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Public Interest Centre
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International Teaching Aid Competition 2023

Reconnoitering Innovative Ideas in Postnormal Times

iTAC

2023

iTAC 2023
INTERNATIONAL TEACHING AID COMPETITION
E-PROCEEDINGS

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Layout : *Nurina Anis Mohd Zamri*

eISBN : 978-967-2948-51-3

Published by : Universiti Teknologi MARA Cawangan Kedah,
08400 Merbok,
Kedah,
Malaysia.

TUANKU SULTANAH BAHYIAH

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PREFACE

iTAC or International Teaching Aid Competition 2023 was a venue for academicians, researchers, industries, junior and young inventors to showcase their innovative ideas not only in the teaching and learning sphere but also in other numerous disciplines of study. This competition was organised by the Special Interest Group, Public Interest Centre of Excellence (SIG PICE) UiTM Kedah Branch, Malaysia. Its main aim was to promote the production of innovative ideas among academicians, students and also the public at large.

In accordance with the theme "Reconnoitering Innovative Ideas in Post-normal Times", the development of novel ideas from the perspectives of interdisciplinary innovations is more compelling today, especially in the post-covid 19 times. Post-pandemic initiatives are the most relevant in the current world to adapt to new ways of doing things and all these surely require networking and collaboration. Rising to the occasion, iTAC 2023 has managed to attract more than 267 participations for all categories. The staggering number of submissions has proven the relevance of this competition to the academic world and beyond in urging the culture of innovating ideas.

iTAC 2023 committee would like to thank all creative participants for showcasing their innovative ideas with us. As expected in any competition, there will be those who win and those who lose. Congratulations to all the award recipients (Diamond, Gold, Silver and Bronze) for their winning entries. Those who did not make the cut this year can always improve and join us again later.

It is hoped that iTAC 2023 has been a worthy platform for all participating innovators who have shown ingenious efforts in their products and ideas. This compilation of extended abstracts published as iTAC 2023 E-Proceedings contains insights into what current researchers, both experienced and novice, find important and relevant in the post-normal times.

Best regards,

iTAC 2023 Committee
Special Interest Group, Public Interest Centre of Excellence (SIG PICE)
UiTM Kedah Branch
Malaysia

I-FRAS AN INTELIGENT FACE RECOGNITION ATTENDANCE SYSTEM

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ABSTRACT

I-FRAS is a project that is being developed in collaboration with SJK(T) KALAIVANI school to automate the process of taking attendance at educational institutions via the use of face recognition technologies. Students have a tendency to assist absent friends with their attendance by either raising their hands, writing their names on the attendance sheet, or simply sharing the Google Form, which has become a problem because monitoring attendance in a class with a large number of students is time-consuming and prone to errors. Besides, students tend to assist absent friends with their attendance by sharing the manual Google Form. The primary goals are to create a face recognition system for tracking students' attendance in real time to replace the existing manual approach with an automated one and to notify parents via Gmail which will be attach with Google Datasheet to view their children's attendance records. This project utilizes a real-time face recognition attendance system which will be develop using ESP32 Camera. To activate this ESP32 Camera, ATMEGA 328 mini-Microcontroller is programmed using Python and Arduino IDE to perform face recognition steps i.e., Capturing, Extracting, Comparing, and Matching to allow efficient recognition in recoding student attendance. The benefits of this project include the recording of time spent in and out of the building, encouraging students to arrive on time, reducing the amount of time spent recording, and allowing parents to assess attendance data using google datasheet. An increase in attendance will not result in a drop in academic attainment if this plan is implemented.

Keywords: Facial attendance system, Google Datasheet, Arduino IDE, Students, Record, Phytion

INTRODUCTION

An institution's automatic facial recognition system makes use of biometrics to improve the attendance procedure. In some classrooms, teachers still announce out students' names, hand out Google Forms, or hand out paper for students to write their names on. Students will be using a mobile device to take attendance rather than teachers doing it manually. We created this system for SJK(T) KALAIVANI School to deal with difficulties like teachers constantly calling out student's names throughout class. A proof point that someone is present is attendance. It is in effect worldwide, including at SJK(T) KALAIVANI SCHOOL where students faced punishments for having an attendance rate below 80%. Numerous attendances have always been manually recorded by lecturers reading out the names of each student one at a time on a piece of paper. The principal might also hand out the attendance form to each student individually and ask them to sign it next to their name. To key in the system, it has been slightly improved, though. The reason for this is that most students only attend for the first few weeks of class before requesting friends who attend frequently to certify their attendance. Due to the teacher's usual teaching schedule and the teacher's lack of time to individually check each student's attendance, students take advantage of this chance to aid their companions in signing. This student misbehavior will result in a decrease in the student's attendance record for the class.

PROBLEM STATEMENT

Students have a tendency to assist absent friends with their attendance by either raising their hands, writing their names on the attendance sheet, or simply sharing the Google Form. If the teacher didn't have time to take attendance, absent pupils may prove that they were in the next class. Those that arrived late may attempt to pose as early arrivals because the teacher is unable to keep track of when each student entered the classroom. Secondly, despite the large number of students in a class, teachers frequently make faults when taking attendance because they may need to help telling separate individuals with similar names or because they may not hear their name being called and incorrectly mark a student as absent.

