

Attendance System Using Face Recognition And Biometric

B.E. Dissertation

Submitted in partial fulfillment of the requirement of

University of Mumbai

For the Degree of

**Bachelor of Engineering
(Electronics and Telecommunication Engineering)**

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April 2018



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in

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to the

University of Mumbai.

Guide

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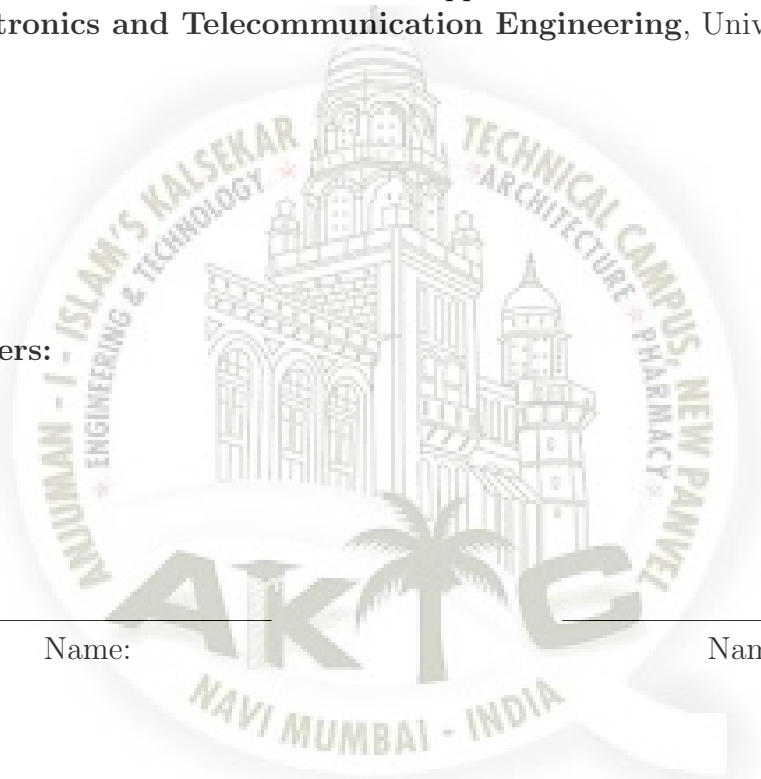
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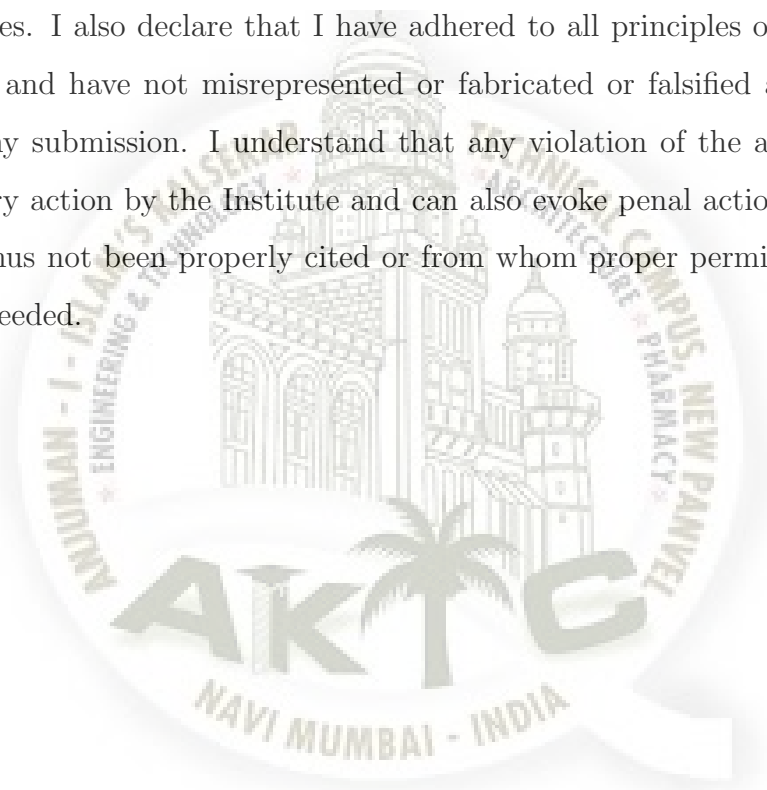
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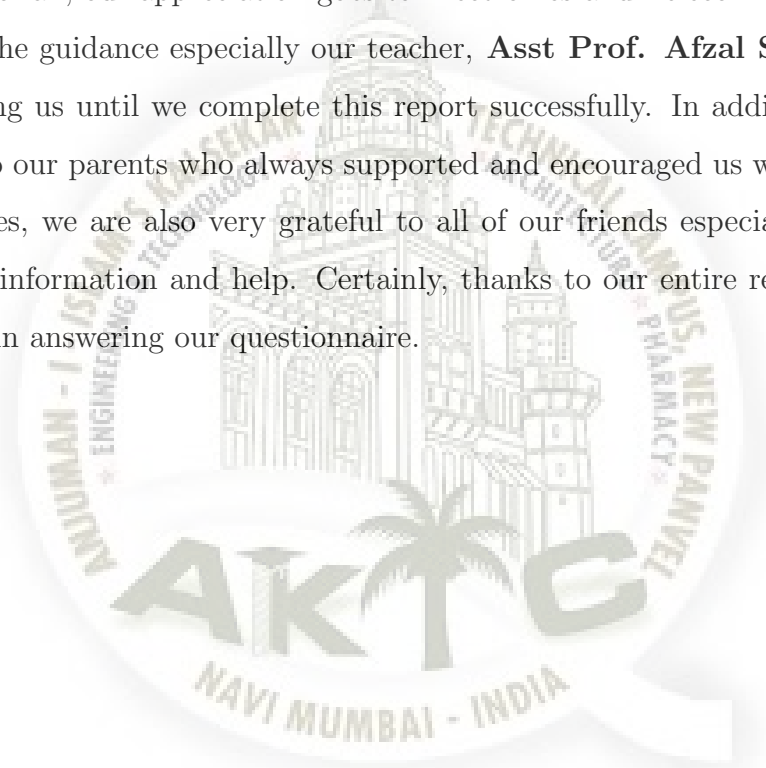
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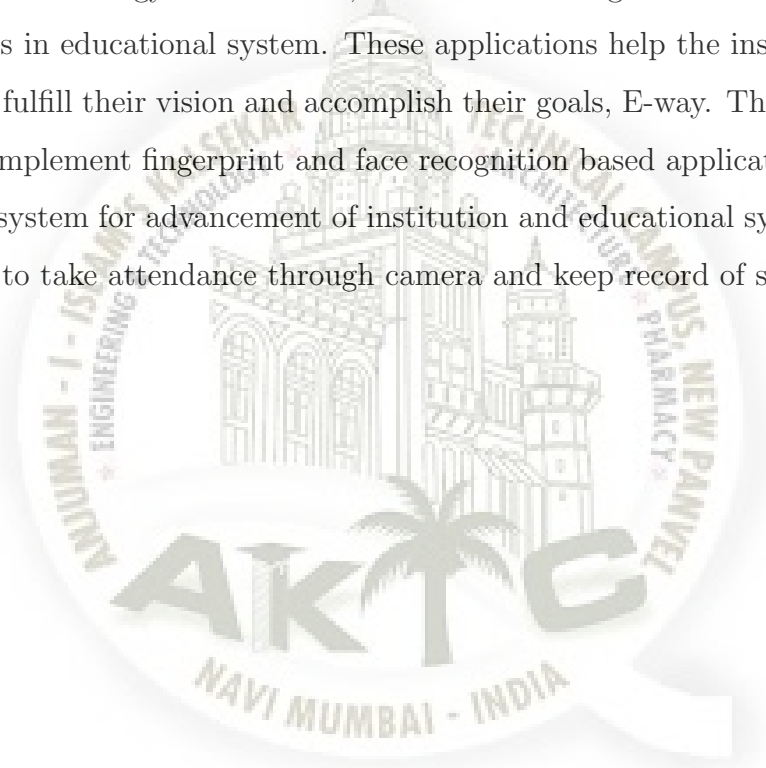
Acknowledgments

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Abstract

An Education system in India has become so advanced in last decade due to the development of the technology. Smart class, video conferencing are some of the examples of modern trends in educational system. These applications help the institute to move forward quickly, fulfill their vision and accomplish their goals, E-way. The main objective of project is to implement fingerprint and face recognition based application for attendance management system for advancement of institution and educational system. This system helps teacher to take attendance through camera and keep record of students.



