedings, journals and books.  
 Construction Education in the Pandemic Proceedings  
 We offer world-class services, fast turnaround times and personalised  
 communication. The proceedings and journals on our platform are Open  
 Access and generate millions of downloads every month.



For more information, please contact us at: [contact@atlantis-press.com](mailto:contact@atlantis-press.com)

- ▶ PROCEEDINGS
- ▶ ABOUT
- ▶ JOURNALS
- ▶ NEWS
- ▶ BOOKS
- ▶ CONTACT
- ▶ POLICIES
- ▶ SEARCH

---

Home [Privacy Policy](#) [Terms of use](#)   

Copyright © 2006-2022 Atlantis Press – now part of Springer Nature

Part of **SPRINGER NATURE**

[PROCEEDINGS](#) | [JOURNALS](#) | [BOOKS](#)

Search



Series: [Advances in Engineering Research](#)

# Proceedings of the International Joint Conference on Science and Engineering (IJCSE 2020)

---

HOME

---

PREFACE

---

ARTICLES

---

AUTHORS

---

SESSIONS

---

[ORGANIZERS](#)

---

PUBLISHING INFORMATION

---

## **Steering Committee Chairman**

**Prof. Bambang Yulianto**

Universitas Negeri Surabaya, Indonesia

## **Steering Committee Members**

**Prof. Nurhasan**

Universitas Negeri Surabaya, Indonesia

**Prof. Darni**

Universitas Negeri Surabaya, Indonesia

### **Organizing Committee Chairperson**

**Enny Susiyawati, Ph.D**

Universitas Negeri Surabaya, Indonesia

### **Organizing Committee Members**

**Prof. Bambang Suprianto**

Universitas Negeri Surabaya, Indonesia

**Dr. Nurhayati.,MT**

Universitas Negeri Surabaya, Indonesia

**Dr. Euis Ismayati, M.Pd**

Universitas Negeri Surabaya, Indonesia

**Aries Dwi Indriyanti, M.Kom**

Universitas Negeri Surabaya, Indonesia

**Naim Rohmawati., M.Kom**

Universitas Negeri Surabaya, Indonesia

**Arif Widodo.,M.Sc.**

Universitas Negeri Surabaya, Indonesia

**Dr. Ricky Eka Putra., MT**

Universitas Negeri Surabaya, Indonesia

**Rindu Puspita Wibawa., M.Kom.**

Universitas Negeri Surabaya, Indonesia

**Yeni Anistyasari, M.Kom**

Universitas Negeri Surabaya, Indonesia

**Reza Rahmadian, MengSc**

Universitas Negeri Surabaya, Indonesia

**Ahmad Bashri, M.Si.**

Universitas Negeri Surabaya, Indonesia

**Dwi Anggorowati Rahayu, M.Si.**

Universitas Negeri Surabaya, Indonesia

**Laily Rosdiana, M.Pd.**

Universitas Negeri Surabaya, Indonesia

**Lisa Lisdiana, Ph.D.**

Universitas Negeri Surabaya, Indonesia

**Rudianto Artiono, M.Si.**

Universitas Negeri Surabaya, Indonesia

**Aris Rudi Purnomo, M.Pd.**

Universitas Negeri Surabaya, Indonesia

**Dhita Ayu Permata S., M.Pd.**

Universitas Negeri Surabaya, Indonesia

**Sari Kusuma Dewi, M.Si.**

Universitas Negeri Surabaya, Indonesia

**Dr. Warju, S.Pd., M.T.**

Universitas Negeri Surabaya, Indonesia

**Dr. Mutimmatul Faidah**

Universitas Negeri Surabaya, Indonesia

**Ahmad Bashri, M. Si.**

Universitas Negeri Surabaya, Indonesia

**Paramitha Nerisafitra, M. Kom**

Universitas Negeri Surabaya, Indonesia

**Ghea Sekar Palupi, M. I. M**

Universitas Negeri Surabaya, Indonesia

**Amalia Ruhana, M. PH.**

Universitas Negeri Surabaya, Indonesia

**Ima Kurrotun Ainin, M. Pd.**

Universitas Negeri Surabaya, Indonesia

**Syafiatul Mardliyah, M. A.**

Universitas Negeri Surabaya, Indonesia

## **Editorial Board**

**Prof. Alexandre Maniçoba De Oliveira**

Federal Institute of Sao Paulo, Brazil

**Prof. Hadi Susanto**

University of Essex, UK and Khalifa University of Science and Technology,  
Abu Dhabi

