Biometric Students Attendance System Using Raspberry Pi

Ankita U. Bhurke[1], Bhagyashri V. Tambade[2], Laxmi R. Patil[3]
[1, 2, 3] Student IT Dept FAMT, Ratnagiri

Abstract- *The attendance system is on paper in colleges which is traditional method. In this old system attendance sheet is provided to all students for marking attendance in form of signature for uniquely identification. Raspberry-pi, Open source cloud platforms. In this current system chances of making proxies are more i.e. if any student is absent but his/her friend whom knows the signature of absent one, can easily make his/her signature. Due to which our system causes problem if any wrong happens with anyone who's absent. The system is blamed for any problems occurred. Hence the attendance system must be advanced accordingly. Time waste over responses of students, waste of paper etc. is the disadvantages of manual attendance system. The system we are going to design is based on biometric authentication using Raspberry 3, python and open CV platform. In this system fingerprint authentication is being used. Every students fingerprint will be collected in a database. The kit will be provided to students for giving their thumb impression on the fingerprint sensor. This sensor will take an image of the thumb and then with help of open CV platform & python scripts, image processing will be done. If the image gets matched with the previously stored database then the attendance will be marked before his/her name.*

Keywords- Image Processing, Pattern recognisation and Matching algorithms.

I. INTRODUCTION

This project consists of the development of low-cost and competitive security environment of fingerprint recognition based on a GT (511C1R) device, and embedded into a Raspberry Pi B+) with Raspbian Linux. This work presents a preliminary study about the viability of integrating a fingerprint device and a Raspberry with Linux into the same framework and, at the same time, providing a user interface by web server. This first prototype called Finger Scanner, is security system that provides the users a means to be validated by using a fingerprint scanner. This manuscript can be the basis for other possible projects that encourage Raspberry and similar board's developers to create interesting projects about accessibility, security, etc. Finger Scanner can be used then to build much more complicated systems on top of it. However, we are interested in focusing our attention on designing an efficient prototype with a competitive performance. Combined with low-cost fingerprint scanners. Nowadays some enterprises in the sector of cash handling that use finger-print sensors complain about the fingerprint tools and sensor cost. So, our project is on the basis of the low-cost systems based on fingerprint sensors.

II. RELATED WORK

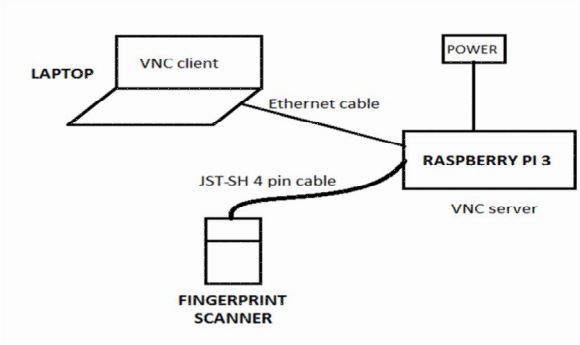

Fig 1. Proposed system

In this system we used raspberry pi hardware module which attaches a fingerprint scanner to get fingerprints which is used for authentication. This system provides security in authenticating a student attendance and doesn't allow to make proxies. The system will scan the fingerprint with the help of the fingerprint scanner which will be attach to hardware device, after scanning the processed image will be matched with the stored database. The result obtained by matching will be displayed to the monitor/LCD.

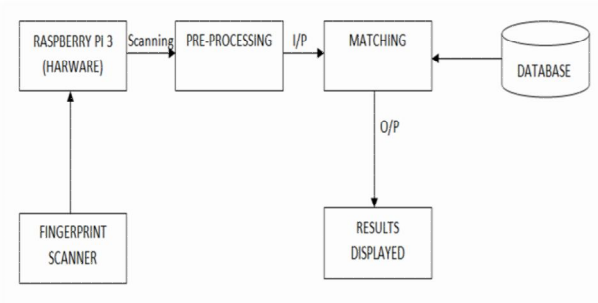

Fig 2. Methodology

III. SYSTEMS

Details of hardware and software:

3.1 Hardware Requirements:

This project requires some hardware components such as Raspberry pi, Fingerprint sensor and power supply.

