

Automatic Tracking and Attendance Analytics Using Bluetooth and Face Detection

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Abstract: Research on “How to create a fair, convenient attendance management system”, is being pursued by academics and government departments frequently. Manual checking of professor’s presence or attendance in the classroom in their respective class hours has been causing disturbances due to opening of doors and it is prone to personal errors. Other methods of taking attendance are RFID cards, biometric identifiers like fingerprint, face recognition, palm print hand geometry, iris recognition etc. In this paper we propose attendance system based on Bluetooth and Face recognition. Here the basic idea is, to have the attendance of students in colleges or employees in the organization; they have to switch on their Bluetooth device (mobile phones/Bluetooth tag). Face recognition is an easy task for humans. Experiments in have shown, that even one to three day old babies are able to distinguish between known faces. It turns out we know little about human recognition to date. Are inner features (eyes, nose, mouth) or outer features (head shape, hairline) used for a successful face recognition which should be previously registered in the database.

Keywords: Open CV, GTK window, Eigen face, MAC address, GSM900 module, Raspberry pi 2.

I. INTRODUCTION

Attendance is for keeping records of number of students present in schools, colleges or in any organization. It is very important strand in maintaining discipline among employees in an organization and imparting quality education in schools, colleges. Using RFID and Biometrics to take attendance has disadvantages like time consumption, proxy etc. So in our paper we are proposing the system to take attendance in less time and to avoid proxy. In this paper we take the attendance using Bluetooth and Face detection. Here the basic idea is, to have the attendance of students in colleges or employees in the organization, they have to switch on their bluetooth device (mobile phones/bluetooth tag) which should be previously registered in the database

In together with Bluetooth we are using face detection to avoid proxy. The image samples of students or employees should be registered in the database. The camera will take the photo and photos are compared with the images stored in the database. The Bluetooth devices detected after scanning and the photos captured are compared to take the attendance.

In this paper using GSM900 module to send the details regarding presence or absence of students or employees to the particular stake holders.

II. BACKGROUND

RFID & Finger print based attendance system are available in the current market. This system are used anywhere like as government office, hospital, college, companies. Also this system is too costly and high annual maintenance cost also [1] Radio-frequency identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. The technology requires some extent of cooperation of an RFID reader and an RFID tag.

Various fingerprint matching systems have been proposed which emphasizes on minutiae information, local ridges. The skin on our palms and fingers exhibits a flow like patterns of ridges and valleys.[2] The papillary ridges on the finger, called friction ridges, which help the hand to grasp objects and increase friction and improve the tactile sensing of the surface structure. These ridge patterns are now scientifically proved as unique for each person.

The cuts and burns in a person’s finger may alter these patterns temporarily but they reappear after the injury heals. Fingerprints are now used widely for identification and verification purpose. They are used for attendance purpose in organizations to avoid proxy for criminal identification like terrorist, murderer and violators and also in passports (a matter of national high importance) of person.

III. PROPOSED SYSTEM

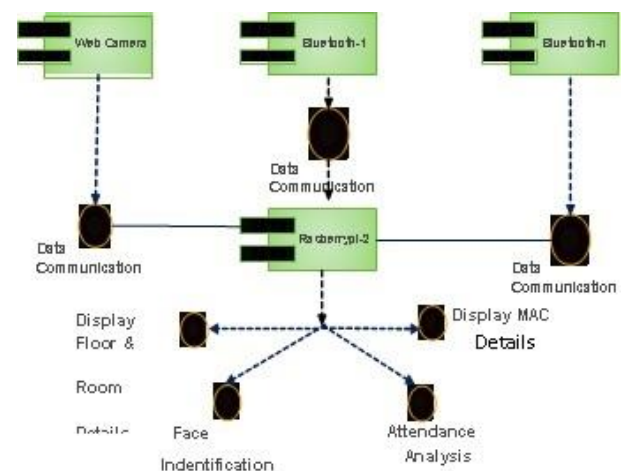


Fig 1. Block Diagram of the Proposed System

The setup is shown in the above figure. In each class room there will be a tracking device. [3]The tracking Bluetooth devices are mounted on the walls of the building at various rooms that needs to be tracked. When a person walks in to the room with Bluetooth device, it will be connected to tracking Bluetooth device and the person location will be identified. All the tracking devices are connected to central ARM based board which will track the persons based on tracking devices location.

