A

Project Report

on

Interrogators Identification System

Submitted in partial fulfilment of the

requirement for the award of the

Degree of

BACHELOR OF TECHONOLOGY

in

ELECTRONICS AND COMMUNICATION ENGINEERING

by

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DECLARATION

We declare that the work presented in this report titled "**Interrogators Identification System"**, submitted to the Department of Electrical, Electronics and Communication Engineering, Galgotias University, Greater Noida, for the Bachelor of Technology in Electronics and Communication Engineering is our original work. We have not plagiarized unless cited or the same report has not submitted anywhere for the award of any other degree. We understand that any violation of the above will be cause for disciplinary action by the university against us as per the University rule.

Place:

Date:

Signature of the Student

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CERTIFICATE

This is to certify that the project titled "**Interrogators Identification System"** is the bonafide work carried out by Ayush Kumar, Ashutosh Gaurav students, during the academic year 2022-2023. We approve this project for submission in partial fulfilment of the requirements for the award of the degree of Bachelor of Technology in Electronics and Communication Engineering, Galgotias University.

D Gnana Jeba Das
Project Guide

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External Examiner

Approved by

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HOD

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ABSTRACT

Automatic face recognition systems have widely improved in performance as compared to the past few years and many systems are widely used for security and private enterprises applications. An automated system for individual faces in real-time is used for marking the attendance of students. Smart attendance systems also handle the activities of students. Radio-frequency identification (RFID) is a technology that uses radio waves to transfer data from an electronic tag, called RFID tag or label, attached to an object, through a reader for the purpose of identifying and tracking the object .This system consists of two main parts which include: the hardware and the software. The hardware consists of a motor unit and RFID reader. The RFID reader, which is a low-frequency reader (125 kHz), is connected to the host computer via a serial to USB converter cable. The Time-Attendance System GUI is developed using Visual Basic.Net. The Attendance Management System provides the functionalities of the overall system such as displaying live ID tags transactions, registering ID, deleting ID, recording attendance and other minor functions. This interface was installed in the host computer.

TABLE OF CONTENTS

LIST OF FIGURES

Figure no Page no

GLOSSARY

RFID	Radio Frequency Identification
OpenCV	Open Source Computer Vision Library
IoT	Internet of things
PC	Personal Computer

1.Introduction to RFID tags

An active RFID technology which attendance can be collected without human intervention during lecture session. The proposed system is aims to simplify the process of collecting class attendance whereby the RFID reader automatically triggered the tags and verify the triggered data in databases., RFID. Having a system that can automatically capture student's attendance by flashing their student card at the RFID reader, this system provides valuable online facilities for easy record maintenance offered not only to lecturers but also to related academic management staffs especially for the purpose of students' progress monitoring.

Active RFID is a technology that uses a radio wave to identify a physical object automatically where an active RFID tags have an on-board power source from battery, solar and electronics to perform specific tasks. It has an onboard power supply to transmit it data to a reader. Generally, active RFID transponder have significantly greater read range than passive RFID that have less read range due to it does not have an internal power source

	Active RFID	**Passive RFID**
Tag Power Source	Internal to tag	Energy transferred from the reader via RF
Tag Battery	Yes	NO
Availability of Tag Power	Continuous	Only within field of reader
Required Strength	Low	High (must power the tag)
Communication Range	Long range(100m or more)	Short(3m or less)
Signal strength from Tag to Reader	High	Low

2.Introduction to Facial recognition and RFID tags

Facial recognition has become a very important. Face recognition is effectively applied in various applications like security systems, authentication, entrance control, surveillance system, unlocking of smartphones and social networking systems. Most of the devices do not use facial recognition as the main form of conceding entry. However, with advancement in technology and algorithm, facial recognition system has the potential to replace the standard passwords and fingerprint scanners.

2.1.Face detection:-The primary function of this step is to conclude whether the human faces emerge in each image, and what is the location of these faces. The expected outputs of this step are patches which contain each face in the input image.

2.2.Face extraction:- Face detection step the extraction of human face patches from images is done. After this step, the conversion of face patch is done into vector with fixed coordinates or a set of landmark points.

2.3.Face recognition:- The last step after the representation of faces is to identify them. For automatic recognition we need to build a face database. Various images are taken of each person and their features are extracted and stored in the database. Then when an input image is fed the face detection and feature extraction is performed and its feature to each face class is compared and stored in the database.