3.1.1Raspberry pi

The design of this project uses Raspberry pi 3 B. Raspberry Pi is a single board computer with Linux or other small operating systems. It was created by Raspberry Pi foundation in UK for the use of computer science education. The second version of the Raspberry Pie used in this project.Raspberry pi consists of an ARM 1176JZF-S processor, which runs at 700MHz clock speed, 512MB SDRAM shared with GPU, a Video Core IV GPU, 2 USB port, 1 100 M bit/s Ethernet port, one video and audio output, one HDMI output. It also has 26 pins including 8 General purpose Input/output(GPIO), one SPI bus, one I2C bus, one UART bus and3.3V, GND and 5V.The Raspberry Pi needs an external Secure Digital(SD) card to store its operating system and also all the user data. So, it can be used as a really powerful microcontroller which can accomplish almost any functions, and also it can act as a normal use computer with keyboard, mouse and monitor connected.

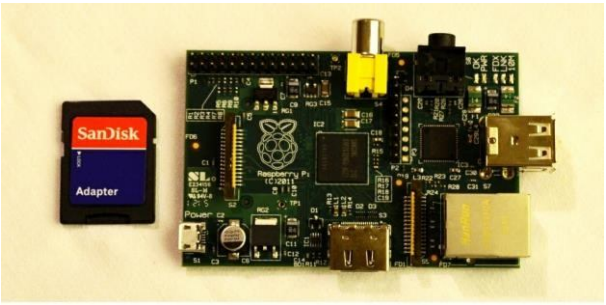

Fig 3. Raspberry pi

3.1.2Fingerprint sensor:

This device uses 4-pin connector to communicate with the Raspberry. We chose the Fingerprint Scanner Device GT 511C1R as it is very cheap and provides a well-documented manual, a Linux compatible module as well as a low cost relation. GT511C1R which has a more memory capacity. The module can backlog up to 200 distinct fingerprints and is now capable of 360° recognition. The on board JST-SH connector has 4 signals are Vcc, GND, TX, Rx.

Fig 4.Fingerprint sensor

3.1.3 Power supply:

The power supply on Raspberry pi is easy. This uses a Micro USB connection to power itself and the micro USB connection ability of supplying at least 700mA at 5v. Apparently normal mobile phone charges are applicable and do not efforts to power of Raspberry pi from a USB port of another computer or hub because they are frequently incapable of supplying the required current.

3.2 Software Requirements:

Python is a extensively used high-level, general-purpose, interpreted, dynamic programming language. Its design conception accent code readability, and its syntax allows programmers to express concepts In less lines of code than possible in languages such as C++ or Java. The language provides constructs advise to enable clear programs on both a small and large scale. Python supports various programming criterion, including object-oriented, compulsory and functional programming procedural styles. It features a dynamic type system and automatic memory management and has a large and absolute standard library.

IV. ACKNOWLEDGMENTS

I would like to intend my sincere gratitude towards my guide, Prof. Amar Palwankar, for the help, guidance and encouragement, he provided during my project work. This work would have not been possible without his valuable time, patience and motivation. I thank him for making my stint thoroughly pleasant and enriching. It was great learning and an honor being her student. I would also like to thank our Principal Dr. Kaushal Prasad, H.O.D. Dr.Vinayak Bharadi, and associate professor Prof.S.V.Jadhav, for encouraging me and supporting me. I am deeply indebted to the entire team in the Information Technology Department. I would also like to express gratitude to my colleagues for their valuable guidance and co-operation as and when needed. At last I would like to

thank all the helping hands which directly or indirectly helped me in my project.

REFERENCES

[1] https://www.raspberrypi.org
[2] https://www.raspberrypi.org/forums/viewtopic.php?f=61&t=74178
[3] https://github.com/QuickGroup/pyGT511C3
[4] https://github.com/Jucker/SIPIntercom-with-FPS
[5] https://raspberrypi.stackexchange.com/questions/44176/connection-guide-for-gt-511c3-fingerprint-scanner-andraspberry-pi-2-model-b
[6] https://github.com/zafartahirov/fingerpi
[7] https://github.com/QuickGroup/pyGT511C3
[8] https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&uact=8&sqi=2&ved=0ahUKEwizx7WW2qTVAhXGUrwKHazXBhwQtwIINzAD&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DLn0JUmccjjk&usg=AFQjCNEpL3MGLGbq4AgieO7bA5AgBrEXzg
[9] https://github.com/the-AjK/GT-511C3
[10] https://startingelectronics.org/articles/GT-511C3-testing/
[11] https://pypi.python.org/pypi/pyGT511C3
[12] http://ijtet.com/wpcontent/plugins/ijtet/file/upload/docx/525IJTET0502001pdf.pdf
[13] http://www.mdpi.com/1424-8220/16/2/220/pdf
[14] http://www.sciencedirect.com/science/article/pii/S1877050916001745