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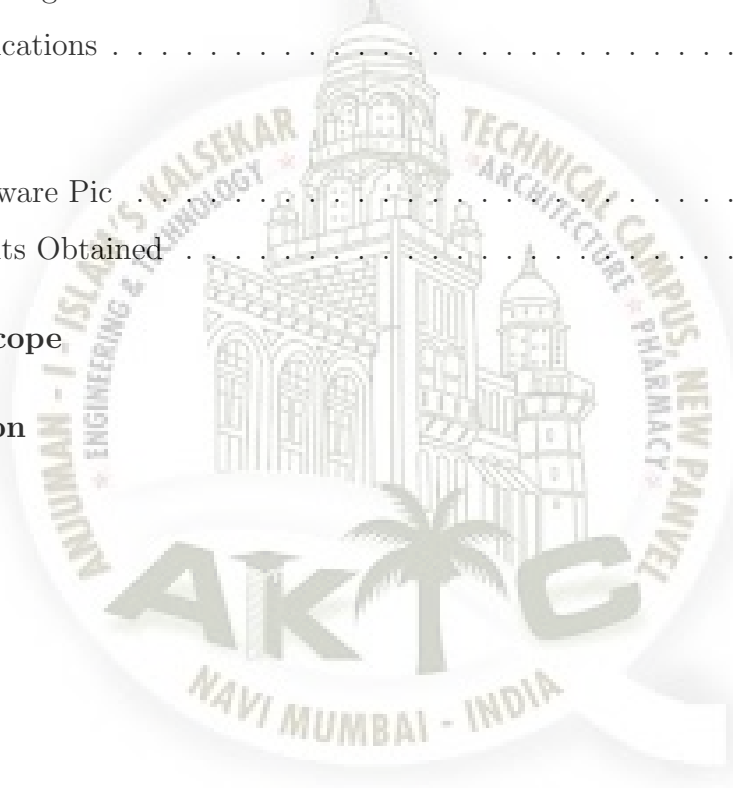
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Chapter 1

Introduction

1.1 Introduction

Nowadays, mobile devices have become a way of life for students especially in higher education. Computers are now replaced by compact smartphones that can be fit into pocket and can be carried anywhere. The rapid progress in mobile technology has created a new area which is known as mobile learning. Mobile learning is the next generation of e-learning that leads attractive way of knowledge delivery especially used in teaching and learning process. With development of this Android application the student preferred to use mobile devices as technology supported educational tool. This system is designed because chances of false marking of attendance is more due to more paper work and manual attendance entry, evaluation and report generation is tedious and time consuming job. Timely updates to parent are not possible. This system enables student to learn anywhere, anytime and at their own convenience. This system makes students to be active, responsive while learning their academic. Another application that is provided by this system is smart attendance evaluation and report generation. Smart phones are based on operating systems like blackberry, IOS and Android. To design proposed project, smart phones with Android operating system are chosen because penetration rate of Android OS is 70 percent. It is open source and freeware. The application is compatible with all Android versions ranging from Gingerbread 2.3 to Lollipop 5.0.1 so that students who cannot afford to buy high end mobiles and institutes located in remote, rural area can also take the advantage of this application. This project consists of face detection and recognition using matlab and finger print sensor. Student will place his finger on finger

print sensor after verifying than face will be detected through camera. After verifying both, student will be marked as present. And will be displayed at Visual Basic (For Institute) and to Android app which will be at parent's side.

Android

Android is the most used operating system on the planet. In fact, its almost omnipresent in the mobile ecosystem. Even the Android versions, like Nougat, Marshmallow, Lollipop, etc. have been able to build their individual fan following. Google is very punctual in releasing the market share of these Android versions on a monthly basis. This data gets uploaded to their developer portal and gives us a rough estimate of the most popular Android versions for the month. It helps the developers prioritize their resources for widely used Android versions, rather than wasting them on near out-of-date Android versions. In this project there are used of android smartphone for load control. Android mostly used available smartphone it is biggest advantage in our project. Android is easy to access and easily under-standable to user. Basically we are using bluetooth module to connect with load and get controls.

Android Name	Android Version	Usage Share
Nougat	7.0, 7.1	28.5%↑
Marshmallow	6.0	28.1%↓
Lollipop	5.0, 5.1	24.6%↓
KitKat	4.4	12%↓
Jelly Bean	4.1.x, 4.2.x, 4.3.x	5%↓
Oreo	8.0, 8.1	1.1%↑
Ice Cream Sandwich	4.0.3, 4.0.4	0.4%↓
Gingerbread	2.3.3 to 2.3.7	0.3%↓

Figure 1.1: Android Usage

Chapter 2

Literature Survey

A Survey on Attendance System Using Biometric: This paper deals with the Attendance System Using Biometric. It can reduce the presence of fraudulent students who are now mostly done by the students and the system can also reduce problems such as the presence of missing paper and easily damaged.

Review: The above system only consist of biometric attendance system. We are also adding face recognition to provide security.

A Survey on Attendance System Using Face Recognition: This paper deals with Face Recognition System. In this system face is detected and recognised and compared with database and then attendance is marked.

Review: In above system the face is detected properly but not recognised properly.

Objective: Our objective is to recognize the face properly. And to make attendance system using face recognition and by finger print sensor.

Chapter 3

Block Diagram and Description

3.1 Block Diagram

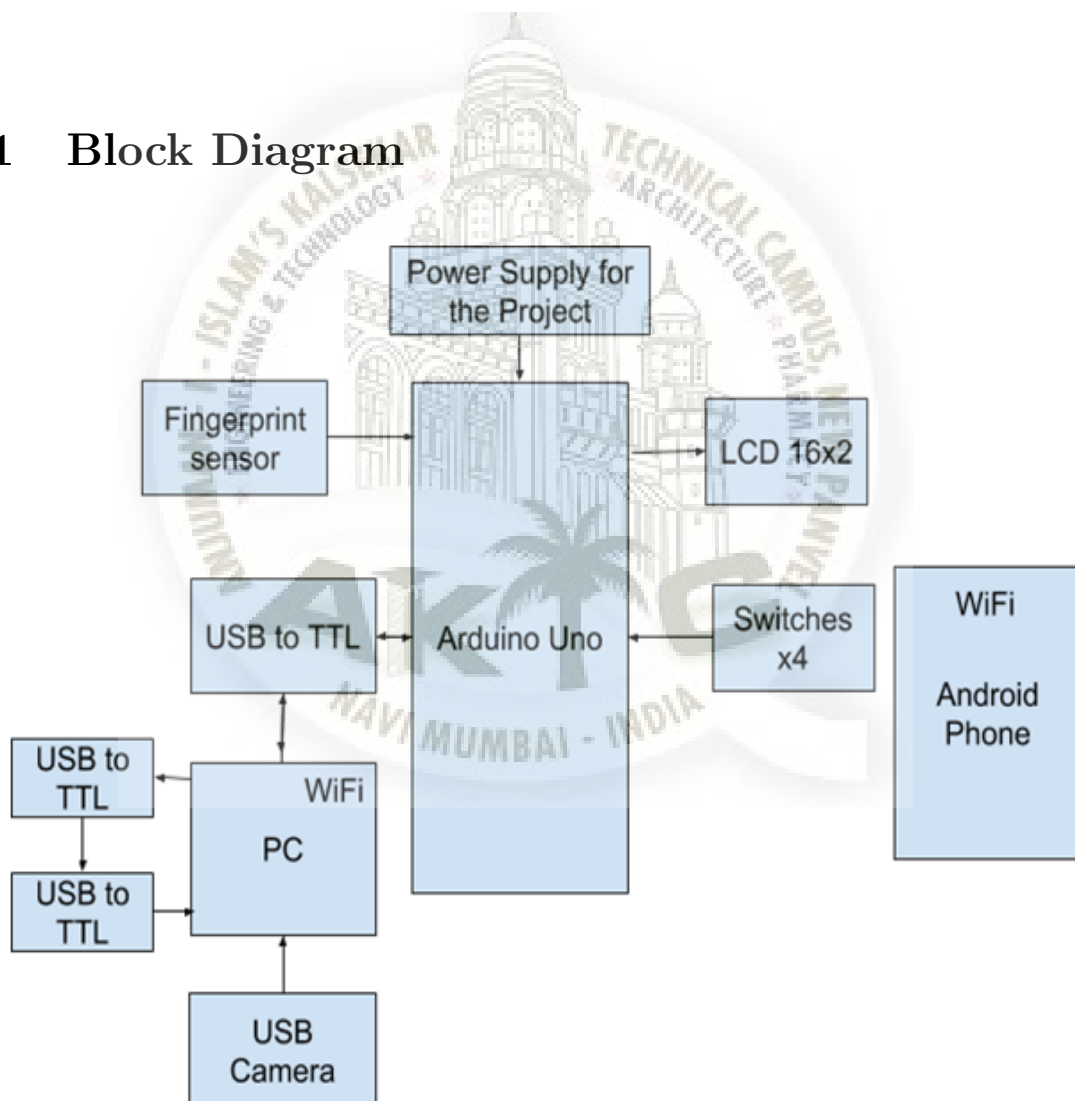


Figure 3.1: Block Diagram

3.2 Hardware/ software requirements

3.2.1 Hardware requirements

- 1 Arduino controller
- 2 Fingerprint sensor
- 3 USB wired camera
- 4 Liquid Crystal Display (LCD)

3.2.2 Software Requirements

- 1 Arduino IDE
- 2 Android
- 3 VB 6.0
- 4 Matlab



3.3 Hardware Details

3.3.1 ARDUINO

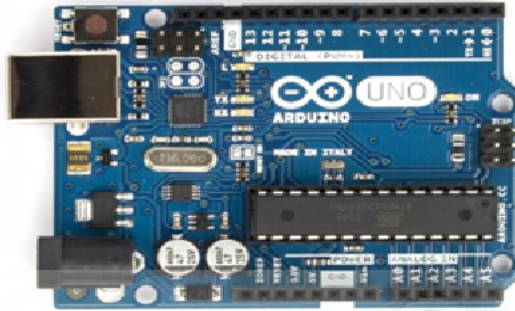


Figure 3.2: Arduino

Arduino is a tool for making computers that can sense and control more of the physical world than your desktop computer. It's an open-source physical computing platform based on a simple microcontroller board, and a development environment for writing software for the board.

