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Fingerprint, Face and Voice Recognition Based Attendance Monitoring System

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Abstract: ***In This project aims to record the attendance without manual intervention. In the area of technology that changes and modifies daily, use biometrics is the most popular and trending technology.***
Taking attendance manually for a class of almost 60-80 students can be a time-consuming task if thought of it in a long run Each person has a unique biometric feature such as fingerprint, face structure, voice detection etc. **Keywords—** ***Boimetrics, Fringerprint, Face Structure,Voice Detection.***

I. INTRODUCTION

This project is all about to overcome on the problems that faced by the teachers when they record the attendance in the institutions or it can be used by in various working space like offices in private sector and govt. sector. when the teachers are taking of attendance of 60-80 students at a time it's a time consuming process of around 2-5minutes so this is a more time consuming if it's thought of it in a long run.

Each person's has their own identity for recognizing themselves just like if you say face structure the face has different natural points we can consider for face recognition it will appear differently for every individual because everyone has their own face structure so its automatically appears different and it's become unique, just like everyone has their own fingerprint structure , because of this natural feature of biometrics it's been using for various fields like forensic science like that etc.so we are using this as finger print for detection attendance, also everyone has their own voice quality and frequency , amplitude ,etc information detection comes in voice recording for building up a database a comprehensive database combining all the three features of biometrics can be used to record and monitor attendance accurately and thereby decreasing of chance of malpractices of all kind, we are using the domain of IoT which also a cloud based and we can use different types of microcontrollers like raspberry pie , Aurdino, NodeMcu8266 equipped Board in this project we are using the NodeMcu8266 because of its flexibility of ease of use for run program with IDE of Aurdino and dump into run for errors. We are using this biometrics of all individual persons to record and store the collection of information database that will be use to detect the person who will coming on entry and give the Fingerprint, face and voice biometrics will match the data that stored in the cloud database by using the algorithm it will also check for comparison for data is mismatch with the other persons if its matched with the persons who is that actual person whose trying to making an entry for attendance will automatically authorize that this person is verified by cloud database and its will make an entry for excel sheet that generated and get stored in Google sheets base cloud system , IoT has lot of scope of improvisation in terms of technology we add and remove our system from main microcontroller board and make it portable to install in every premises that has a simple infrastructure available for installation of our system ,previously on other papers the project is only done on the basis of Face Structure, and finger print which has not that much accuracy for capturing the data from database.

We are adding voice into it and it will make the system more accurate capturing the biometrics from Face Structure ,Voice and Fingerprint .

II. PROPOSED SYSTEM

A. Face Recognition

Humans has a unique biometric got from nature that its face ,human face has lots of different variation in the form of facial points that appears differently and unique if we record that data in the form of digital information collected its appears specifically for every individual person. so we are having programming code algorithm that will work as a logic for face detection. We are using hardware ESP32CAM Module that will connect with that NodeMcu8266 equipped Board with other modules like voice and fingerprint module.