OBJECTIVE

The purpose of this innovation is to provide a system that aids teachers in monitoring student attendance records. With this invention, we've used an intelligent, well-organized system that records students' faces on ESP32 CAM to track attendance. We also offer a face recognition attendance solution that uses facial recognition to store real-time records of student attendance.

This project monitoring student's attendance by notifying parents via Gmail which will be attach with Google Datasheet to view their children's attendance records. Teachers can use this technology to examine students' attendance records and memory card-stored images of their faces. This project will be creating a system that can track students' movements, such as when they enter and leave the classroom. Thus, the objective of this project are:

1. To store real-time records of student attendance using facial recognition.
2. To notify parents about their children's attendance via Gmail

LITERATURE REVIEW

I-FRAS is located in SJK(T) KALAIVANI. Every day, excluding Friday and Saturday, I-FRAS attendance system is open from 7:30 p.m. to 1:15 p.m. during the school year. I-FRAS attendance system on a class-wide primary program that records ID, date, and time in addition to classifying and identifying faces. Also, the records are stored in a Google Data Sheets that is integrated into the application, and parents receive Gmail notifications which attach with Google Datasheet links to their phones. Figure 1 show the flowchart of the face recognition system.

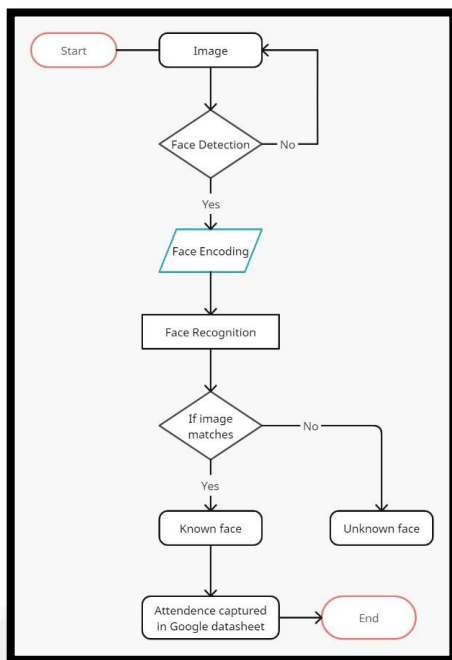


Figure 1. Flowchart of face recognition system

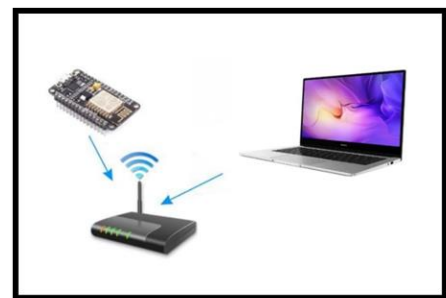


Figure 2. Block diagram of face recognition system

CONSTRUCT THE FACE RECOGNITION SYSTEM

Face recognition is a well-liked biometric technology that is widely utilized in authentication,

access control, and pictures or video surveillance applications. When students scan their faces as they enter the classroom, a face recognition system must be able to recognize their faces. The system has two modes of operation: identification and authentication. The Google Datasheet will save the attendance records for each and every time. Only staff members and teachers can operate this system. Figure 2 shows the block diagram of the face recognition system.

ESP32-CAM: IP NETWORK CAMERA

It is a very compact integrated module of an OV2640 camera and an ESP32-S processor that enables the development of IP camera projects for video streaming with various resolutions and direct real-time visualization over a Wi-Fi network. When an event is detected, photos can be saved using the SD card reader on the ESP32-CAM module. Figure 3 shows the front and back side of ESP32-Cam board.

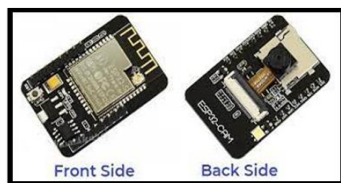


Figure 3. Front & back side of ESP32-Cam board

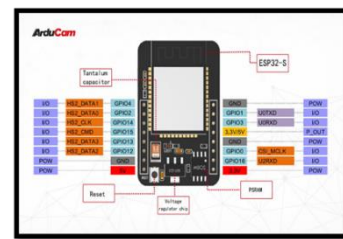


Figure 4. Internal structure of ESP32-CAM board

USAGE OF ESP32-CAM

The ESP-32CAM is suitable for a wide range of IoT applications. It is appropriate for smart home appliances, industrial wireless controls, wireless monitoring, QR wireless identification, wireless positioning system signals, and other Internet of Things (IoT) applications. There are numerous cards available to ensure the uploading of an operational program of such an application to the ESP32-CAM card, such as FTDI, ARDUINO, and MODULE TTL. Figure 4 shows the internal structure of ESP32-CAM board.