3.System Description

The system consists of a camera that captures the images of the employee and sends it to the image enhancement module. After enhancement the image comes in the Face Detection and Recognition modules and then the attendance is marked on the database server. At the time of enrolment, templates of face images of individual employees are stored in the Face database. Here all the faces are detected from the input image and the algorithm compares them one by one with the face database. If any face is recognized the attendance is marked on the server from where anyone can access and use it for different purposes. In this way a lot of time is saved and this is highly secure process no one can mark the attendance of other. Attendance is maintained on the server so anyone can access it for purposes like administration, employees themselves. To avoid the false detection we are using the skin classification technique. Using this technique enhance the efficiency and accuracy of the detection process. Active RFID is a technology that uses a radio wave to identify a physical object automatically where an active RFID tags have an on-board power source from battery, solar and electronics to perform specific tasks. It has an onboard power supply to transmit it data to a reader. Generally, active RFID transponder have significantly greater read range than passive RFID that have less read range due to it does not have an internal power source.

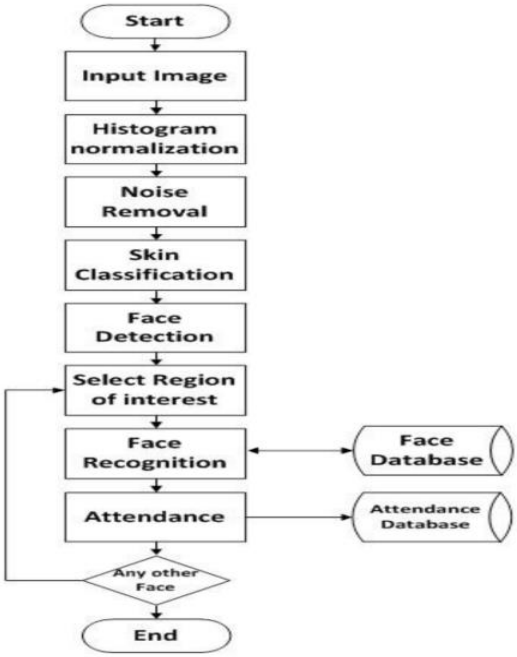

Fig 1:- Block diagram of face recognition attendance system

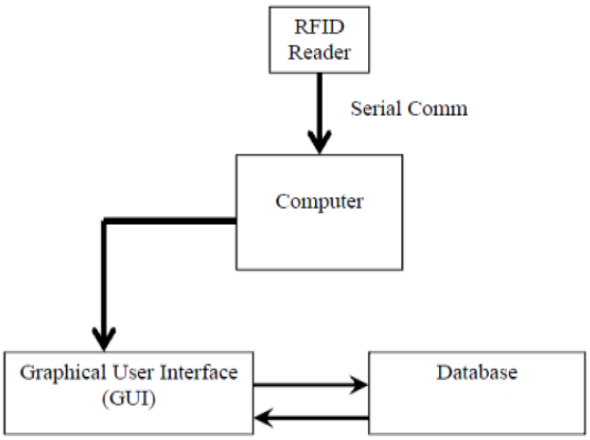

Fig2. Block diagram

3.1.Technical Requirements:-

3.1.1 Hardware Requirements:- A standalone computer needs to be installed in the room where the system is to be deployed. Camera must be positioned in the room to obtain the snapshots. Secondary memory to store all the images and database.

RFID tags, RFID reader(EM18),Arduino UNO R3,LCD Module, Buzzer.