The tracking device will have Bluetooth dongle installed, and Ethernet interface and an optional Wi-Fi dongle. Wi-Fi will be used in case Ethernet is not used. All the tracking devices in the campus will be connected to central device using either Ethernet or Wi-Fi based on distance from tracking device to central device.

The [4] Bluetooth in the tracking device will be programmed to scan the area of its range, and try to capture the other Bluetooth devices like smart phones that are switched ON. That means the scanner will capture the MAC addresses and names of the devices. The tracking devices then collect the MAC address, name and send them to board.

The main controller will receive data from all the tracking devices. The data include MAC address, Names of the students. The raspberry board will be registered with class room and students name in the database. The main controller will compare the received data with registered data in the database. For example if class A is registered with 10 students names and for the period from 10AM to 11AM then the board will compare the data from database, if main device receives only 8 names then the main device will find out two students are absent and store the attendance status.

The raspberry board will display the layout of college floors with class rooms on the monitor using a GTK Window. When main control device receives student names and MAC address from tracking devices it will display the MAC address and Names of the student on respective class room layout. The tracking device will scan the area every five seconds and send the data to database. The raspberry board immediately displays the data on the layout.

After the bluetooth scanning camera module will start identifying the faces by continuous video streaming using [5] OpenCV image processing library. Here it takes continuous frames of the faces and processing it in a loop so it seems to be like a live streaming.

For [6] image recognition we are creating a database of images of every individual students by creating a separate folder for each students. This folders contains 10-12 samples of faces of each student at different angles and with different lighting conditions. This

folder also contain a text file which has the bluetooth device name and the name of the student.

With this image folders there is also a test folder where the faces in the real time captured images are cropped and stored in this folder for further processing. This images will be cropped using background subtraction algorithm and Haar cascade algorithm is used for comparing of the images. The comparison is done at gray scale level, In gray scale level the images are converted from colour to the black & white format.

Comparison is done in such a way that the faces captured from the real time image which is stored in test folder is compared with the every image files stored in the database if the match is found then the text file stored in the corresponding folder is again compared with the bluetooth statistics. If both are matched then the attendance is marked as present, or else absent.

This attendance status is stored as the text file in the memory. The server is connected with GSM900 Module which is can be used to send the attendance status of students to concerned stake holders.

IV. IMPLEMENTATION

USER: Here user represents the students in the college or employees in the organization. They are supposed to carry the bluetooth device.

BLUETOOTH DONGLE: Bluetooth dongle is interfaced with the raspberry pi 2 board. It will scan for available bluetooth devices in that area.

Usb Camera: USB camera is interfaced with the raspberry pi 2. The camera will capture the images of the students or employees which is required for attendance.

Raspberry Pi 2: Raspberry pi 2 works as a server. All the processing is done using Raspberry pi 2 board.

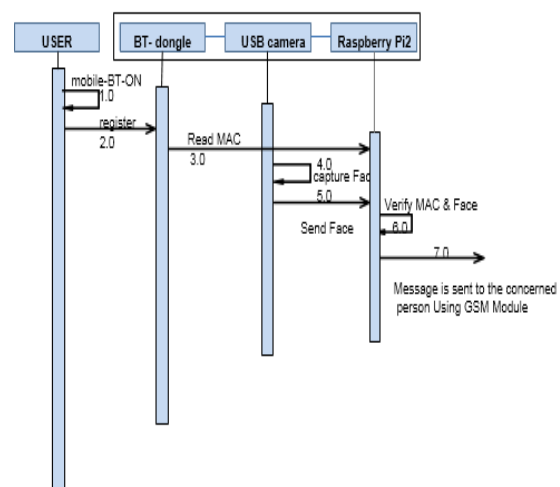


Fig 2. Sequence Flow Diagram

V. CREATION OF GTK WINDOW AND DISPLAYING THE DATA

Start is the starting point for the creation of GTK window. Next step is to initialize the GTK window. Next is to create the drawing area which means dividing the whole layout into coordinates and based on this coordinates we will create the GTK window. Next is to take the input from camera and dongle. Comparing using database and processing is done using raspberry pi 2 board. This result is displayed on the layout. This will be continuously updating