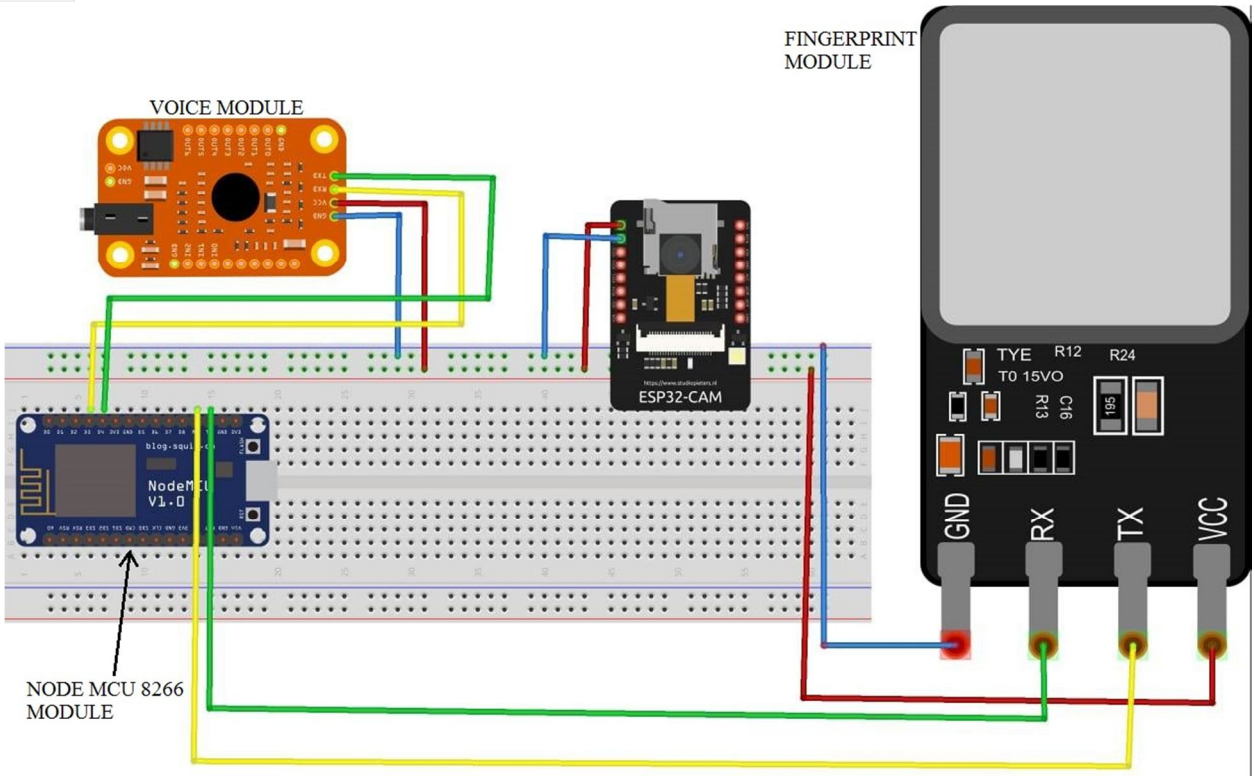


Fig.1 Complete Setup of face,fingerprint,voice module.

B. Fingerprint Recognition

A fingerprint is a type of electronic security system that uses fingerprints for biometric authentication to grant a user access to information or to approve transactions. Human fingerprints are practically unique, which is why they're successful at identifying individuals. It's not just law enforcement agencies that collect and maintain databases of fingerprints. Many types of occupations that require professional licensing or certification (e.g. financial advisors, stockbrokers, real estate agents, teachers, doctors/nurses, security, contractors, etc.) mandate fingerprinting as a condition of employment. It's also typical to provide fingerprints when having documents
notarized.



Fig.2 finger print variation details

Fingerprint scanners work by capturing the pattern of ridges and valleys on a finger. The information is then processed by the device's pattern analysis/matching software, which compares it to the list of registered fingerprints on file.

C. Capacitive Sensor

Instead of light, capacitive scanners use electricity (think of the way touch screens work) to determine fingerprint patterns. As a finger rests on the touch-capacitive surface, the device measures the charge; ridges exhibit a change in capacitance, while valleys produce practically no change at all. The sensor uses all this data to accurately map out prints. Most all Smartphone with fingerprint scanners use capacitive sensors.

D. Voice Recognition

voice or speech based recognized system is unique biometric feature of humans in this system we have a microphone which is recording the voice of students or any other individual person, the recorded voice is segmented into different parts like frequency , frequency band ,amplitude , top pitch , voice signal is converted into the electrical analog signal after that the signal is then converted into digital signal processing method there are various module available in the market , with the help of algorithm the sampling of digital voice signal become unique metrics data which matched with recorded voice present in the database along with face structure, fingerprint intels it gives the feedback to algorithm to match the data with present in the data base if its matched then the person is authorize or otherwise not given attendance entry into the cloud based sheet.