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

Arduino Specifications

Microcontroller	ATmega328
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
Analog Input Pins	6
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328) of which 0.5 KB used by boot loader
SRAM	2 KB (ATmega328)
EEPROM	1 KB (ATmega328)
Clock Speed	16 MHz

Figure 3.3: Arduino Specifications



3.3.2 FINGERPRINT MODULE R305

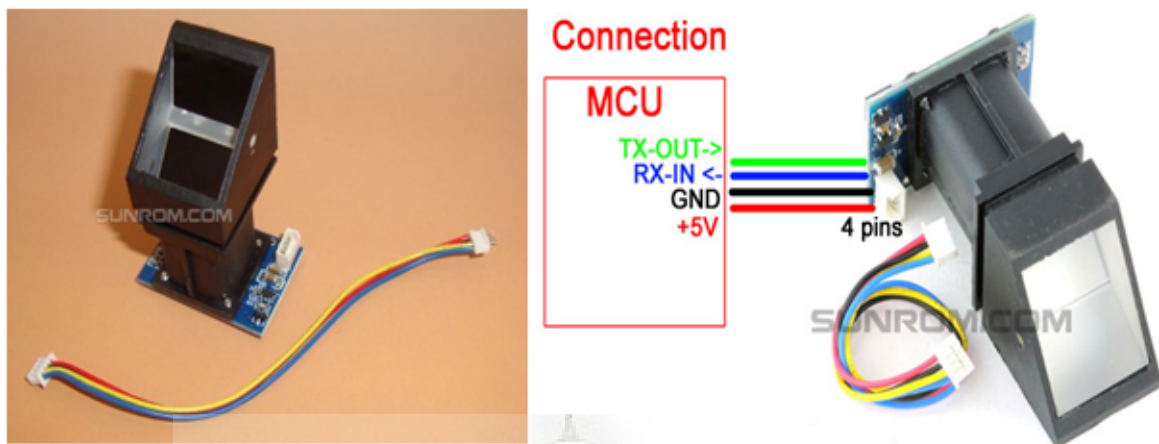


Figure 3.4: Fingerprints Module

Optical biometric fingerprint reader with great features and can be embedded into a variety of end products, such as: access control, attendance, safety deposit box, car door locks.

Features

1. Integrated image collecting and algorithm chip together, ALL-in-One.
2. Fingerprint reader can conduct secondary development, can be embedded into a variety of end products.
3. Low power consumption, low cost, small size, excellent performance.
4. Professional optical technology, precise module manufacturing techniques.
5. Good image processing capabilities, can successfully capture image up to resolution 500 dpi.

Specifications

Fingerprint sensor type: Optical

Sensor Life: 100 million times

Static indicators: 15KV Backlight: bright green

Interface: USB1.1/UART(TTL logical level)

RS232 communication baud rate: 4800BPS 115200BPS changeable

Dimension: 55*32*21.5mm

Image Capture Surface 1518(mm)

Verification Speed: 0.3 sec

Scanning Speed: 0.5 sec

Character file size: 256 bytes

Template size: 512 bytes

Storage capacity: 250

Security level: 5 (1,2,3,4,5(highest))

False Acceptance Rate (FAR) :0.0001percent

False Rejection Rate (FRR): 0.1percent

Resolution 500 DPI

Voltage :3.6-6.0 VDC

Working current: Typical 90 mA, Peak 150mA

Matching Method: 1: N

Operating Environment Temperature: -20 to 45 centigrades

3.3.3 USB to TTL



Figure 3.5: USB to TTL

The USB TTL Serial cables are a range of USB to serial converter cables which provide connectivity between USB and serial UART (Universal Asynchronous Receiver Transmitter) interfaces.

The TTL-232R-3V3 is a USB to TTL serial converter cable incorporating FTDI's FT232RQ USB- Serial UART interface IC device, the latest device to be added to FTDI's range of USB UART interface Integrated Circuit Devices. It is designed to allow for a fast, simple way to connect devices with a TTL level serial interface to USB.

The FT232RQ chip used by the TTL-232R-3V3 is housed within the USB 'A' connector.

A 1.6 meter(6foot) cable is terminated with a 6 way 0.1” pitch header socket which provides access to the transmit(Tx) , receive(Rx),RTS, CTS, as well as VCC(5V out) and GND.

The FT232R is a USB to Serial UART interface with optional clock generator output, and the new FTDIChip ID security dongle feature.In addition,asynchronous and synchronous bit bang interface modes are available USB to serial interface designs using the FT232R have been further simplified by fully integrating the external EEPROM, clock circuit and USB resistors onto the device.



3.3.4 LCD (Liquid Crystal Display)

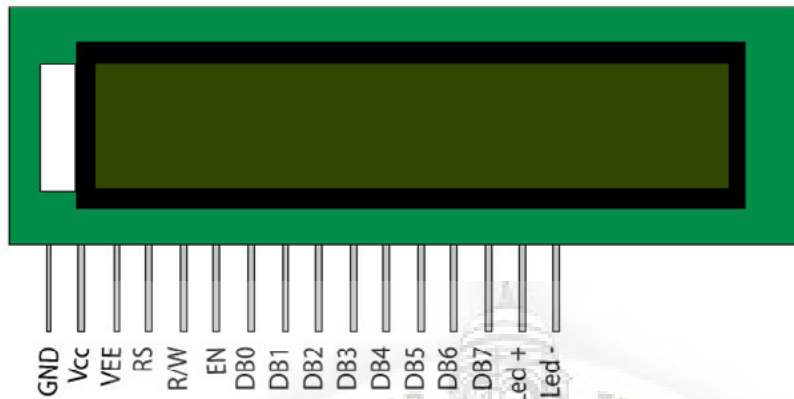


Figure 3.6: LCD

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special and even custom characters (unlike in seven segments), animations and so on. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

Pin Description

Pin No	Function	Name
1	Ground (0V)	Ground
2	Supply voltage; 5V (4.7V – 5.3V)	V _{CC}
3	Contrast adjustment; through a variable resistor	V _{EE}
4	Selects command register when low; and data register when high	Register Select
5	Low to write to the register; High to read from the register	Read/write
6	Sends data to data pins when a high to low pulse is given	Enable
7	8-bit data pins	DB0
8		DB1
9		DB2
10		DB3
11		DB4
12		DB5
13		DB6
14		DB7
15	Backlight V _{CC} (5V)	Led+
16	Backlight Ground (0V)	Led-

Figure 3.7: Pin Description

3.4 Softwares Details

3.4.1 MATLAB

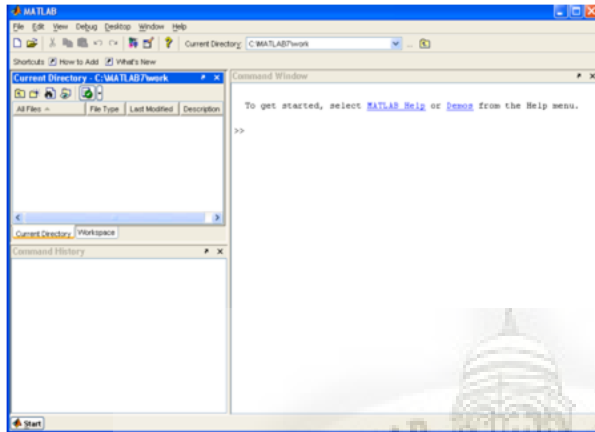


Figure 3.8: MATLAB

MATLAB (matrix laboratory) is a multi-paradigm numerical computing environment. A proprietary programming language developed by MathWorks, MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C, C plus plus, C hash, Java, Fortran and Python. Although MATLAB is intended primarily for numerical computing, an optional toolbox uses the MuPAD symbolic engine, allowing access to symbolic computing abilities. An additional package, Simulink, adds graphical multi-domain simulation and model-based design for dynamic and embedded systems.

3.4.2 Visual Basic



Figure 3.9: Visual Basic 6.0

Visual Basic (VB) is an event driven programming language and associated development environment from Microsoft for its COM programming model. VB has been replaced by Visual Basic .NET. The older version of VB was derived heavily from BASIC and enables the rapid application development (RAD) of graphical user interface (GUI) applications, access to databases using DAO, RDO, or ADO, and creation of ActiveX controls and objects. A programmer can put together an application using the components provided with Visual Basic itself. Programs written in Visual Basic can also use the Windows API, but doing so requires external function declarations.

3.4.3 Arduino IDE



Figure 3.10: Arduino IDE

The Arduino project provides the Arduino integrated development environment (IDE), which is a cross-platform application written in the programming language Java. It originated from the IDE for the languages Processing and Wiring. It includes a code editor with features such as text cutting and pasting, searching and replacing text, automatic indenting, brace matching, and syntax highlighting, and provides simple one-click mechanisms to compile and upload programs to an Arduino board. It also contains a message area, a text console, a toolbar with buttons for common functions and a hierarchy of operation menus.

3.4.4 Basics4Android

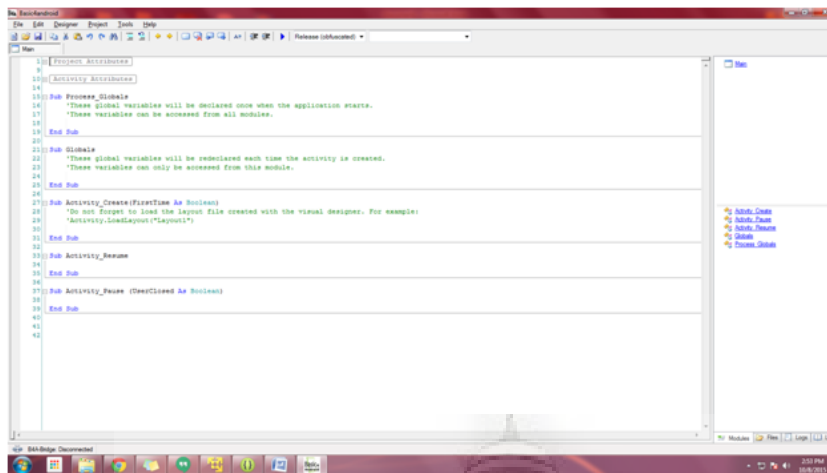


Figure 3.11: Basics 4 Android Main Screen

Basic4Android (currently known as B4A) is a rapid application development tool for native Android applications, developed and marketed by Anywhere Software Ltd. B4A is an alternative to programming with Java and the Android SDK. B4A includes a visual designer that simplifies the process of building user interfaces that target phones and tablets with different screen sizes

Steps

Go to File-> Save. Make a new folder(here named as project). Open the new folder(here project) and give file name and click ok This window will appear. Uncomment the Activity. LoadLayout() method Click on designer to make layout From add View tab select label, buttons etc It will display like this Go to file and save layout with a name which we have to enter in Activity.LoadLayout() method And to run the app click on blue triangle

After successful running app, Go to that folder where u gave path to save the project. Go to objects file. You will get generated APK file. Copy paste that file in mobile using data cable and install it.

