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College Automation System Using IOT

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Abstract: ***College Automation System Using IOT Project will work on College Electrical Appliances Remote control and Improved Attendance System. It will include Automation of all the Electrical gadgets in the college. It will have Facial Recognition verified RFID Attendance system along with Appliances Remote Control System for every class so that admin can see all Incoming and Outgoing Students Record on the Web User Interface and can also control the Gadget switches through a click on their phone. Let us see how this College Automation System Project will work. College Automation System Project will help the college administrator. Administrator will able to get all the information regarding any faculty members on particular day and time. Admin panel will also able to edit the login display panel of teachers, staff members, students etc. Admin can add person, delete person, can give special permission. Teachers can also see list of students who comes under the category of attendance shortage and many more under this one roof.***
Keywords: ***face recognition, RFID Attendance, Haar-Cascade, IOT, Attendance, etc.***

I. INTRODUCTION

As the Name Suggests, In this Project we've tried the Automate Some of the major Task carried out in College on a Day-to-Day basis. But here we've primarily focused on Improved Attendance System along with some other Secondary Task Automations. Attendances is a system that is used to track the attendance of a particular person and is applied in the industries, universities, schools & also in working places. The manual attendance record system is not efficient & requires more time to arrange record & to calculate the average attendance of each student. The traditional way for taking attendance has drawback. Old conventional methods for student attendance is still used by most of the universities. As this traditional method is used, any students are gives proxy attendance of their friends by signing in their attendance in case of them absent in the institute. Hence there is a requirement of a system that will solve the problem of student record management and student average attendance calculation. The technology-based attendance system such as smart cards and biometrics-based attendance system reduced human involvement and errors. The proposed system should store the absent and present student's attendance details in electronic format so that management of attendance becomes easy. RFID Based Attendance System is widely used today at Various Places and other most used method is Facial Recognition. But this Both systems have a Concerned drawback which we have tried to cope up in the proposed System. Additionally, we've used IOT-based sensors at various places to Automates the Electrical Appliances inside the class and control it through a Mobile-Phone.

II. EXISTING METHODOLOGY

All the System working today at Various Places are implemented based on RFID, Face-Recognition, Fingerprints, Barcode based, QR-code, etc. But the major problem that arises in these is the chances of proxy attendances that these systems can incur in some or the other case. Also Implementation of some Systems will lead to very high Infrastructure cost to the implementing organization.

III. PROPOSED METHODOLOGY

In the Proposed System, we've tried to improve the existing system by making use of RFID Based Attendance with Facial verification. Here, whenever any user tries to mark his presence using his RFID card, he/she will be cross-verified will be authenticated using facial recognition through a camera installed along the RFID sensor. His/her Attendance will be only marked present if Card-holder face ID and Card Unique ID matches in the database.

This System is sub-divided into three phases: -

- Facial Record Registration.
- RFID Cards Registration.
- RFID Attendance Marking with Face Verification.

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A. Algorithms for RFID Card and Face Record Registration

Step 1: - Start
Step 2: - Read RFID Card through RFID Module Sensor.
Step 3: - Send the Detected Card to get Displayed on Website.
Step 4: - Save the card with the Concerned Person Details (Name, Department, Roll call).
Step 5: - Once Card Details Saved, Open the camera.
Step 6: - Click Image of Card Holder and Save image with his name.
Step 7: - Repeat Step 2 to 6.
Step 8: - End.

B. Algorithms for RFID Card Attendance with Face Verification

Step 1: - Start
Step 2: - Read RFID Card through RFID Module Sensor.
Step 3: - As soon as it Detects any Person's card, Open the camera and click his Image.
Step 4: - Match the RFID Card with the Stored Records and Also Match the Face ID's with Existing Face ID's.
Step 5: - If Card ID and Face ID both gets verified, Mark his Attendance in Database.
Step 6: - Repeat Step 2 to 5.
Step 7: - End.