**Prof. Madlazim**

Universitas Negeri Surabaya, Indonesia

**Eppy Yundra, Ph.D**

Universitas Negeri Surabaya, Indonesia

**Prof. Supari Muslim**

Universitas Negeri Surabaya, Indonesia

**Prof. Endang Susantini**

Universitas Negeri Surabaya, Indonesia

**Prof. Sari Edy Cahyaningrum**

Universitas Negeri Surabaya, Indonesia

**Prof. Tukiran**

Universitas Negeri Surabaya, Indonesia

## Dr. Elly Matul Imah

Universitas Negeri Surabaya, Indonesia

Atlantis Press – now part of Springer Nature – is a professional publisher of scientific, technical & medical (STM) proceedings, journals and books. We offer world-class services, fast turnaround times and personalised communication. The proceedings and journals on our platform are Open Access and generate millions of downloads every month.

For more information, please contact us at: [contact@atlantis-press.com](mailto:contact@atlantis-press.com)

▶ PROCEEDINGS

▶ JOURNALS

▶ BOOKS

▶ POLICIES

▶ ABOUT

▶ NEWS

▶ CONTACT

▶ SEARCH

---

[Home](#) [Privacy Policy](#) [Terms of use](#)



Copyright © 2006-2022 Atlantis Press – now part of Springer Nature



# CERTIFICATE

No : 43456/UN38.9/DL.01.02/2020

This certificate is proudly presented to:

Puput Wanarti Rusimamto  
as Presenter of paper entitled

Design and Implementation of Thermal Body System Employing Thermal Sensor MLX 90614  
for Covid-19 Symptoms Early Detector

on International Conference on Research and Academic Community Services  
"Strengthening Innovation to Enhance Revenue for the Better Future"  
hosted by Institute for Research and Community Services Universitas Negeri Surabaya

On October, 3<sup>rd</sup> - 4<sup>th</sup> 2020

Head of Institute for Research and  
Community Services



*[Signature]*  
**Prof. Darni, M.Hum.**

NIP. 196509261990022001

Chief of Committee  
2020  
**IO RACOS**  
*[Signature]*

**Dr. Warju, S.Pd., S.T., M.T.**

NIP. 198103282006041001

# Design and Implementation of Thermal Body System Employing Thermal Sensor MLX 90614 for Covid-19 Symptoms Early Detector

Puput W. Rusimamto<sup>1,\*</sup>, Rina Harimurti<sup>2</sup>, Endryansyah<sup>1</sup>, Yeni Anistyasari<sup>2</sup>, Lilik Anifah<sup>1</sup>

<sup>1</sup> *Department of Electrical Engineering, Universitas Negeri Surabaya, Surabaya 60213, Indonesia*

<sup>2</sup> *Department of Informatic Engineering, Universitas Negeri Surabaya, Surabaya 60213, Indonesia*

\*Corresponding author. Email: puputwanarti@unesa.ac.id

## ABSTRACT

Researchers designed and implementation of thermal body measurement system for Unesa residents when they entered the building. The system design is made using engineering methods. Before body temperature is measured, the object will occupy a position at a predetermined point. At that point installed LDR which functions to turn on the servo motor that will move down and turn on the infrared sensor. At an altitude that has been detected by an infrared sensor, the motor will stop and start the temperature measurement process. The temperature sensor uses MLX 90614 which reads data from the reflection of infrared light in the form of raw data. Then the data is processed by a microcontroller using Arduino to become real data. The processed temperature data is displayed by the LCD and sent to the esp32-cam camera. Then esp32-cam will take photos as documentation. Data that has been processed will be grouped according to the 'condition' group that has been determined. Data that has been obtained in the form of temperature data, condition data and photo documentation, is sent to the webserver for display. All temperature measuring components have shown accurate data with the following test results. Sensor Temperature sensor MLX 90614 can measure temperatures at a distance of 30 cm. The temperature measurement program code on Arduino works well with a temperature value of 37.3oC. Camera image output format esp32-cam is a JPEG that is displayed on the webserver. The Body Temperature Measurement System using the MLX 90614 Temperature Sensor for Early Detection of COVID-19 Symptoms can be used with an average error of 0.6% and a standard deviation of 0.078.