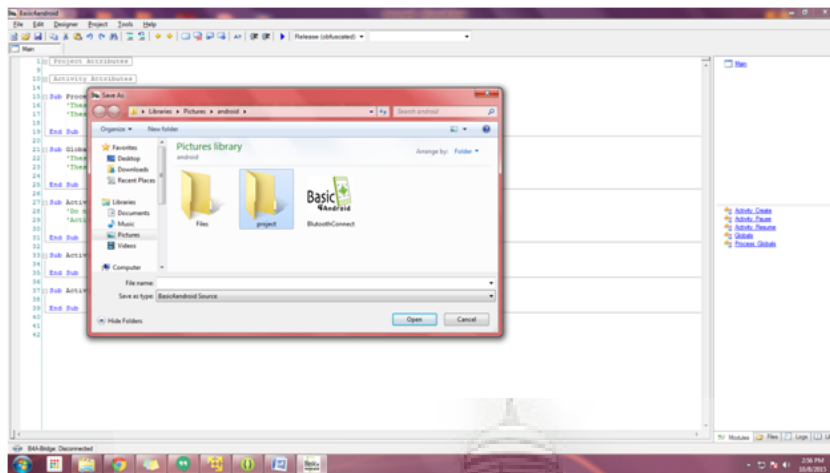


Figure 3.12: B4A Step1

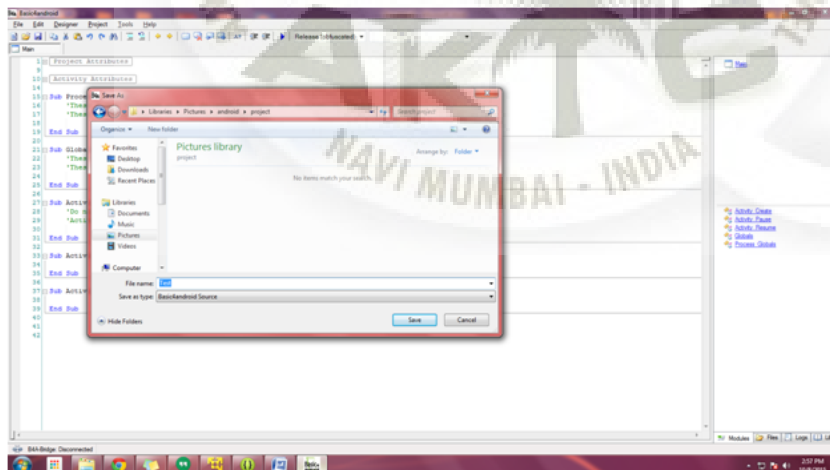


Figure 3.13: B4A Step2

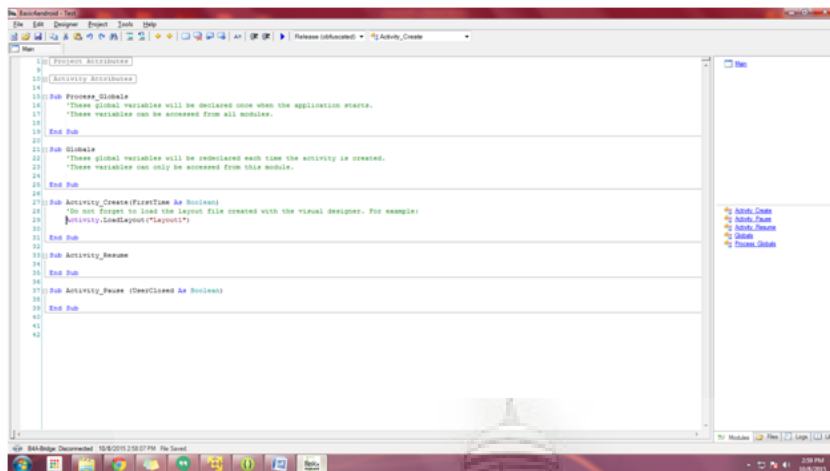


Figure 3.14: B4A Step3

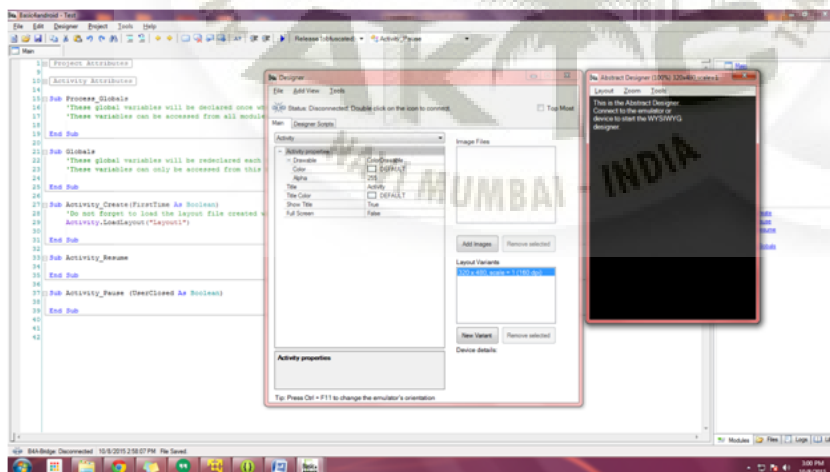


Figure 3.15: B4A Step4

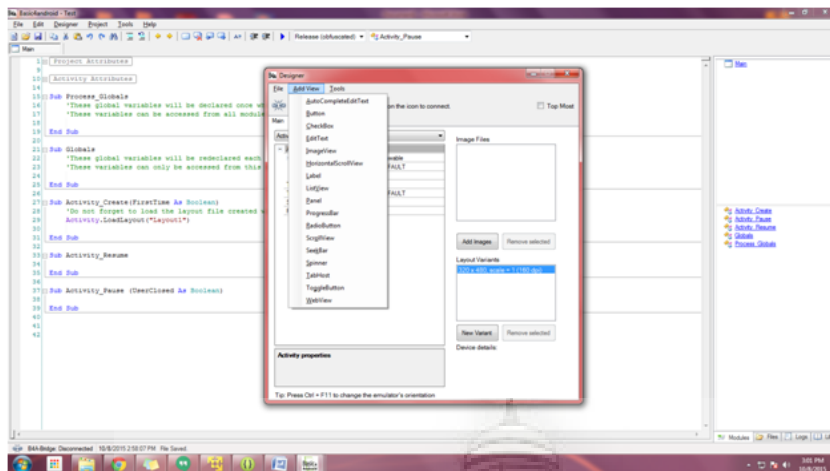


Figure 3.16: B4A Step5

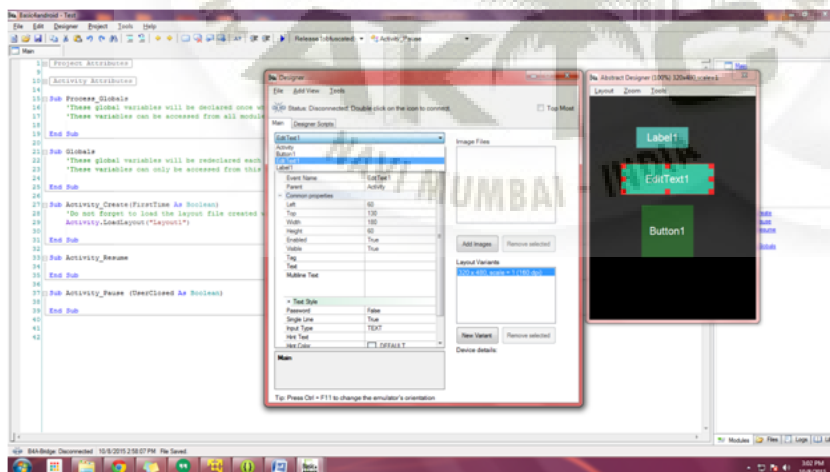


Figure 3.17: B4A Step6

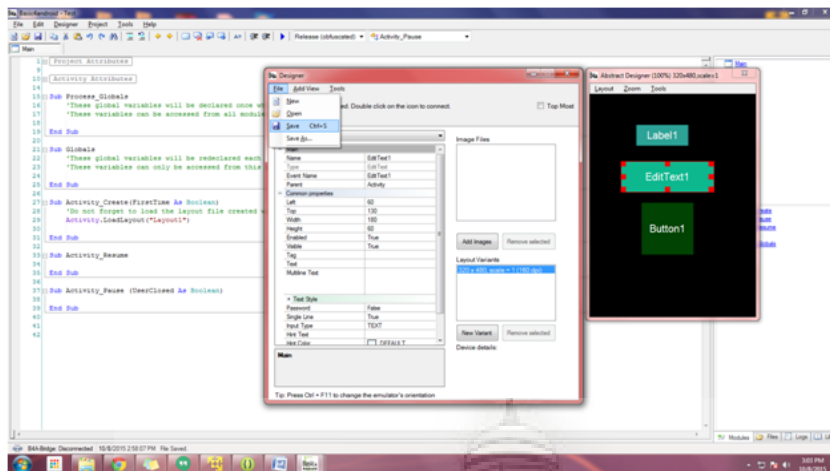


Figure 3.18: B4A Step7

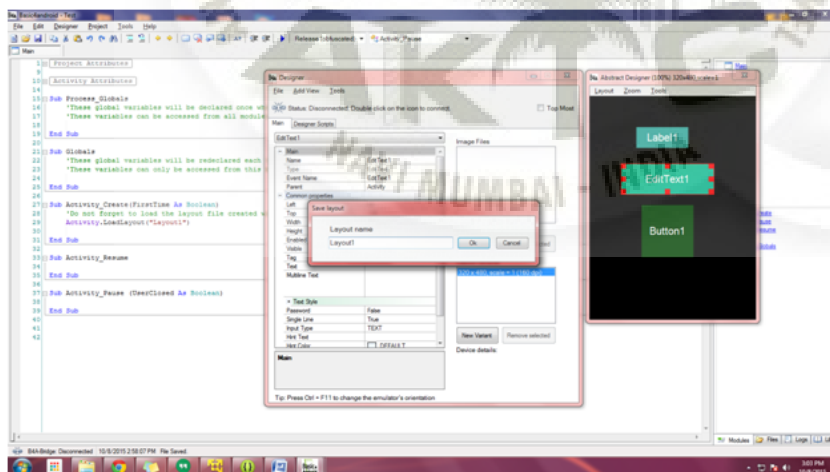


Figure 3.19: B4A Step8

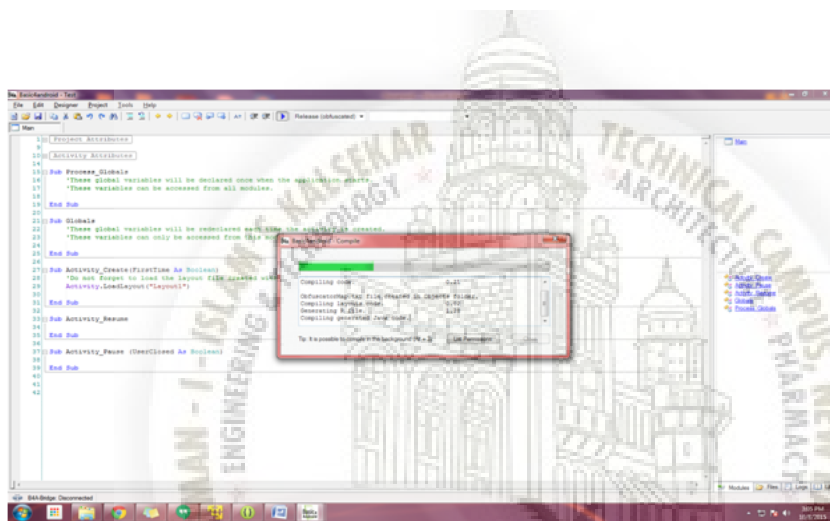


Figure 3.20: B4A Step9

Chapter 4

Interfacing Diagram

4.1 Interfacing Diagram

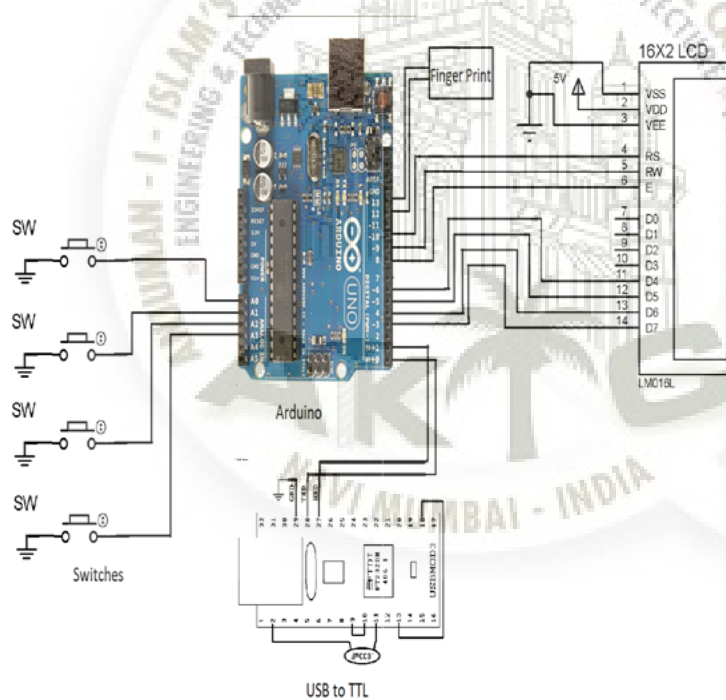


Figure 4.1: Interfacing Diagram

4.2 Flow of Working

1. Fingerprint and Face of the students along with id and name of the student have to be stored in the system.
2. There are 4 switches we are using to registered and recognized fingerprint.
3. LCD 16x2 we are using to display whether person is authorized or not.
4. 2 more USB to TTL using PC side to transmit data from MATLAB to VB.
5. MATLAB will generate ID for student and will transfer to VB using USB to TTL.
6. Students are supposed to place his finger in the fingerprint scanner, after fingerprint gets verified the student must scan his face in the camera connected to the PC.
7. Webcam will capture the face of students and comparison will be made with database.
8. If the face matches with the database then that student will be marked as present.
9. Lecture wise and Date wise report will be generated accordingly and stored in the PC where PC is acting as a server.
10. Parents can access the data of the student directly through the app by putting the id of the student whenever required, here the android phone is connected to the PC via WiFi and the network is Intranet.
11. If there is any error while putting an attendance the same will get notified in the VB output from the system.
12. We can store database of 4 students in the system.

Chapter 5

Software Design

5.1 Arduino

Installing Arduino Software On Windows XP,7,10

There are common Methods to get software is to download from www.arduino.cc

Install arduino ide setup. After installation open the software.

Go to tools select board as arduino uno.

Connect the arduino cable to arduino uno and laptop/pc.

Connect finger print module, lcd, swithces etc.

Type the code on main window save it. File will be saved by .ino extension

After programming is done in arduino software. First execute it to check error. If there is no error then upload the code. If there is error correct it and than upload.

Arduino Coding

```
#include <Adafruit_Fingerprint.h>
SoftwareSerial mySerial(12, 13); // RX, TX
#include <LiquidCrystal.h>