C. Other Existing Algorithms Used

1) *Viola Jones Face Detection Algorithm:* It is an Object Detection Algorithm used to identify faces in an image or a real time video. The algorithm uses edge or line detection features proposed by Viola and Jones in their research paper "Rapid Object Detection using a Boosted Cascade of Simple Features" published in 2001. The algorithm is given a lot of positive images consisting of faces, and a lot of negative images not consisting of any face to train on them.
2) *LBPH (Local Binary Pattern Histogram):* It is a Face-Recognition algorithm it is used to recognize the face of a person. It is known for its performance and how it is able to recognize the face of a person from both front face and side face.

D. Sensors Used for Automation

1) ESP8266 NodeMCU.
2) Blynk Android Application.
3) MFRC-522 RFID Module.
4) ESP32 WIFI-Cam.
5) Arduino Uno.

E. System Architecture

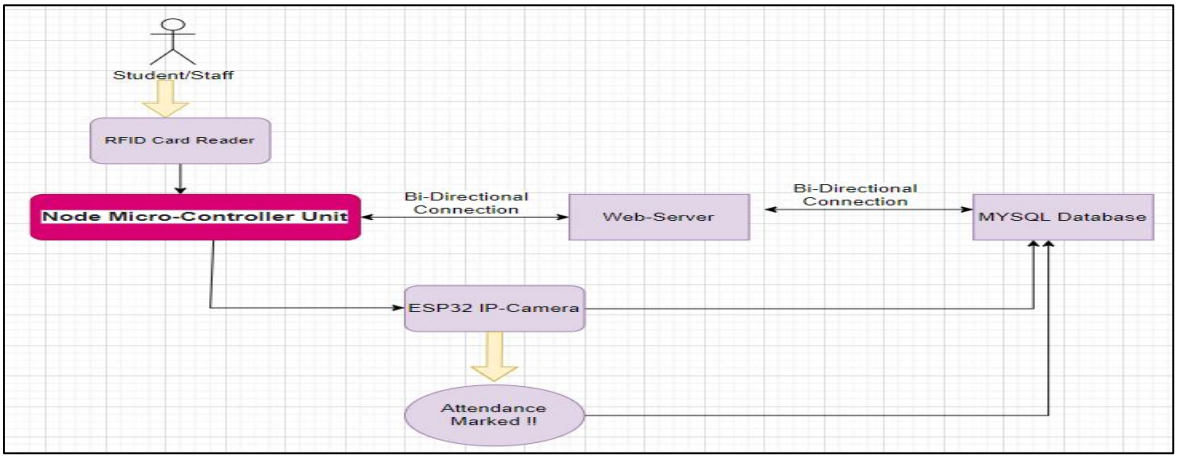


Fig. 1 Proposed System Architecture

F. Flow Diagrams

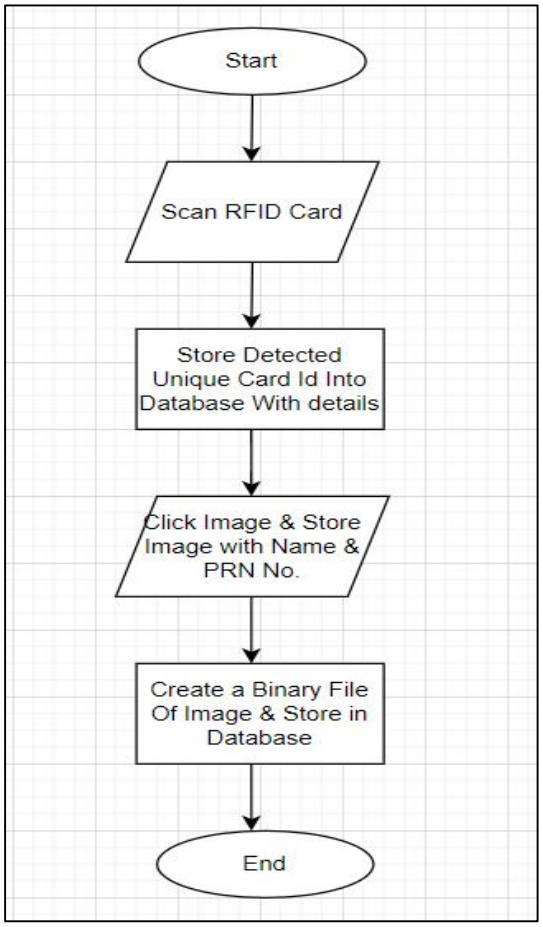


Fig. 2 Working Flow of RFID and Face Records Capturing

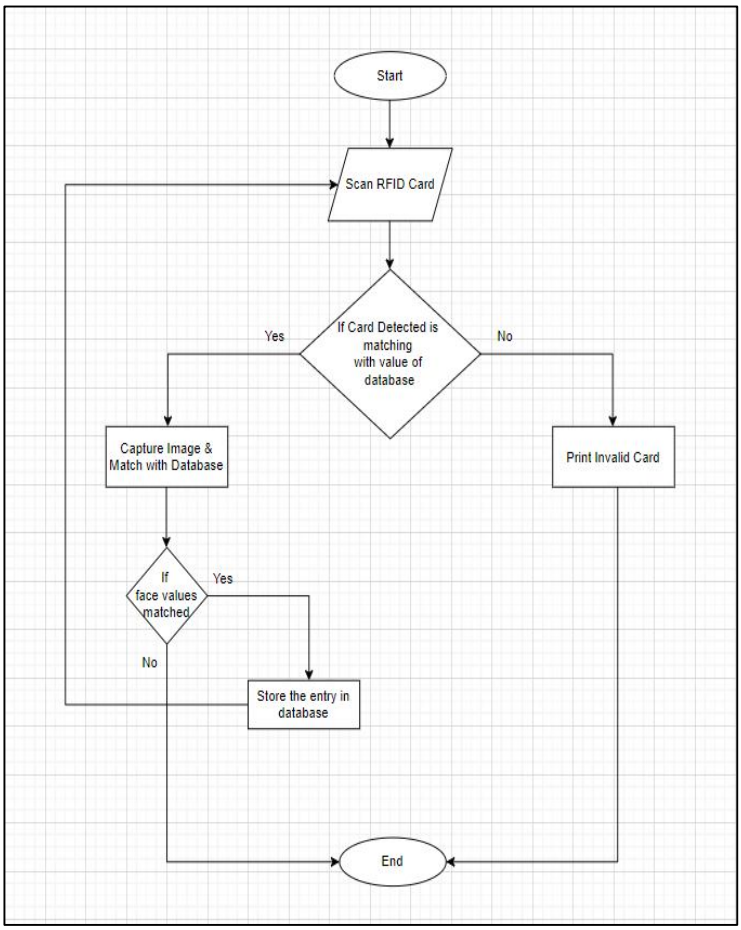


Fig. 3 Working Flow of RFID and Face Records Capturing

G. Result of Comparisons

Sr. No	Methodology Used	Accuracy	Drawback
1.	RFID Based Attendance Management System.	65-95%	Proxy Attendance Can be Made. If XYZ person shows Card of ABC, System would still mark his Attendance.
2.	Facial Recognition-Based Attendance System.	>=99%	If Someone Shows a Video to Camera of a Persons face, System would Detect his face and mark his Attendance.
3.	Barcode Based Attendance System	98%	They are less Secure as they can be more easily reproduced or forged.
4.	RFID Based Attendance with Card-Holder Face Verified System.	99%	Nil

