

BIO-METRIC ATTENDANCE AND BILL GENERATOR

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Abstract: Bio-Metrics have been the game changers over the past years, this paper is presented about a system that is capable of efficiently performing dual role, the proposed system can monitor student's attendance using Bio-metric verification for marking attendance and also eliminates the need for writing permission letters at schools and colleges, by generating a bill, that replaces the old-fashioned letters used to get permission from the authorized personnel. As mentioned above our system performs two tasks i.e., by default it marks (present) to the students if they access the system using their finger print, the bill is generated only if requested by the ward for a specific reason.

Index terms: fingerprint, attendance management, enrolment, authentication, GSM module, thermal printer

I. INTRODUCTION

Over a period of time Biometrics has gained popularity and has proved itself to be a reliable method of ensuring privacy, maintaining security and identifying individuals in a very efficient manner. In the past decade fingerprint processing has grown tremendously and many algorithms have changed as per the latest technology. Accuracy and reliability are the two most important parameters when it comes to biometric applications, Fingerprint verification is preferred for its simplicity and good levels of accuracy. Hence in this module finger print based system is being proposed. This proposed system has to be placed in every class or in every department; students should verify their fingerprint to mark attendance and also can generate a bill if required. The fingerprints of the students should be enrolled prior to the process and the student fingerprint along with details like name, class, department, parent's phone number are stored in the onboard memory of the Arduino. Everyday within a mentioned time, whenever a student accesses the system with their fingerprint, attendance is marked are present by default and if the timed out all the entries are marked as absent. The other distinct and Special function of this proposed system is that it can generate bills that replace the old-fashioned permission letters for defaulters, who always forget their ID cards and other possible reasons. They can mention the required reason for the bill, fully automated and predefined wordings are printed along with the student's details every student can generate three bills for a semester, above which their parents will intimated-via-SMS. The figure.1 shows the time difference in manual attendance and fingerprint-based attendance system.

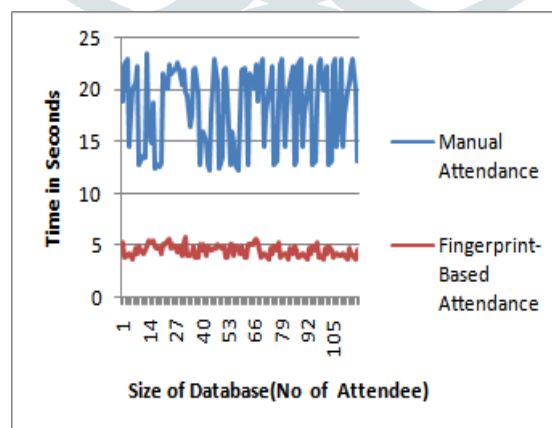


Fig.1 Manual Vs Finger Print Based Attendance

I. INTERGRAED BIO-METRIC ATTEDANCE AND BILL GENERATOR SCHEMATIC

Figure.2 shows the blocks associated with this module. The finger prints from the various users are acquitted using the fingerprint module. For example, we are taking the samples of three or four fingerprints and they are enhanced using several enhancement techniques after that we detect the edges along the image using the edge detection function. Here we use the pewit operator for the detecting the edges. We use finger print images. Instead of doing all these image processing works, we had used Fingerprint Module (R305) in this paper. The circuit is made to be switched ON and all the initialization processes are done. The “Initialization done” message has to be displayed in the screen. Up to that user should not keep any fingerprints for scanning. After that “Show the Finger” will be displayed on the screen.