LiquidCrystal lcd(2, 3, 4, 5, 6, 7);

#define KEY_1    A0
#define KEY_2    A1
```

```
#define KEY_3    A2
#define KEY_4    A3

#define MAXSTUDENT          10
#define MAX_STUDENT_NAME_SIZE  15
uint8_t id;

char check_attendance = 0;
int base_ms = 0;

Adafruit_Fingerprint finger = Adafruit_Fingerprint(&mySerial);
uint8_t getFingerprintEnroll();

void setup()
{ Serial.begin(9600);

  pinMode(KEY_1,INPUT_PULLUP);
  pinMode(KEY_2,INPUT_PULLUP);
  pinMode(KEY_3,INPUT_PULLUP);
  pinMode(KEY_4,INPUT_PULLUP);

  lcd.begin(16, 2);
  lcd.setCursor(0, 0);
  lcd.print("    Biometric    ");
  lcd.setCursor(0, 1);
  lcd.print(" AttendanceSystem ");

  delay(5000);

  // set the data rate for the sensor serial port
  finger.begin(57600);
```

```

    if (!finger.verifyPassword())
    {
        lcd.setCursor(0, 0);
        lcd.print(" FINGER PRINT ");
        lcd.setCursor(0, 1);
        lcd.print(" MODULE ERROR ");
        delay(3000);
    }
}

void loop()
{
    if (!digitalRead(KEY_1)) register_student_id();
    if (!digitalRead(KEY_4))
    {
        if (check_attendance == 0) check_attendance = 1;
        else check_attendance = 0;
        delay(500);
    }

    delay(1);
    base_ms++;
    if (base_ms < 1000) return;
    base_ms = 0;

    if (check_attendance == 1)
    {
        check_for_attendance();
        lcd.setCursor(0, 0);
        lcd.print("MARK ATTENDANCE ");
        lcd.setCursor(0, 1);
        lcd.print(" ");
    }
    else

```

```
{    lcd.setCursor(0, 0);
    lcd.print("    Biometric    ");
    lcd.setCursor(0, 1);
    lcd.print(" AttendanceSystem");
}
}

int check_for_attendance(void)
{
    int p = finger.getImage();
    if (p == FINGERPRINT_NOFINGER) return p;
    char student_match_id = 0;
    char i = 0, id_number = 0;
//-----
    p = finger.image2Tz(2); //convert into binary
//-----
    for(i = 1; i <= 10; i++)
    { p = finger.loadModel(i);
      p = finger.createModel();
      if(p == FINGERPRINT_OK)
      { id_number = i;
        break;
      }
    }

    if(id_number != 0)
    { Serial.print(" ID");
// CC2500
      if(id_number < 10) Serial.print('0');
// CC2500
      Serial.println(id_number, DEC);
    }
```

```

    lcd.setCursor(0, 1);
    lcd.print("STUDENT ID:      ");
    lcd.setCursor(12, 1);
    lcd.print(id_number,DEC);
    delay(5000);
    return 0;
}

lcd.setCursor(0, 1);
lcd.print(" Student NotMatch");
delay(3000);
}

int register_student_id(void)
{ id = readnumber();
//GET IMAGE
  int p = -1;
  lcd.setCursor(0, 1);
  lcd.print("TAP FINGER ONCE ");
  while (p != FINGERPRINT_OK)
  { p = finger.getImage();
    delay(50);
  }
  // OK success!
//CONVERT IMAGE
  p = finger.image2Tz(1);

//WAIT FOR REMOVE FINGER
  lcd.setCursor(0, 1);
  lcd.print("REMOVE FINGER  ");
  delay(2000);
  p = 0;
}