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IV. RESULTS

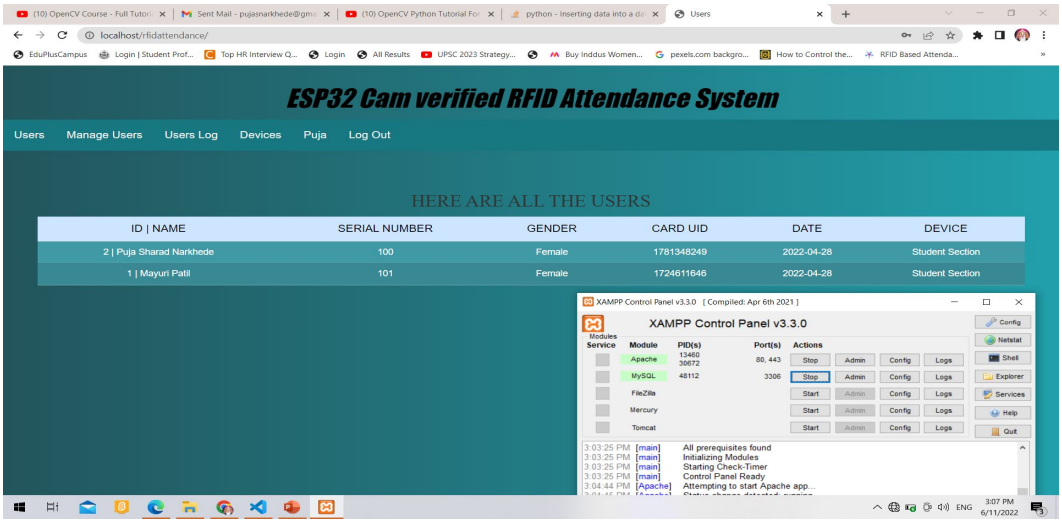


Fig. 4 Image of a Website Broadcasting the Newly Registered Students with their ID's.

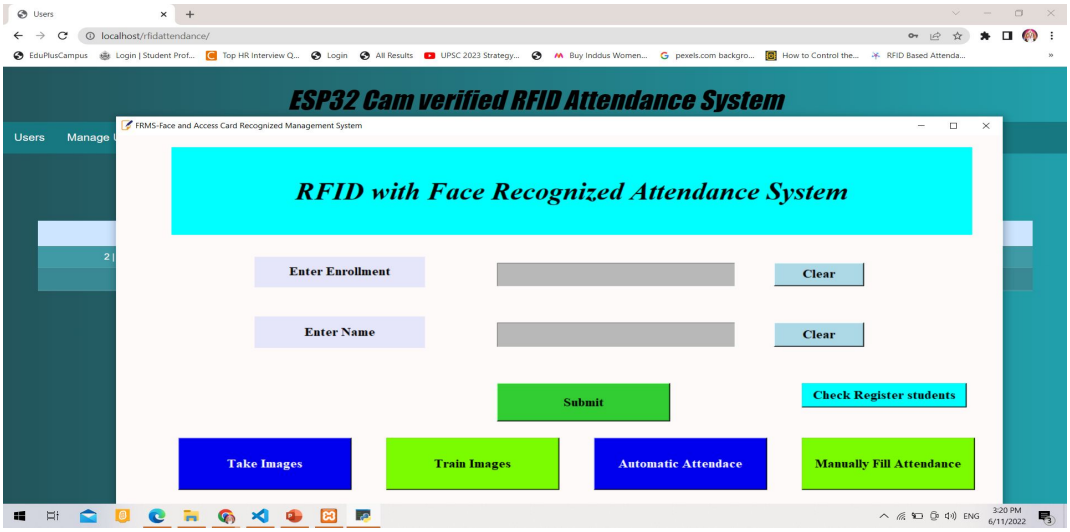


Fig. 5 Image of Mechanism used to record the facial frames made using T-Kinter Library