3.1.2 Software Requirements:-

- ✓ Windows XP and above.
- ✓ Arduino IDE

4.Simulation

4.1.Code:- For Face recognition

```
import cv2
import face_recognition
import os
import numpy as np
from datetime import datetime
import pickle
path = 'known'
images=[]
classNames = []
mylist = os.listdir(path)
for cl in mylist:
    curImg = cv2.imread(f'{path}/{cl}')
    images.append(curImg)
    classNames.append(os.path.splitext(cl)[0])
    def findEncodings(images):
        encodeList = []
        for img in images:
            img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
            encoded_face = face_recognition.face_encodings(img)[0]
            encodeList.append(encoded_face)
        return encodeList
encoded_face_train = findEncodings(images)
def markAttendance(name):
    with open('Attendance.csv','r+') as f:
        myDataList = f.readlines()
        nameList = []
        for line in myDataList:
            entry = line.split(',')
```

```
            nameList.append(entry[0])
        if name not in nameList:
            now = datetime.now()
            dtString = now.strftime('%H:%M:%S')
            f.writelines(f'\n{name},{dtString}')
            # take pictures from webcam
cap = cv2.VideoCapture(0)
while True:
    success, img = cap.read()
    imgS = cv2.resize(img, (0,0), None, 0.25,0.25)
    imgS = cv2.cvtColor(imgS, cv2.COLOR_BGR2RGB)
    faces_in_frame = face_recognition.face_locations(imgS)
    encoded_faces = face_recognition.face_encodings(imgS, faces_in_frame)
    for encode_face, faceloc in zip(encoded_faces,faces_in_frame):
        matches = face_recognition.compare_faces(encoded_face_train, encode_face)
        faceDist = face_recognition.face_distance(encoded_face_train, encode_face)
        matchIndex = np.argmin(faceDist)

        if matches[matchIndex]:
            name = classNames[matchIndex].upper().lower()
            y1,x2,y2,x1 = faceloc
            # since we scaled down by 4 times
            y1, x2,y2,x1 = y1*4,x2*4,y2*4,x1*4
            cv2.rectangle(img,(x1,y1),(x2,y2),(0,255,0),2)
            cv2.rectangle(img, (x1,y2-35),(x2,y2), (0,255,0), cv2.FILLED)
            cv2.putText(img,name, (x1+6,y2-5),
cv2.FONT_HERSHEY_COMPLEX,1,(255,255,255),2)
            markAttendance(name)
    cv2.imshow('webcam', img)
    if cv2.waitKey(1) & 0xFF == ord('q'):
        break
```

4.2 Input and Output

4.2.1 Input :-

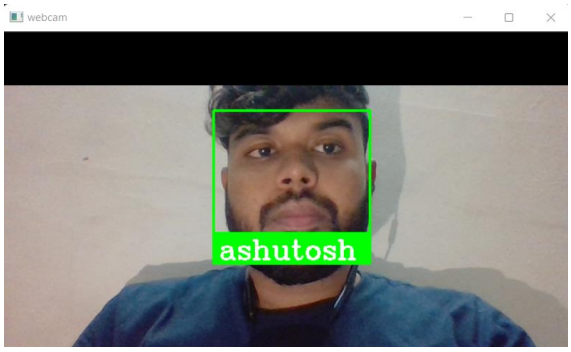

Fig:-3 Input Image

4.2.2 Output:-

	A	B	C	D	E
1	Name	Time			
2					
3	ashutosh	22:37:30			
4					
5					
6					
7					
8					
9					
10					

Fig:-4 Output image

4.3.Code:- For RFID

```
#include <LiquidCrystal.h>
char input[12];
int count = 0;
char tag1[]="1D1111231C8D";
char tag2[]="091122505277";
char tag3[]="090111F45BDEE";
LiquidCrystal lcd(8,9,10,11,12,13);

void setup() {
```

```
  //serial monitor
  Serial.begin(9600);
  // set up the LCD's number of columns and rows:
  lcd.begin(16, 2);
  pinMode(4, OUTPUT);
  pinMode(6, OUTPUT);
   pinMode(5, OUTPUT);
}
void loop() {
    boolean match = 1;
    digitalWrite(2, HIGH);
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("Hi, WELCOME");
    lcd.setCursor(0,1);
    lcd.print("SCAN SDUDENT ID");
    delay(1000);
    if(Serial.available())// check serial data ( RFID reader)
          {
                count = 0; // Reset the counter to zero
                /* Keep reading Byte by Byte from the Buffer till the RFID Reader Buffer is
          empty
                   or till 12 Bytes (the ID size of our Tag) is read */
                while(Serial.available() && count < 12)
                {
                      input[count] = Serial.read(); // Read 1 Byte of data and store it in the
input[] variable
                      count++; // increment counter
                      delay(5);
                }
             Serial.println("I received: ");
             for(int i=0;i<12;i++)
             Serial.print(input[i]);
```

```
        Serial.println();
Serial.println();
int j= 0;
while (match==1 && j<12){
    if((tag1[j]==input[j])||(tag2[j]==input[j])||(tag3[j]==input[j])){
      match=1;
      j++;
    }
    else
    match=0;
}
if (match == 1){
  lcd.clear();
         lcd.setCursor(0,1);
  lcd.print("VALID STUDENT");
  lcd.setCursor(0,2);
  lcd.print("You May Enter ");
  delay(1000);
  digitalWrite(4, LOW);
  digitalWrite(6, HIGH);
  delay(2000);
  digitalWrite(6, LOW);
  digitalWrite(4, HIGH);
   delay(1000);
   digitalWrite(4, HIGH);
  digitalWrite(6, LOW);
}
else{
  lcd.clear();
  lcd.setCursor(0,0);
  lcd.print("Unauthorished");
  lcd.setCursor(0,1);
```

```
            lcd.print("STUDENT");
            digitalWrite(5, HIGH);
            delay(2000);
            digitalWrite(5, LOW);
}
}
}
```

5.Results

The final version of the research are two face detection systems, one is based on a dlib library, the second is based on OpenCV. The results of their work submitted to fig.4, which provides an interface of applications, in which we see the detected face.