**Keywords:** *Design, Body temperature measurement system, MLX 90614 temperature sensor, Arduino*

## 1. INTRODUCTION

Coronavirus disease (COVID-19) is caused by SARS-COV2 and is a causative agent of a fatal disease of great global public health concern. Based on the large number of infected people exposed to a wet animal market in Wuhan City, China, it is suspected that this is likely the zoonotic origin of COVID-19. Person-to-person transmission of COVID-19 infection results in isolation of patients providing various treatments. Extensive measures to reduce person-to-person transmission of COVID-19 have been implemented to control the current outbreak [1]. Since its identification in late December, this new type of corona virus has infected 92,8600 people and killed 3,162 people as of Wednesday (4/3/2020). Patients who reportedly

recovered also experienced a significant increase to 48,252 people. Currently, early detection of the corona virus is often done by checking a person's body temperature. Body temperature is defined as one of the vital signs that describes a person's health status [2]. If a person's body temperature is above normal, it is said that the person has a fever. Fever is a body temperature above normal ( $> 37.1 \text{ }^\circ\text{C}$ ), can be caused by abnormalities in the brain itself or by toxic substances that affect the body's temperature regulation center. The causes of fever include bacterial diseases, brain tumors, and environmental conditions that can end in heat stroke [3].

A number of public facilities such as airports, offices to palaces carry out procedures to check a person's body

temperature to prevent the spread of the corona virus. Reporting from the South China Morning Post (SCMP), one of the efforts to find out and prevent the spread of the corona virus is by checking the temperature which is equipped with a handheld infrared thermometer or known as a "firing thermometer". The thermometer is used by officers to check people without having to make direct contact [4].

One sign of contracting the corona virus is fever. Humans can be said to have a fever when their body temperature has passed the normal average body temperature, which is 37.1 degrees. This requires early detection of human body temperature. Handheld infrared thermometers have emerged as a popular device for screening people with fever during the coronavirus outbreak. This infrared thermometer is also called a firing thermometer (thermogun) because it looks like a gun that is fired at the forehead. No more than one second, body temperature can be detected immediately. This thermometer can quickly measure surface temperature without touching human skin [4]. Meanwhile, the results of other studies suggest that thermal infrared cameras are a potential reference temperature "fixed point" that can replace mercury thermometers [5].

In line with Roland's idea that the Coronavirus is placing enormous pressure on health care systems worldwide, health analysts, then policy must respond by initiating research on the consequences of current policies [6]. Various attempts have been made by many researchers to detect Covid 19. Among them is Tianxing by carrying out detection tests for nucleic acids and antibodies which play an important role in the rapid identification and isolation of COVID-19 patients to reduce the spread of SARS-CoV-2 infection further [7]. In addition, efforts were also carried out to activate the SARS-CoV-2 RNA virus detection LAMP [8]. Meanwhile, Unesa's efforts in dealing with the COVID-19 pandemic include issuing a circular on Anticipatory Measures to Prevent the Spread of COVID-19 in the State University of Surabaya on March 20, 2020. In this circular, Unesa's academics are urged to carry out the flow of health checks and follow Unesa health team protocol directions. Some efforts that can be done are washing hands with soap and water or using the hand sanitizer provided, wearing a mask according to standards and checking body temperature by the relevant officer [9].

In measuring human body temperature for early detection of COVID-19 prevention by using a thermogun, the operation still requires officers to fire at the object's forehead. The officer using the thermo gun must stand as close to the object as possible. And this can endanger officers if the detected object is positive for COVID-19. For this reason, research will be carried

out by developing an effective and efficient thermogun for early detection of COVID-19.

## 2. METHOD

The indicator of achievement in this research is the manufacture of a thermogun device for effective and efficient early detection of COVID-19. Effective indicators are reviewed from the performance of the tools developed in measuring temperature accurately. This can be done by calibrating the tool, by comparing measurements manually [10]. Efficient indicators in terms of the use of resources needed in the temperature measurement process. Success indicators can be seen from the achievement of all research targets. Similar research was conducted by Mazgaoker by evaluating the accuracy of temperature measurements using The "Dräger" Double Sensor (DS) [11].