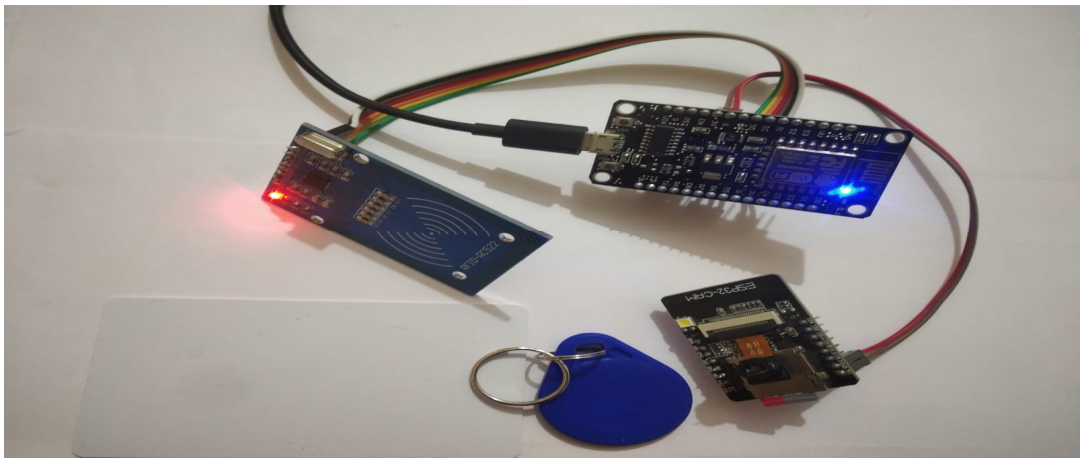


Fig. 6 Image of NodeMCU Attached with RFID sensor along with ESP-32 Camera

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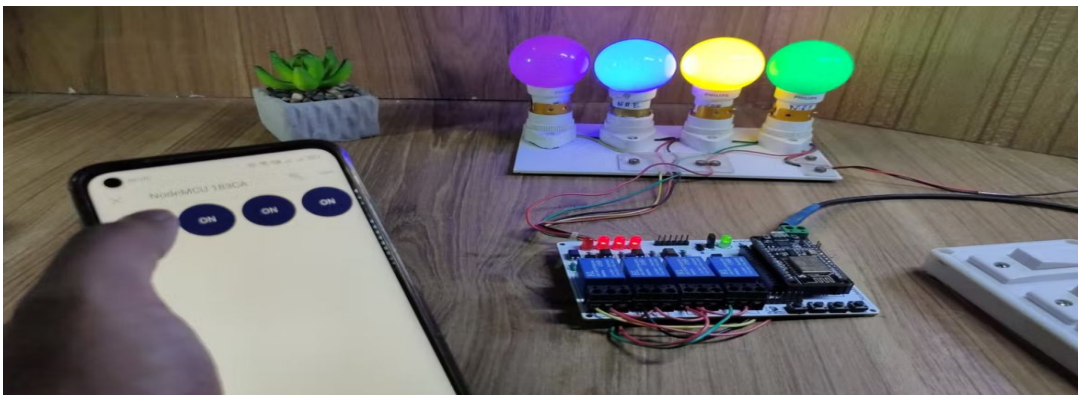


Fig. 7 Image of Remote Controlling of Lights Using a Mobile Application

V. CONCLUSIONS

The design and implementation of the Attendance System based on RFID and Verification by Face Recognition. which was our aim and objective of the project at the beginning ends with a success as both part works as desired. There it goes without any saying that our proposed model has the potential to overcome the manual attendance system because it's efficient and convenient. Our model is more user friendly and it provides the most accurate and organized data. And with just some few modifications we can use our system in any secured facilities. Also, implementing this Remote-Controlled Switching of Appliances in a College/Schools will Definitely result into Energy Conservation on a Daily Basis as well as Students will moreover take it as a Culture for learning things and work on Making it more Advanced.

VI. ACKNOWLEDGMENT

We thank to all the teachers and faculty of my institution for their valuable suggestions and Support while conducting this project. Also thanks to Dr. Aparna Pande for sharing the knowledge which helped a lot during our Project.