```

```

while (p != FINGERPRINT_NOFINGER) {
    p = finger.getImage();
}
//TAB AGAIN
lcd.setCursor(0, 1);
lcd.print("TAP FINGER AGAIN");
p = -1;
while (p != FINGERPRINT_OK)
{ p = finger.getImage();
}
// OK success!
//-----
p = finger.image2Tz(2);
p = finger.createModel();
//STORE FINGER IMAGE
p = finger.storeModel(id);
lcd.setCursor(0, 1);
lcd.print("RegistrationDone");
check_attendance = 0;
delay(2000);
}

uint8_t readnumber(void)
{ uint8_t num = 1;

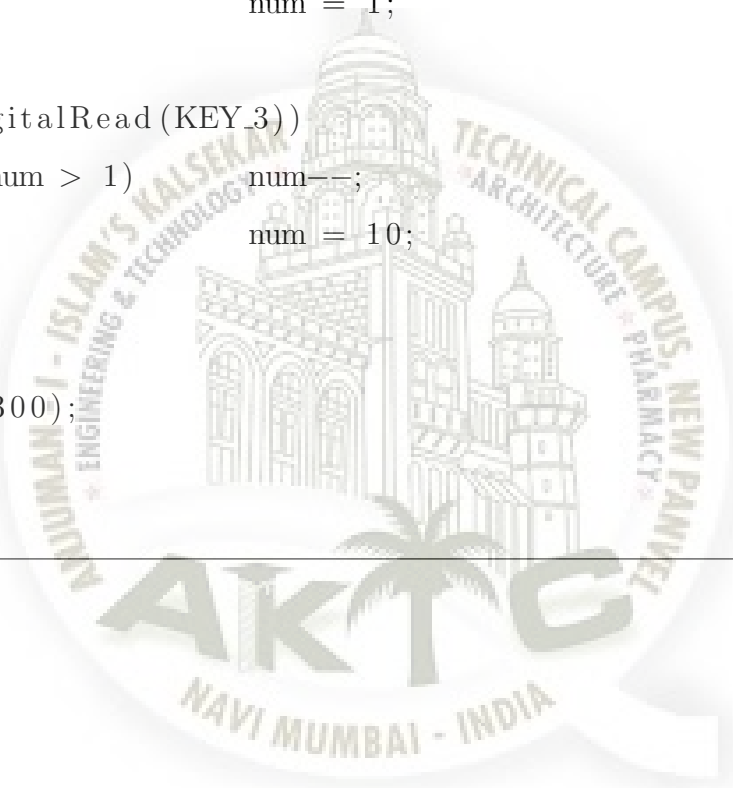
    lcd.setCursor(0, 0);
    lcd.print("STUDENT ID      ");
    lcd.setCursor(0, 1);
    lcd.print("  REGISTRATION  ");
    delay(1000);

    while (1)

```



```
{ lcd.setCursor(12, 0);  
  lcd.print("  ");  
  lcd.setCursor(12, 0);  
  lcd.print(num,DEC);  
  
  if(!digitalRead(KEY_1))      return num;  
  if(!digitalRead(KEY_2))  
  { if(num < 10)      num++;  
    else              num = 1;  
  }  
  if(!digitalRead(KEY_3))  
  { if(num > 1)      num--;  
    else              num = 10;  
  }  
  
  delay(300);  
}  
}
```



5.2 Matlab

Installing Matlab Software On Windows XP,7,10

There are common Methods to get software is to download from <https://www.mathworks.com>

Install Matlab R2015b setup. After installation open the software.

Type the code on main window save it. File will be saved by .m extension

After programming is done in matlab software. Execute it to check error. If there is error then corecct it and then run again.

Arduino Coding

```

clc
clear all
warning off
imaqreset
fid = fopen('text.txt', 'wt');%Opens text.txt as file for write
ser1 = serial('COM6');
ser2 = serial('COM4');
load('reg_face.mat')
st_menu = 'y';
tts('Welcome to Attendance System using Face Recognition.')
vidobj = videoinput('winvideo',1,'YUY2_320x240');
set(vidobj,'ReturnedColorSpace','RGB');
    % setting the properties of object
set(vidobj,'FramesPerTrigger',1);
set(vidobj,'TriggerRepeat',inf);
triggerconfig(vidobj,'manual');
videoRes = get(vidobj,'VideoResolution');
numberOfBands = get(vidobj,'NumberOfBands');
start(vidobj);
TrainDatabasePath = strcat(pwd,'\register');
while st_menu == 'y'

```

```

N = menu('Attendance system using Face and Finger Print ',
'Register ', 'Recognise ', 'Reset ', 'Cancel ');
if (N == 1)
    clc;
    tts('Kindly enter your name')
    r_name = input('Enter your name: ', 's');
    r_name = lower(r_name);

    if r_count == 0;
        r_entry = 0;
    else
        for i=1:r_count
            if (strcmp(r_name, face_db{i,1}))
                r_entry = 1;
                r_count1 = i;
                break
            else
                r_entry = 0;
            end
        end
    end
end

if (r_entry == 0)
    tts('Enter your 10 digit mobile number.')
    r_no = input('Enter your 10 digit mobile number: ', 's');
    r_no = lower(r_no);
    disp('Kindly show your Finger Print ');
    tts('Kindly show your Finger Print... ');
    stt = 'n';
    fopen('ser1')
    pause(5)
    while stt == 'n'

```

```

hel = ser1.BytesAvailable;
if hel >= 4
    stt = 'y';
    SP = fscanff(ser1);
end
end
fclose(ser1)

sttr = 'n';
while sttr == 'n'
    tts('Kindly show your face and
    press Enter when ready')
    preview(vidobj)%handleToImage)
    pause(5);
    r_face = input('Show your face ,
    Press Enter when ready: ','s');
    I = getsnapshot(vidobj);
    faceDetector = vision.CascadeObjectDetector();
    bbox = step(faceDetector, I);
    r_size = size(bbox);
    if (r_size(1,1) > 1)
        disp('Cannot register two faces. ');
        tts('Cannot register two faces. ');
    elseif (r_size(1,1) == 0)
        disp('No face detected. ');
        tts('No face detected ');
    else
        sttr = 'y';
        BRE = bbox(:, 1:4);
        r1 = BRE(1,1);
        c1 = BRE(1,2);
        r2 = r1 + BRE(1,3);
    end
end

```

```

        c2 = c1 + BRE(1,4);
        r_face = I(c1:c2,r1:r2,:);
        r_face = imresize(r_face,[200 200]);
        r_count = r_count + 1;
        face_db{r_count,1} = r_name;
        face_db{r_count,2} = r_count;
        face_db{r_count,3} = SP;
        face_db{r_count,5} = r_no;
        save('reg_face.mat','face_db','r_count');
        f_name = strcat(r_name,'_fac.jpg');
        imwrite(r_face,f_name,'jpg');
        movefile(f_name,'./register')
        disp('Registration done successfully.');
```

end

```

end
else
    tts('Name is already registered. Do you want to
        add face samples to make Training Strong?')
    r_select = input('Name is already registered.
Do you want to add face samples to make Training Strong?
    Press "Y" for yes and "N" to exit.','s');
    r_select = lower(r_select);
    if r_select == 'y'
        sttr = 'n';
        while sttr == 'n'
            tts('Kindly show your face and
                press Enter when ready')
            preview(vidobj%,handleToImage)
            pause(5);
```

```

r_face = input('Show your face ,
    Press Enter when ready: ','s');
I = getsnapshot(vidobj);
faceDetector = vision.CascadeObjectDetector();
bbox = step(faceDetector , I);
r_size = size(bbox);
if (r_size(1,1) > 1)
    disp('Cannot register two faces. ');
    tts('Cannot register two faces. ');
elseif (r_size(1,1) == 0)
    disp('No face detected. ');
    tts('No face detected. ');
else
    sttr = 'y';
    BRE = bbox(:, 1:4);
    r1 = BRE(1,1);
    c1 = BRE(1,2);
    r2 = r1 + BRE(1,3);
    c2 = c1 + BRE(1,4);
    r_face = I(c1:c2, r1:r2, :);
    r_face = imresize(r_face, [200 200]);

    temp_count = face_db{r_count1, 2};
    temp_count = temp_count + 1;
    face_db{r_count1, 2} = temp_count;
    save('reg_face.mat', 'face_db', 'r_count');
    f_name =
    strcat(r_name, '_fac', int2str(temp_count), '.jpg');
    imwrite(r_face, f_name, 'jpg');
    movefile(f_name, './register')
    disp('Updated face into Training set. ');
    tts('Updated face into Training set. ');

```

```
        end
    end
end
end

elseif (N == 2)
    clc
    if r_count > 0
        disp('Kindly show your Finger Print ');
        tts('Kindly show your Finger Print... ');
        stt = 'n';
        fopen('ser1')
        pause(5)
        while stt == 'n'
            hel = ser1.BytesAvailable;
            if hel >= 4
                stt = 'y';
                SP = fscanff('ser1');
            end
        end
        fclose('ser1')
        for i=1:r_count
            if (strcmp(SP, face_db{i,3}))
                rf_entry = 1;
                rf_count1 = i;
                break
            else
                rf_entry = 0;
            end
        end
    end
end
```

```

if rf_entry == 1
    disp('Finger Print identified.')
    tts('Finger Print identified.')
    rf_name = face_db{rf_count1,1};
    sttr = 'n';
    while sttr == 'n'
        tts('Kindly show your face
            and press Enter when ready')
        preview(vidobj)%handleToImage)
        pause(5);
        r_face = input('Show your face ,
            Press Enter when ready: ','s');
        I = getsnapshot(vidobj);
        faceDetector = vision.CascadeObjectDetector();
        bbox = step(faceDetector, I);
        r_size = size(bbox);
        if (r_size(1,1) > 1)
            disp('Cannot recognise two faces. ');
            tts('Cannot recognise two faces. ');
        elseif (r_size(1,1) == 0)
            disp('No face detected. ');
            tts('No face detected ');
        else
            sttr = 'y';
            BRE = bbox(:, 1:4);
            r1 = BRE(1,1);
            c1 = BRE(1,2);
            r2 = r1 + BRE(1,3);
            c2 = c1 + BRE(1,4);
            t_snap = I(c1:c2, r1:r2, :);
            t_snap = imresize(t_snap, [200 200]);