The stages of the research carried out are as follows. The first is to make the PCB layout in accordance with the circuit and continue to install the components according to the component layout on the PCB. Then the power supply is installed, to measure the voltage on each circuit line and the installation of the supporting modules. After completion, proceed with programming the microcontroller components and installation of the circuit along with the module to the tool frame. The next step is to test the tool and the tool calibration process.

### 2.1. Design

The design of the tool to be developed is shown in Figure 1. From this design, a system block diagram is made which is shown in Figure 2, Figure 3 and Figure 4.

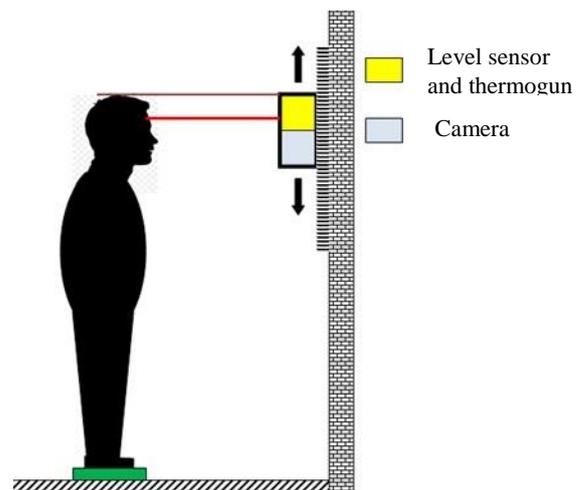


Figure 1 Thermogun Development Design

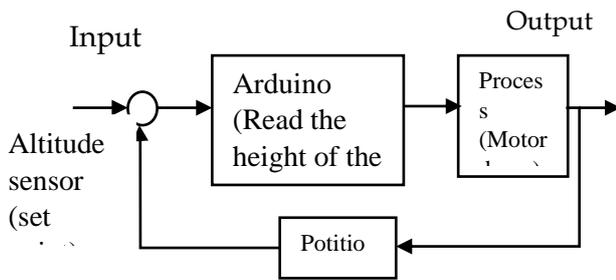


Figure 2 Block diagram of the position program (Loop I)

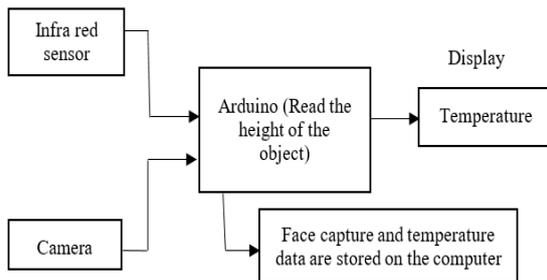


Figure 3 Block diagram of the measurement program (Loop II)

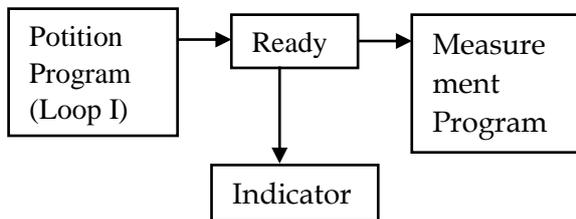


Figure 4 Program step block diagram

How the tool works is described as follows. When power on, the tool will condition itself to the initial set state. Namely where the measuring box is at the very top and connects wifi according to the settings used. When the sensor detects a user, the gauge box will drop to adjust the user's head using an infrared sensor in the gauge box, shown in Figure 2. If the sensor has detected the user's head, the microcontroller will read the user's head temperature. At the same time, the system will trigger the camera to take a picture. Then the temperature sensor readings will appear, at that time the photo data and temperature data are sent to the web page on the localhost of the tool, as shown in Figure 3. If the temperature reads 38.0 C, the buzzer will light up as a sign that the user's temperature exceeds boundaries that are set and are in the early detection category of COVID-19. The user can leave the position when the camera flash has flashed, as a sign that all readings from temperature and photo are complete. If the user detection sensor does not read the presence of a user, the gauge box will return to the top, to the starting position.