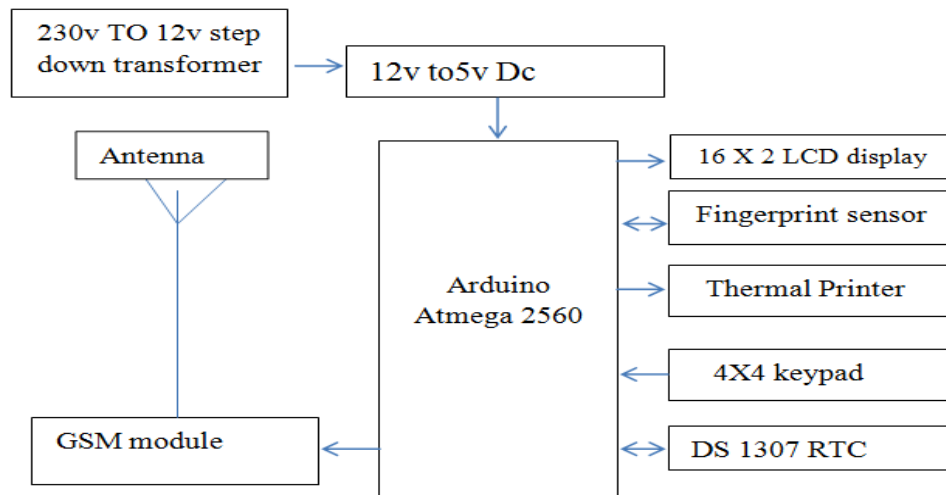


Fig .2 Generalized functional Block Diagram of Bio-Metric Attendance and Bill Generator.

The fingerprint that has to be compared is already stored in the memory of fingerprint module. The fingerprint module is capable of storing about 100 images in the inbuilt memory. Now the fingerprints are kept for scanning with in a stipulated time period. Fingerprint module started to compare the results and it gives the hex codes to the microcontroller for further operations. The microcontroller starts to send the control to GSM based on the results from the finger print module. But the microcontroller has only one transmitter pin in it. We have to communicate both of the GSM and fingerprint module but not at a time. For that we are using Relay for switching between the GSM and fingerprint module. There are also commands for holding the fingerprints and for comparing it. The person whose fingerprint is matched and there will not be any SMS send to those persons. The persons whose fingerprints were not kept were taken and SMS will be sent only to those numbers. If the fingerprint of an unknown person is kept for scanning then the scanning will not take place. If unknown persons fingerprint is kept then the message “Not Identified” will be displayed. With the help of this the parents can be known about their arrival of the Students to the college or school. The fingerprints are one of the greatest authentication systems where students cannot forge very easily. This can be practically implemented by extending the time period and student’s attendance can be managed.

I. IMAGE PROCESSING DESCRIPTION

3.1 Image Acquisition

The Fingerprint images from various users are taken using the module. The finger module itself has an internal memory which can store about 100 images in it. These images are used for the enhancement in next stages.

3.2Image Enhancement

The image is enhanced using the techniques like Histogram Equalization. It is nothing but the graph plot for number of pixels against the gray level. The overall contrast of the image is made uniform and image looks enhanced. Now the image is suitable for the extraction of minutiae extraction.

3.3 Edge Detection

They are many operators used for detecting the edges. The operators are Prewitt, Laplacian, Sobels and Robertson Operators. The Prewitt operator is one of the best edge detecting operator and we are implementing Prewitt operator in this paper. The edges have to be detected in order to match the input image with already saved image. There are two types of masking used here. They are, horizontal and vertical masking

Edges are calculated by using difference between corresponding pixel intensities of an image. All the masks that are used for edge detection are also known as derivative masks. Because as we have stated many times before in this series of tutorials that image is also a signal so changes in a signal can only be calculated using differentiation

3.4 Extraction of Miniature Points and Matching

After the extraction of edges, the points are marked in it. Those points which are detected after edge detection are known as miniature points. The miniature points that are extracted are compared with already stored images. In order to find the matching process, the correlation factor and the Euclidean distance has to be found out. Based on the tolerance value the matching results can be found out.