```



```

TrainFiles = dir(TrainDatabasePath);
t_snap1 = rgb2gray(t_snap);
Train_Number = 0;
Euc_dist = [];
for ij = 1:size(TrainFiles,1)
    if not(strcmp(TrainFiles(ij).name, '.' )|
        strcmp(TrainFiles(ij).name, '.. ')
        |strcmp(TrainFiles(ij).name, 'Thumbs.db'))
        Train_Number = Train_Number + 1;
        % Number of all images in
        the training database
        str = strcat(TrainDatabasePath ,
            '\', TrainFiles(ij).name);
        img = imread(str);
        db_snap = rgb2gray(img);
        temp_cmp = corr2(t_snap1 , db_snap);
        Euc_dist = [Euc_dist temp_cmp];
    end
end
[Euc_dist_min , Recognized_index]
= max(Euc_dist);
Recognized_index = Recognized_index + 2;

OutputName =
    TrainFiles(Recognized_index).name;
k = strfind(OutputName, '_ ');
FinalName = OutputName(1:k-1);
for i=1:r_count
    if (strcmp(FinalName, face_db{i,1}))
        vb_att = face_db{i,2};
    end
end

```

```

        vb_att1 =
            strcat('ID0',int2str(vb_att));
        fprintf(fid , vb_att1);
        disp(vb_att1)
        fopen(ser2);
        pause(1)
        fprintf(ser2 , vb_att1);
        pause(1)
        fclose(ser2);
        break
    else
        r_entry = 0;
    end
end
if (Euc_dist_min > 0.4)
    %Recognise factor
    disp('Face Recognised')
    tts('Face Recognised')
    dd = strcat('Welcome , ', FinalName);
    disp(dd)
    tts(dd)
else
    disp('Face did not matched with
        database.')
    tts('Face did not matched
        with database.')
    disp('Transaction Failed.')
end
end
end
else

```

```
        disp('Finger Print not registered')
        tts('Finger Print not registered')

    end

else
    disp('Kindly Register atleast one user.')
    tts('Kindly Register atleast one user.')
end

elseif (N == 3)
    clc
    face_db = cell(10,5);
    for i=1:10
        face_db{i,4} = 1000;
    end
    r_count = 0;
    save('reg_face.mat','face_db','r_count');
    disp('Reset of Matlab DataBase done.
    Kindly delete photos from Register Folder.')
    tts('Reset of Matlab DataBase done.
    Kindly delete photos from Register Folder.')
elseif (N == 4)
    clc
    st_menu = 'n';
    fclose(fid);
end
end
```

Chapter 6

Advantages and Applications

6.1 Advantages

Timely updates of student can be sent to their parents. Attendance marking and report generation becomes easy.

Reduce paperwork and save time and money with mobile and cloud-based attendance management system.

Eliminate duplicate data entry and errors in time and attendance entries.

6.2 Applications

Fingerprint and face detection based attendance management system project can be used by the employees, staff or workers in various industries like Automobile industries, manufacturing industries.

Software development companies.