All recorded data will be stored in a database on the computer. Overall the measurements of loops I and II are simplified in Figure 4.

### 3. RESULT AND DISCUSSION

Based on the system design that has been discussed previously, the next step is making tools. The microcontroller used is the Arduino Pro mini Atmega328p - 8 BIT AVR controller and the camera used is the Esp32 Cam WiFi + BT Soc Module, as shown in Figure 5. The temperature sensor used is MLX90614-ACF. This sensor works by absorbing infrared light emitted by an object. Since this sensor is not in physical contact with the object being measured, it has a wide measurement range from -70 ° C to + 380 ° C. To detect objects or obstacles with a certain distance using the E18-D80NK IR Obstacle Avoidance Proximity with the infrared light reflection method which has excellent accuracy and response. The distance can be adjusted from 3 cm to 80 cm. The advantage of this sensor is that its design is made for real use, and is not affected by indirect light from the sun. To adjust the speed and direction of the DC motor using the L298N Motor Driver. The servo motor used is a high-performance MG995 with metal gears, double ball bearings, 180 ° rotation, 30 cm long connection cable, and is equipped with accessories to use as needed. This servo motor is suitable for applications requiring a motor with sufficient torque up to 13 kg.cm (stall torque limit at 7.2 Volts).

The next step is programming the microcontroller as shown in Figure 6. It is the integration between software and hardware. After the software and hardware manufacturing process is complete, the results of the research are tested in the rectorate building as shown in Figure 7 and Figure 8. All temperature measurement results and camera photos are integrated into a web page on the localhost of the tool as shown in Figure 9. Then conducted trials as well as calibrating the tool. The results are shown in Table 1. The calculation of the average error from the measurement of the research results on the thermogun is shown in Table 2. While the statistical data of the research results are shown in Table 3.

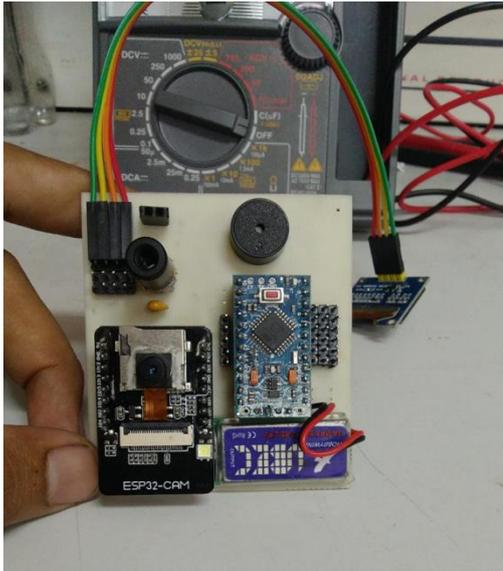


Figure 5 The camera hardware used by the ESP32-CAM



Figure 8 Testing process



Figure 6 The integration process between software and hardware

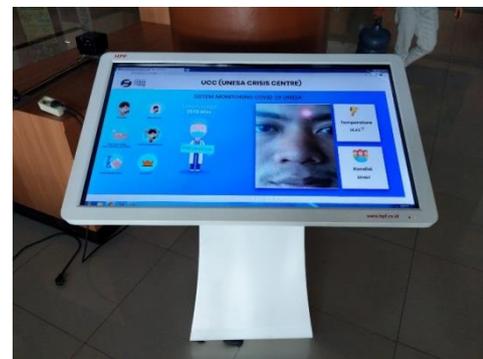


Figure 9 Display on the display



Figure 7 Complete view of temperature detection system

Table 1. The test results of the temperature detection system

No.	Measurement	Measurement Result									
		1	2	3	4	5	6	7	8	9	10
1	Temperature Thermogun (°C)	36	36	36	35,9	36,1	36,1	36,1	35,9	35,9	35,9
2	Temperature Research Tool (°C)	35,9	35,9	36	36	35,92	36,12	36,12	36	36	36
3	Temperature Sensor (V)	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3
4	Infrared Sensor (V)	5	5	5	5	5	5	5	5	5	5
5	Camera (V)	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3
6	Laser (V)	5	5	5	5	5	5	5	5	5	5
7	Buzzer (V)	5	5	5	5	5	5	5	5	5	5
8	LCD (V)	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3
9	Servo (V)	12	12	12	12	12	12	12	12	12	12