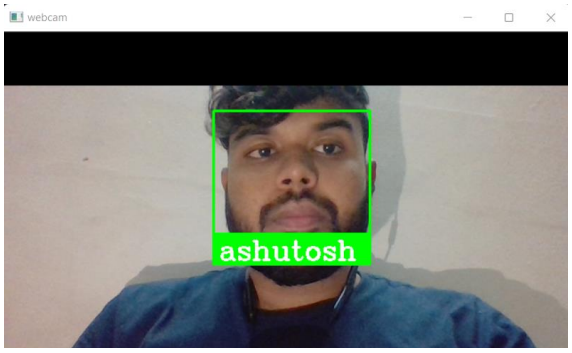

Fig 5:-Face Detection

Applying this project in the real world we can achieve a lot of things such as getting attendance done by the faculty with no proxy, which in turn could help in saving time. This will be beneficial in every university in which there is a problem with attendance. This project will develop the ecosystem of the schools and universities, so the technology is going to revolve around us. This software provides some future scope to develop a device in each class and the developer can provide an application for attendance system for specific university with the specified subject. This software when exposed to the real world can make a difference in attendance of students and help in time management or reliability among the

professors to teach with no attendance marking problems or to carry registers. This software solves the real world issue with schools and universities.

Module testing is one of important phase in this project. The main objective on running this testing is to ensure that all the module are in good condition and working as expected. The module involves are RFID module, MicroSD card module and LCD module.

The output can be observed throughout the LCD. When a card that are registered inside the database was swipe, the LCD will display, matric number and name. For the information, the card can be swipe once only for each file. Swipe inside the database, LCD will display "Invalid"

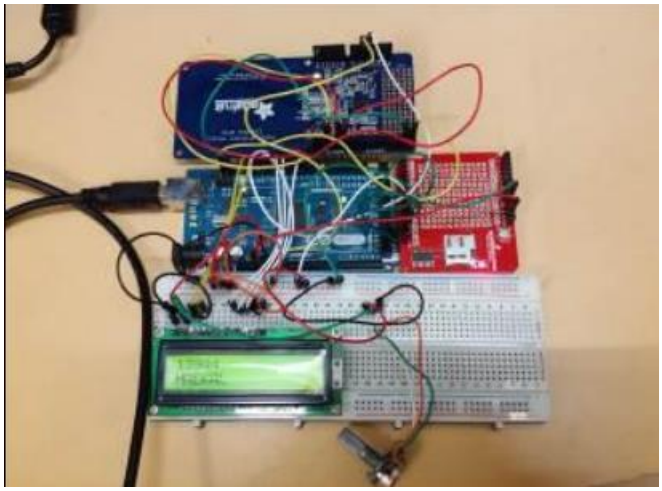

Fig:-6 RFID : Hardware Installation

6.Conclusions

6.1 Conclusion (Face recognition)

As we discussed in this article the OpenCV library is more productive, has better performance for face detection and detection. It also means that with OpenCV, it's better to build recognition applications for the IoT platform. Automated Attendance System has been planned for the purpose of reducing the errors that occur in the manual attendance taking system. The aim is to automate and make a system that is useful to the organization such as an institute. The proposed automated attendance system using face recognition is a great model for marking the attendance of students in a classroom. This system also assists in overcoming the chances of proxies and fake attendance. Now-a-days, many systems using biometrics are available. However, the facial recognition turns out to be a feasible option because of its high accuracy along with minimum human intervention. This system is aimed at providing a significant level of security..

6.2 Conclusion (RFID)

In conclusion, the objective to build an RFID based attendance system was successfully achieved. In terms of performance and efficiency, this project has provided a convenient method of attendance marking compared to the traditional method of attendance system. By using databases, the data is more organized. This system is also a user friendly system as data manipulation and retrieval can be done via the interface, making it a universal attendance system. Thus, it can be implemented in either an academic institution or in organizations.

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