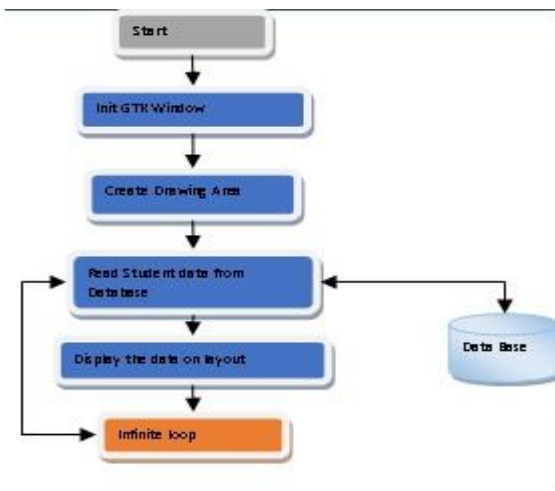


Fig 3. Location display Thread

VI. ADVANTAGES

- The proposed system is able to track students all the time in the class and maintain the record on this.
- Students or employee can't make any proxy of attendance in the campus/ organization.
- System is quite intelligent to pass the information to concerned stake holders about attendance status through GSM so it can be used in educational institutions.

VII. RESULTS

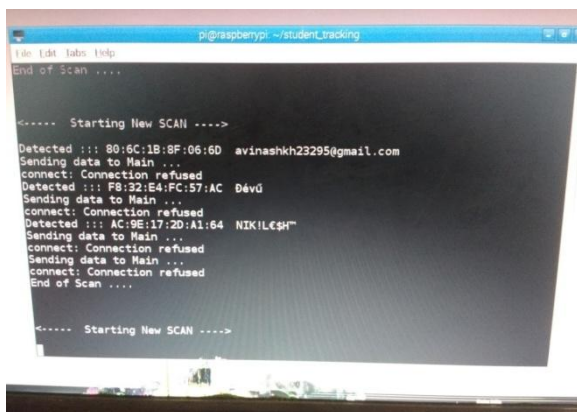


Fig 4. Bluetooth Scanning

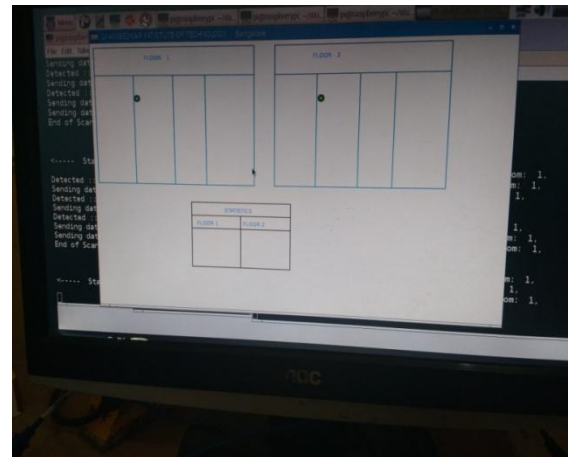


FIG 5. GTK Window

VIII. CONCLUSION

The current system RFID based attendance system is not quite enough to manage the proper record of the student or faculty of the college. Infact Finger print is not reliable or cost effective.

The approach introduced don't need multiple device to setup in the campus like Finger print or RFID Scan machine .Our System is more reliable and cost effective and low maintenance also .In the current approach we are able to track the no of user based on the blue tooth device .Every user must carry mobile with blue tooth on which may be basic handset .Here we have seen that we are able to minimize the proxy user by using object detection in the class room with

web camera .the main controller is the raspberry pi 2 is used with the 1GB RAM and 900MHZ as an operating frequency.

IX. REFERENCES

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