**Table 2.** Calculation of the average error in temperature measurements

Measurement to	Temperature Thermogun	Temperature Research Tool	Error
1	36	35.9	0.1
2	36	35.9	0.1
3	36	36	0
4	35.9	36	-0.1
5	36.1	35.92	0.18
6	36.1	36.12	-0.02
7	36.1	36.12	-0.02
8	35.9	36	-0.1
9	35.9	36	-0.1
10	35.9	36	-0.1
Average	35.99	35.996	-0.006

**Table 3.** Research data statistics

	Thermogun	Research result
N	Valid	10
	Missing	0
Mean	35.9900	35.9960
Median	36.0000	36.0000
Mode	35.90	36.00
Std. Deviation	.08756	.07820
Variance	.008	.006
Range	.20	.22
Minimum	35.90	35.90
Maximum	36.10	36.12
Sum	359.90	359.96

The result of the calculation of the average error is 0.6%, with the standard deviation of measurement using the thermogun of 0.088 and the standard deviation of measurement using the research results is 0.078.

#### 4. CONCLUSION

From the results of the research and discussion, it was concluded that the Body Temperature Measurement System using the MLX 90614 Temperature Sensor for Early Detection of COVID-19 Symptoms can be used with an average error of 0.6% and a standard deviation of 0.078.

#### ACKNOWLEDGMENTS

This research was supported by the State University of Surabaya.

#### REFERENCES

- [1] H. A. Rothan and S. N. Byrareddy, "The epidemiology and pathogenesis of coronavirus disease ( COVID-19 ) outbreak," *J. Autoimmun.*, no. February, p. 102433, 2020.
- [2] Y. Kukus *et al.*, "Suhu tubuh: homeostasis dan efek terhadap kinerja tubuh manusia," *J. Biomedik*, vol. 1, no. 2, pp. 107–118, 2009.
- [3] L. Sherwood, *Fisiologi Manusia*. Buku Kedokteran EGC, 2012.
- [4] R. K. Dewi and S. Hardiyanto, "Pencegahan Virus Corona , Deteksi Suhu dan Penggunaan Termometer Tembak ...." 2020. [Online]. Available: <https://www.kompas.com/tren/read/2020/03/04/091611465/pencegahan-virus-corona-deteksi-suhu-dan-penggunaan-termometer-tembak>. [Accessed: 04-Apr-2020].
- [5] R. Y. Kannan *et al.*, "Infrared cameras are potential traceable ' fixed points ' for future thermometry studies Infrared cameras are potential traceable "" fixed points "" for future thermometry studies," vol. 1902, no. October, pp. 1–6, 2015.
- [6] R. Bal, B. De Graaff, H. Van De Bovenkamp, and I. Wallenburg, "Practicing Corona – Towards a research agenda of health policies," *Health Policy (New. York)*, vol. 124, no. 7, pp. 671–673, 2020.
- [7] T. Ji *et al.*, "Biosensors and Bioelectronics Detection of COVID-19: A review of the current literature and future perspectives," *Biosens. Bioelectron.*, vol. 166, no. March, p. 112455, 2020.
- [8] D. Thompson and Y. Lei, "Mini review : Recent progress in RT-LAMP enabled COVID-19 detection," *Sensors and Actuators Reports*, vol. 2, no. 1, p. 100017, 2020.
- [9] H. Unesa, "Tindakan Antisipasi , Unesa Keluarkan Surat Edaran Pencegahan Penyebaran Covid-19," 2020. [Online]. Available: <https://www.unesa.ac.id/tindakan-antisipasi--unesa-keluarkan-surat-edaran-pencegahan-penyebaran-covid-19>. [Accessed: 04-Apr-2020].
- [10] E. O. Doebelin, Hasto, E. Aritonang, and Suwarso, *Sistem Pengukuran Aplikasi dan Perancangan*. Jakarta: Erlangga, 1987.
- [11] S. Mazgaoker, I. Ketko, R. Yanovich, Y. Heled, and Y. Epstein, "Measuring core body temperature with a non-invasive sensor," *J. Therm. Biol.*, vol. 66, no. March, pp. 17–20, 2017.