Chapter 7

Results

7.1 Hardware Pic

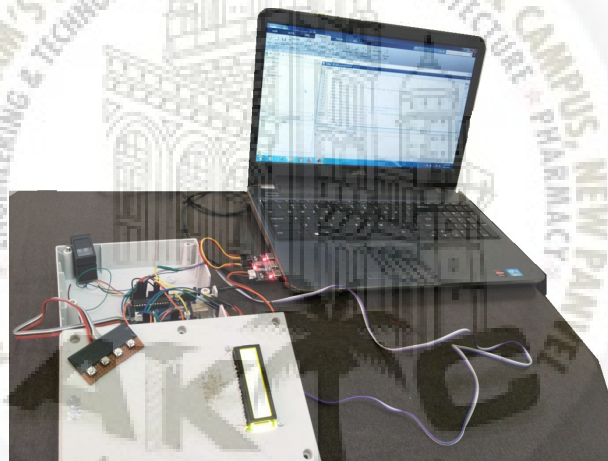


Figure 7.1: Hardware Pic

7.2 Results Obtained

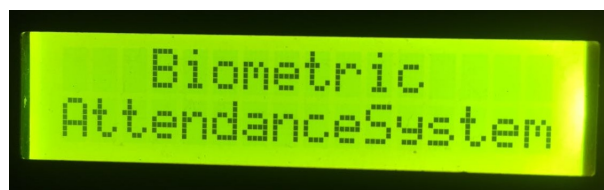


Figure 7.2: Biometric Attendance

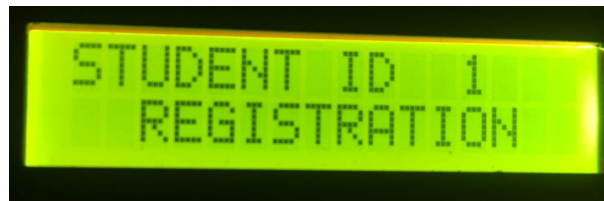


Figure 7.3: Biometric Registration



Figure 7.4: Biometric Registration



Figure 7.5: Biometric Registration



Figure 7.6: Biometric Registration

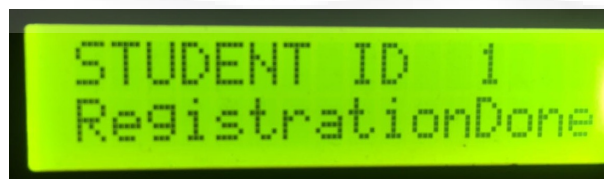


Figure 7.7: Biometric Registration



Figure 7.8: Mark Attendance

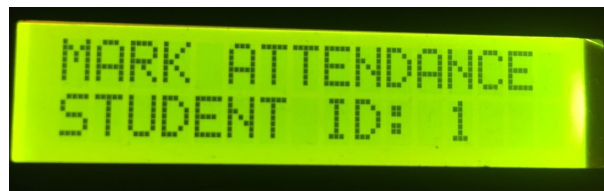


Figure 7.9: Mark Attendance

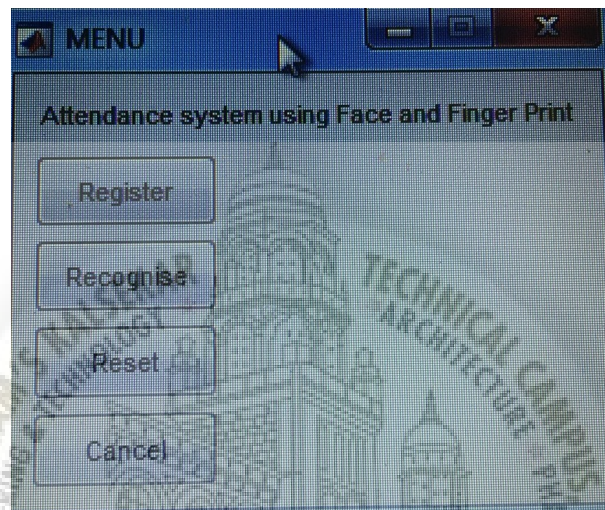


Figure 7.10: Matlab

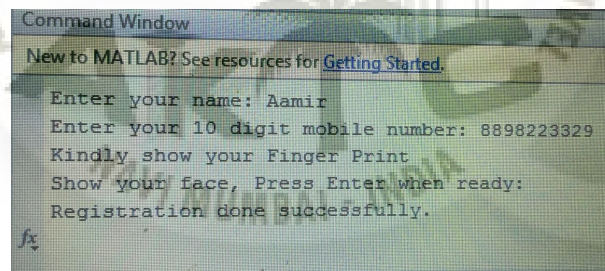


Figure 7.11: Face Registration

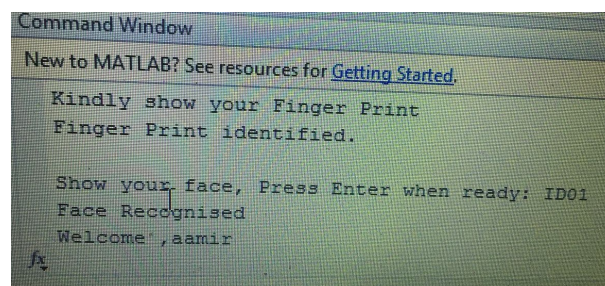


Figure 7.12: Biometric and Face Recognition

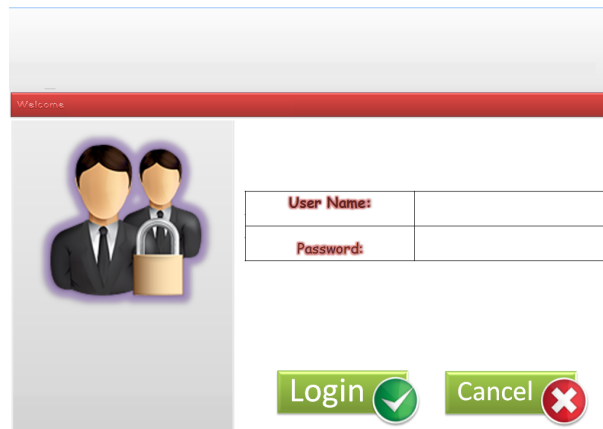


Figure 7.13: Login Page of VB

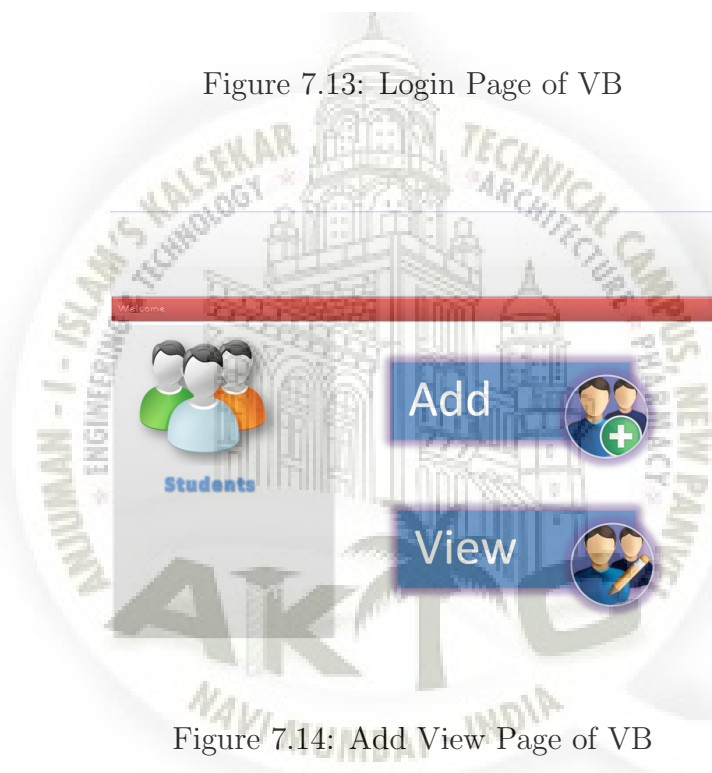


Figure 7.14: Add View Page of VB

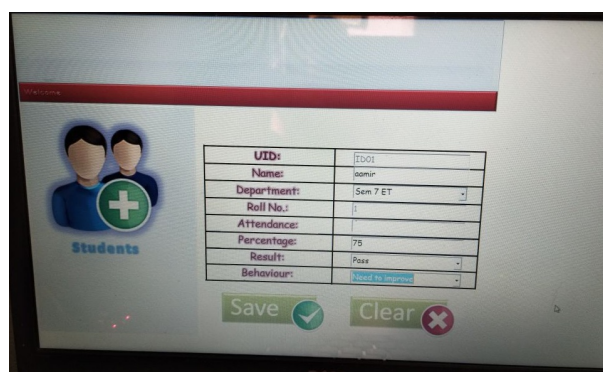


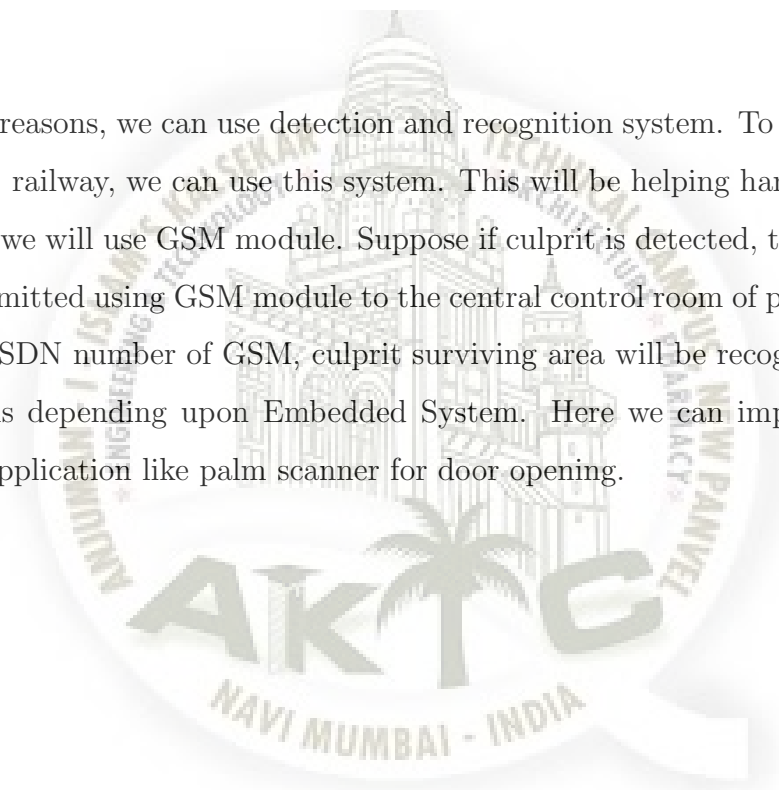
Figure 7.15: Entering details in Vb

Chapter 8

Future Scope

For security reasons, we can use detection and recognition system. To identify culprits on bus stations, railway, we can use this system. This will be helping hand to the police. In this system, we will use GSM module. Suppose if culprit is detected, then detected signal can be transmitted using GSM module to the central control room of police station. With the help of ISDN number of GSM, culprit surviving area will be recognized.

Our future is depending upon Embedded System. Here we can implement with other biometrics application like palm scanner for door opening.

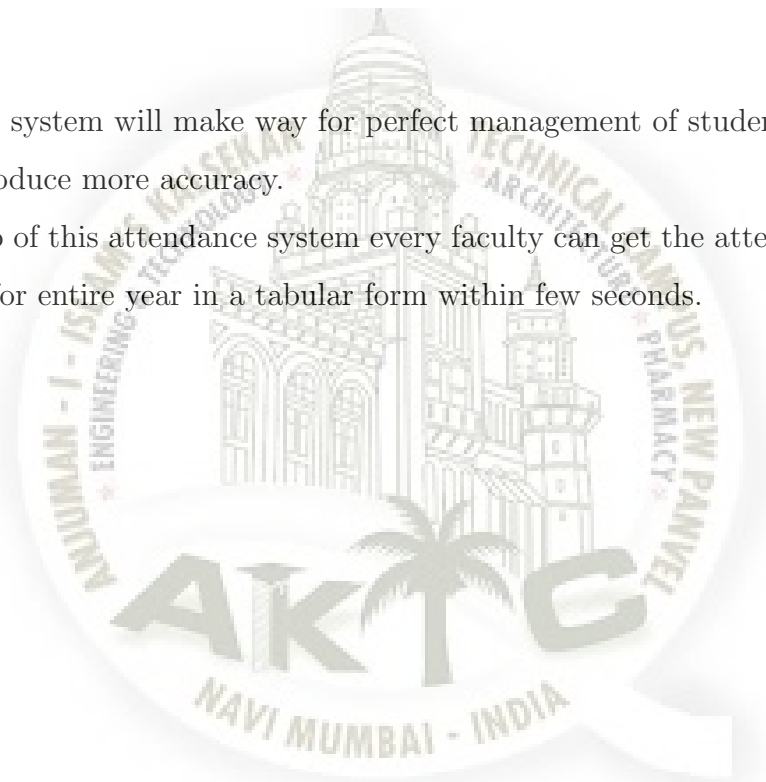


Chapter 9

Conclusion

The proposed system will make way for perfect management of students and staff attendance and produce more accuracy.

With the help of this attendance system every faculty can get the attendance of a particular student for entire year in a tabular form within few seconds.



References

1. E.Varadharajan,R.Dharani, S.Jeevitha, B.Kavinmathi, S.Hemalatha ,Automatic attendance management system using face detection, International Conference on Green engineering and technologies,19 Nov 2016.
2. M.A. Meor Said, M.H. Misran , M.A. Othman, M.M. Ismail, H.A. Sulaiman, A. Salleh, N. Yusop, Biometric Attendance, International symposium on Technology Management and Emerging Technologies,May 27-29 2014.
3. Samuel Lukas, Aditya Rama Mitra, Ririn Ikana Desanti, Dion Krisnadi, Student Attendance System in classroom using face recognition technique, ICTC 2016.
4. <http://learning.grobotronics.com/getting-started/arduino/>
- 5.<https://www.sunrom.com/p/finger-print-sensor-r305>
6. <http://www.ftdichip.com/Products/Cables/USBTTLSerial.htm>
7. www.vishay.com/docs/37217/016m002b.pdf
8. <https://www.coursehero.com/file/17865185/LCD-16x2/>

Certificates

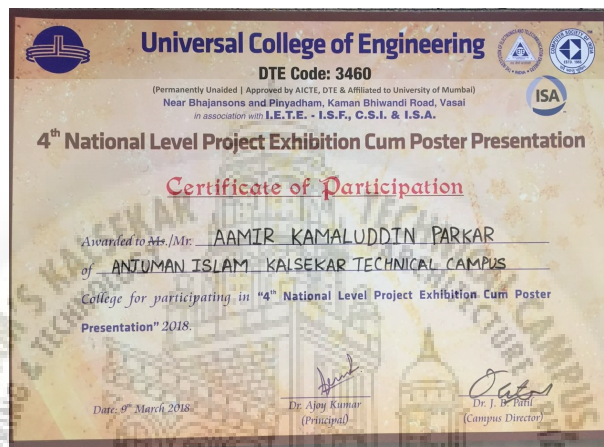


Figure 9.1: Certificate 1 Parkar Aamir



Figure 9.2: Certificate 2 Choudhary Maksud



Figure 9.3: Certificate 3 Momin Rehan



Figure 9.4: Certificate 4 Mansuri Aamir