VII.FUTURE SCOPE

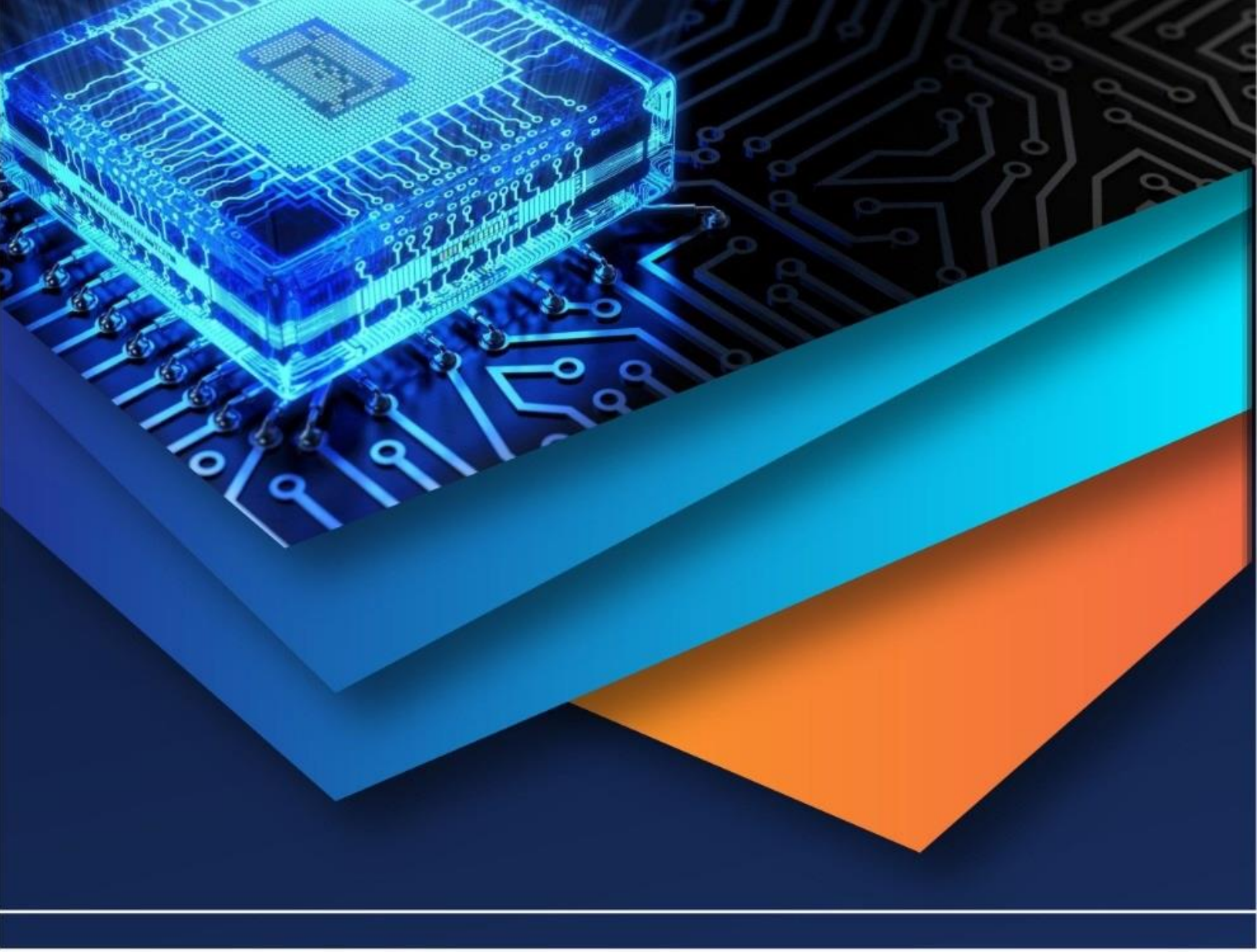
We can Also Increase the Model's Accuracy by Implementing one of the Below given features: -

1) Liveness Detection
2) Micro-expression Analysis
3) Human Face Attribution Analysis
4) 3D Depth Perception

Furthermore, More IOT Sensors can be Implement with greater Automation inculcated resulting into a Complete Automation of each and every manual work and People can utilize their saved time for Better Works.

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