II. GSM MODULE

We have majorly two types of SIM modules. They are SIM 300 and SIM 900. Here the SIM 300 is enough for our purpose. SIM 900 is used for some advanced purposes and it has many additional features. The main purpose of the GSM in projects is to send and receive the messages. But not only that we can make a call and can we also browse using the GSM. The GSM has the operating voltage of 12v. It has mainly of three pins namely transmitter, ground and the receiver pinto perform these tasks, a GSM modem must support an “extended AT command set” for sending/receiving SMS messages. GSM is one of the most useful inventions in the modern world. It has many advantages than other technology standards

III.COMMUNICATION OF GSM WITH MICROCONTROLLER

Figure.3 and Figure.4 shows the software level implementation and component level implementation respectively, the result from the fingerprint module is taken and it is analysed in the microcontroller. We use “ATMEGA 16” microcontroller in the paper. The result from the GSM module is received by microcontroller. If the already stored image in the memory and input image are matched then microcontroller will send the control to the GSM module. The GSM will send the messages to respective parent’s mobile numbers. If the fingerprints are mismatched then the control signal will not be sent to the GSM module After some time interval the details of the students who were not present were taken. Those persons details were taken and message of “NOT PRESENT “is sent to their respective parent’s mobile numbers. So, the parents may know about the student’s presence immediately. The Students cannot forget this system easily.

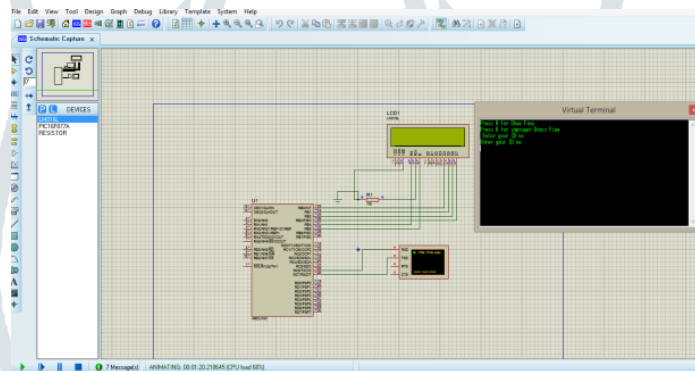


Fig.3 Simulation Level Trial

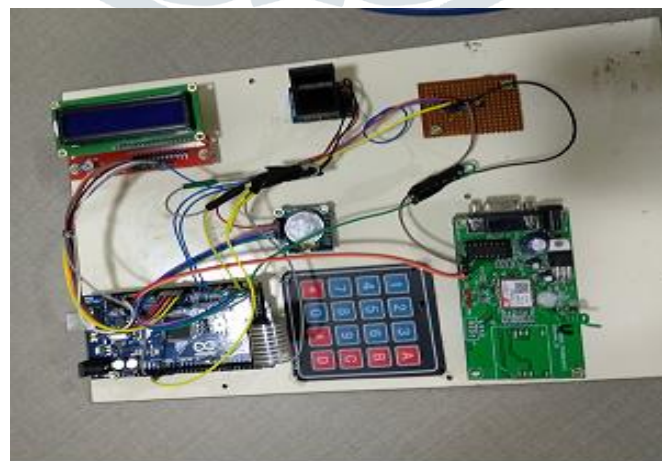


Fig .4 Component Level Implementation

IV.THERMAL PRINTER

Thermal printing is a digital printing process which produces a printed image by selectively heating coated thermo chromic paper, when the paper passes over the thermal print head. The coating turns black in the areas where it is heated, producing an image. Two-colour direct thermal printers can print both black and an additional colour (often red) by applying heat at two different temperatures. No involvement of cartridges or ribbons and thus organizations can save investment by using thermal printers. More efficient and faster in printing monochromic ones compared to other forms of printing.

V. CONCLUSION

This integrated design, will replace the vintage way of marking attendance. The system works perfectly for any kind of institution, office purpose and any commercial purpose, promoting life one step next to the future. The usual way is little modified and automated, this small change can considerable impact in the day- to-day life.

VI. REFERENCES

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