SIMULATION PROJECT RESULT

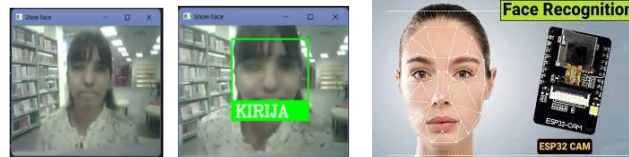
In connecting the ESP32-CAM board over a local network, router serves as an access point, while the ESP32-CAM board serves as a station. The network access mechanism that the ESP32-Cam module is combined with Wi-Fi connectivity, allowing it to send pictures or videos in real time. The module comprises mostly of a microprocessor that works similarly to an Arduino, so we can program it using the Arduino software. The first step in uploading the program from the computer to the ESP32-Cam is to connect the module to a PC using a programmer. The ESP32-Cam module, which is hosted by a web server, may construct its own Wi-Fi network, allowing it to generate a connection and deliver pictures or videos to any

location. The face recognition algorithm by ESP32-CAM is given as follows:

Step 1: Once student enters the classroom, wireless camera will access

```
WiFi connected
camera initialize success
camera starting
http://192.168.182.116
```

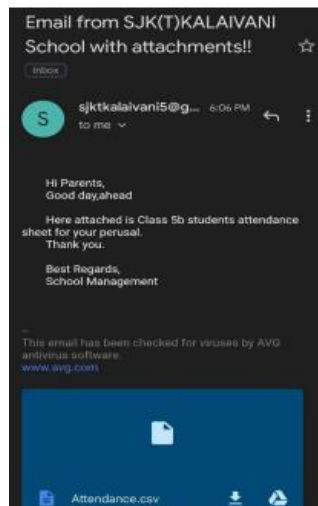
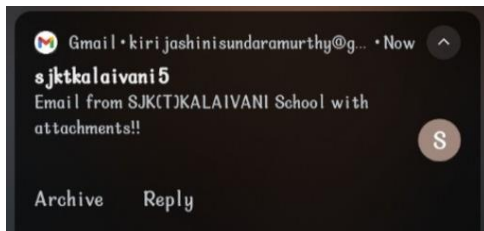
Step 2: Camera will capture the student's face to detect whether the correct person enters the class or not and the students with scratch marks or makeup on face can be detected.



Step 3: The memory card will be used to store the student's image that they already given to their class teacher and the other details such as name, time and date will be saved in google datasheet.



Step 4: Once everything has been saved, parents will receive a notification from Gmail. This attendance system will be handled by some staff in the school. Parents can view their children's attendance details on Google Datasheet by clicking the email.



| | A | B | C | D | E | F |
|----|---------|-----------------|---|---|---|---|
| 1 | NITHIYA | 15/5/2023 13:35 | | | | |
| 2 | KABI | 15/5/2023 13:37 | | | | |
| 3 | KABI | 15/5/2023 13:37 | | | | |
| 4 | KABI | 15/5/2023 13:37 | | | | |
| 5 | KABI | 15/5/2023 13:37 | | | | |
| 6 | KABI | 15/5/2023 13:37 | | | | |
| 7 | KABI | 15/5/2023 13:37 | | | | |
| 8 | KIRIJA | 15/5/2023 13:37 | | | | |
| 9 | KIRIJA | 15/5/2023 13:37 | | | | |
| 10 | KIRIJA | 15/5/2023 13:37 | | | | |
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| 16 | KIRIJA | 15/5/2023 13:37 | | | | |
| 17 | NITHIYA | 15/5/2023 13:37 | | | | |
| 18 | NITHIYA | 15/5/2023 13:37 | | | | |
| 19 | NITHIYA | 15/5/2023 13:37 | | | | |
| 20 | NITHIYA | 15/5/2023 13:37 | | | | |
| 21 | KIRIJA | 15/5/2023 15:39 | | | | |
| 22 | KIRIJA | 15/5/2023 15:39 | | | | |
| 23 | KIRIJA | 15/5/2023 15:39 | | | | |
| 24 | KIRIJA | 15/5/2023 15:39 | | | | |
| 25 | KIRIJA | 15/5/2023 15:39 | | | | |
| 26 | KIRIJA | 15/5/2023 15:39 | | | | |
| 27 | KIRIJA | 15/5/2023 15:39 | | | | |
| 28 | KIRIJA | 15/5/2023 15:39 | | | | |
| 29 | KIRIJA | 15/5/2023 15:39 | | | | |

CONCLUSION

To conclude the ESP32-CAM with camera type OV2640 can be used to operate the actuator in streaming cameras and face detection. Not all cameras can be utilized in esp32-cam, depending on the appropriate resolution and compatibility with the camera used for image recognition. An attendance system based on facial identification will be developed to replace the outmoded technologies already in use by a large number of educational institutions. Among these technologies are: If the intended proportion of hybrid student attendance is attained, it will be feasible to judge whether or not this project was carried out effectively. We hope that using this method will result in a more accurate and easier-to-complete attendance count than in the past.

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e-proceedings

International Teaching Aid
Competition 2023
Reconnoitering Innovative Ideas in Postnormal Times

iTAC **2023**

e ISBN 978-967-2948-51-3



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