III. RESULTS AND OUTPUTS

In this project we have used a combination of three parameters for the recording of attendance namely Fingerprint biometric , Face recognition and voice recognition system. The fingerprint and face are the two most common biometric traits of the attendance system due to convenience and high acceptability rate compared to the iris recognition. A sensor in the form of a camera is required for the iris, fingerprint, or face image acquisition. CMOS is by far the prevalent sensor in nearly all cameras. On the other hand, a sensor for voice recording is managed through a microphone. In addition, time is also another factor in sensor selection. Time saving is achievable through face recognition-based attendance system in that students do not need to queue and contact with the sensor.The communication channel plays an important role in transferring attendance data. Wi-Fi is a great option since high amounts of data can be transferred in a given time from.

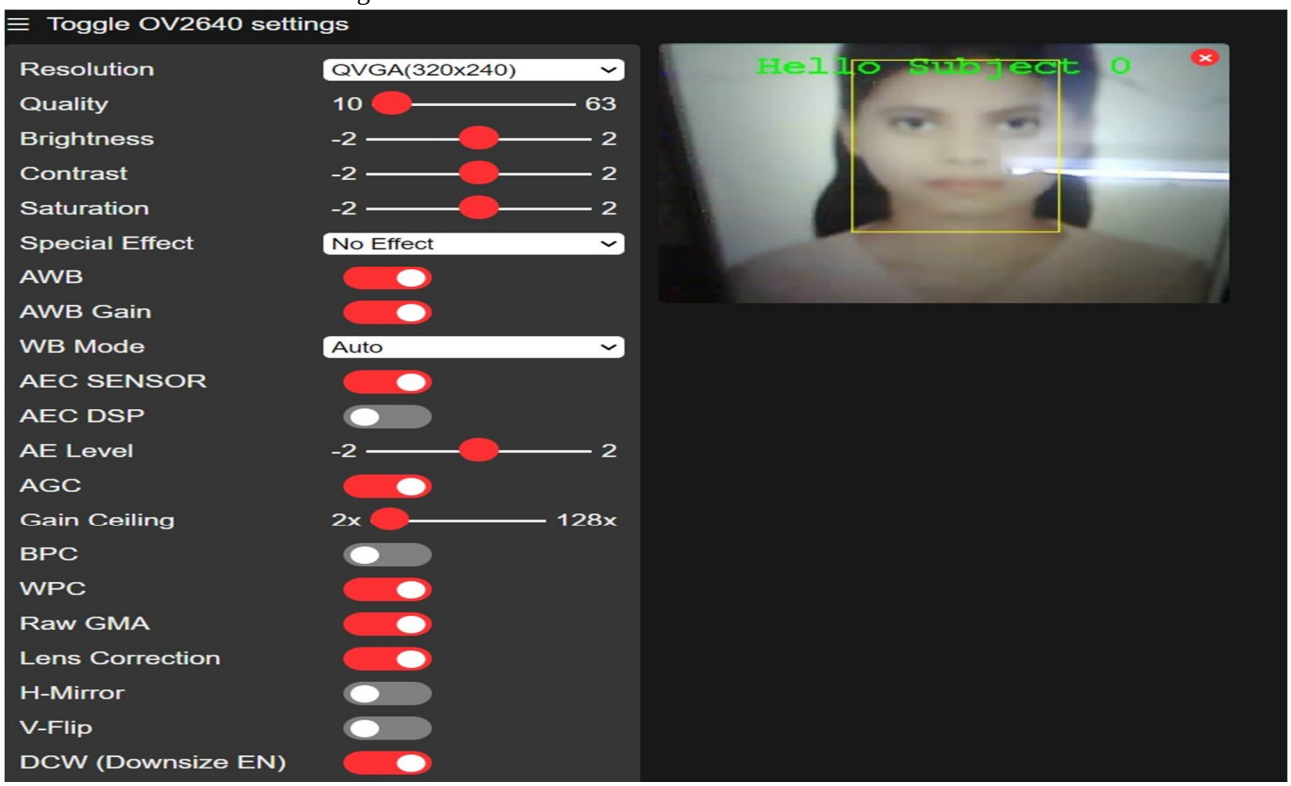


Fig.3 Face Detection

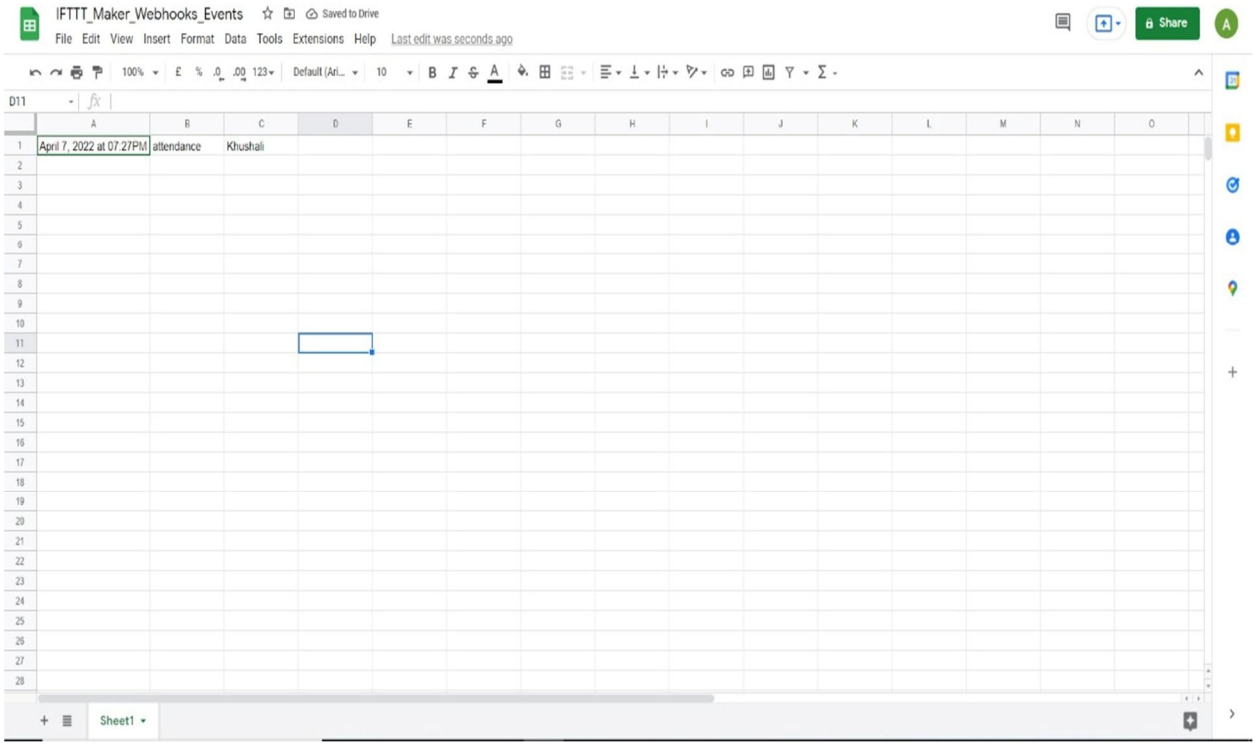


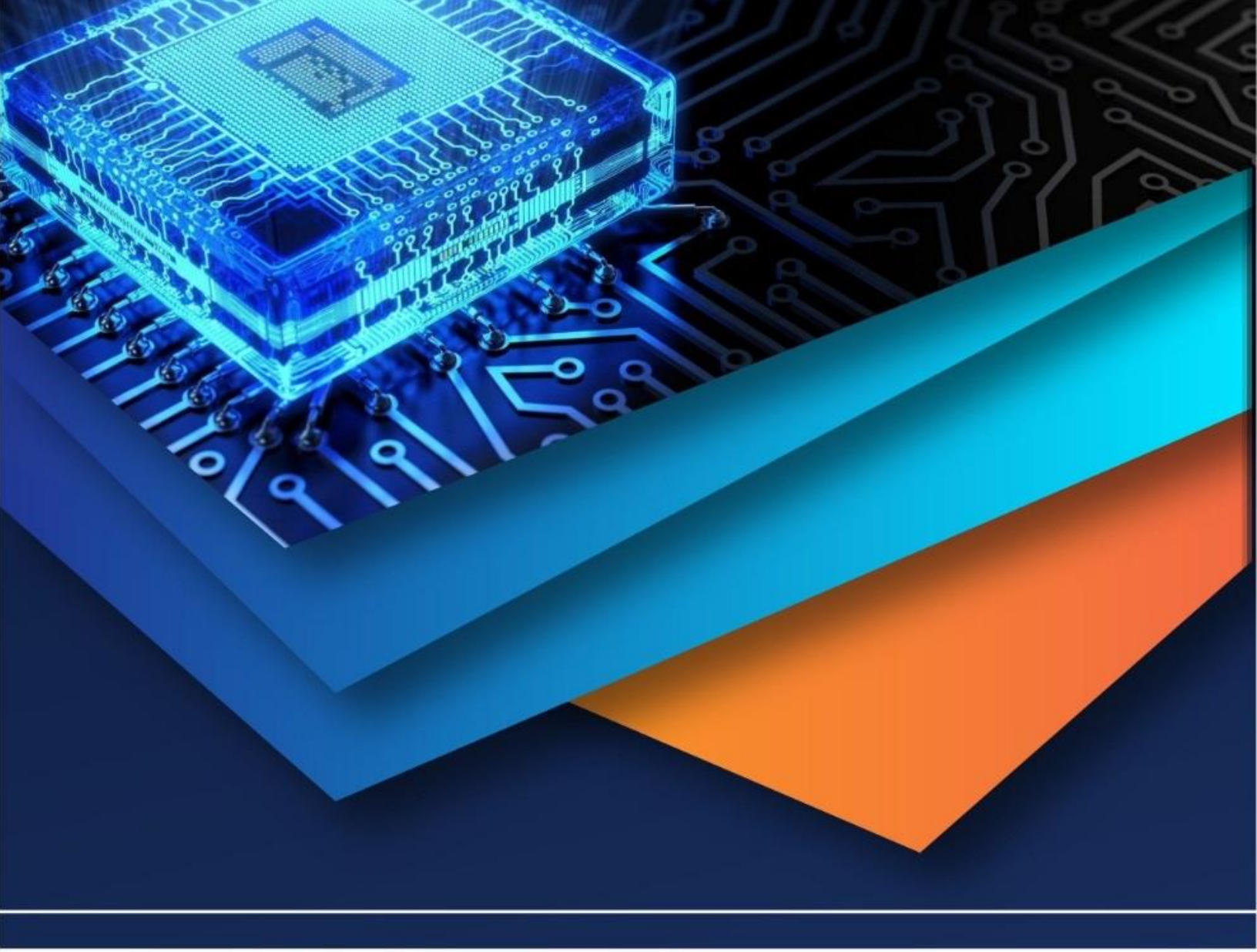
Fig.4 Automated entry in google cloud excel sheet

IV. CONCLUSION

This system proves to be useful for real-time attendance monitoring. Attendance data can be kept in various types of database storage. The server is suitable for huge capacity storage and ease of access while other memory cards are only capable of storing data locally up to a certain extent. Additionally, the number of students and size of biometric template determine the types of storage database as well. Finally, other components are needed to complement the whole biometric attendance system. In a large classroom, researchers may opt for a more powerful microcontroller, contactless sensor, larger database storage, and communication channel with high data rate. To sum up, the benchmark for choosing hardware devices or components always narrows down to three important criteria which are cost, power consumption, and speed. Furthermore, biometric-based attendance systems are taken to the next level with the widespread use of mobile devices in the internet of things (IoT) era. Nowadays, modern Smartphone are embedded with built-in hardware components such as the camera, iris, or fingerprint sensor. Consequently, for future research, an opportunity arises whereby the attendance marking can be taken using only Smartphone instead of setting-up a system with separated hardware components. Upon capturing the biometric traits, these data can be uploaded to the cloud server for authentication using a wireless connection on the Smartphone. Moreover, these attendance data can be saved in the cloud database. Nevertheless, in the world of increasing mobile connectivity, researches should be cautious about the security and privacy of the biometric data so as not to fall prey to cyber criminals.

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