Antitheft Biometric Lock Security System Design Based on Finger Touch and Password recognition using the AT89S52 Microcontroller

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Abstract- *This paper basically involves the design and implementation of an antitheft locking system using biometric involvement, including both finger swipe and password enrollment recognition system. The whole of the setup was implemented using the microcontroller AT89S52 from the Atmel Corporation and the programming (Assembly Language) was done using Kiel compiler. The working of the design is wholly guarded by the microcontroller, which controls the signals sent from the finger touch module and the keypad. Instead of lock and alarm system a relay and a buzzer have also been interfaced to the microcontroller for testing purpose. Furthermore ,red and green LED's have been used to show the user status whether he is registered or not with the system. When a registered user tries to enter, the microcontroller recognizes the user and the relay open along with the green LED glowing along with an LCD to display the user information and the permissions user is granted. Implementation of this system was tested for 50 different, both male and female users. The system can be controlled by an administrator through a master password, who can monitor the activities and can control the registration /deregistration of any users. This system is expected a help to safeguard valuables at homes and offices against theft in case of lost keys or by pirated master keys.*

Keywords- AT89S52,Biometric lock, Finger Touch Lock, Password lock design

I. INTRODUCTION

Biometrics is basically the technology in which an individual or any company gets the safety of authorized access for selected & particular persons or in other words biometrics is the science of verifying the identity of an individual through physiological measurements or behavioral traits. Since biometric identifiers are associated permanently with the user, they are more reliable than token or knowledge based authentication methods. This paper deals with the application of one feature of biometric namely Finger Touch and secondly it also uses the password system also. The whole of the implementation is dependent on the microcontroller AT89S52, which handles the entire design or implementation. This project has the features of having individual fingerprint and password recognitions. Moreover, it has a master password system through which the administrator can delete, add and modify any user.

II. DESIGN ALGORITHM

The design of the algorithm is based upon the following scheme. The said design algorithm defines the working overview of the implemented design.

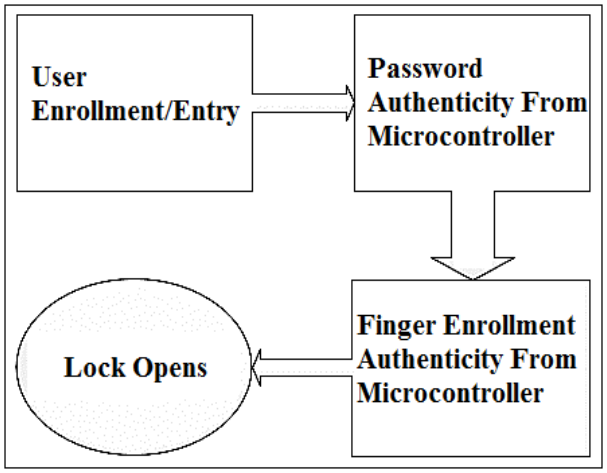

Figure: 1. Algorithm design

III. DESIGN FLOWCHART

The Flowchart below shows the practical scheme of the design implemented. In the said flow chart, we have the user authentication and the same, we have on the practical design, where the new user has to enroll him/herself. Similarly, the implemented design follows the respective scheme for the blocks, that have been declared in the below flowchart.

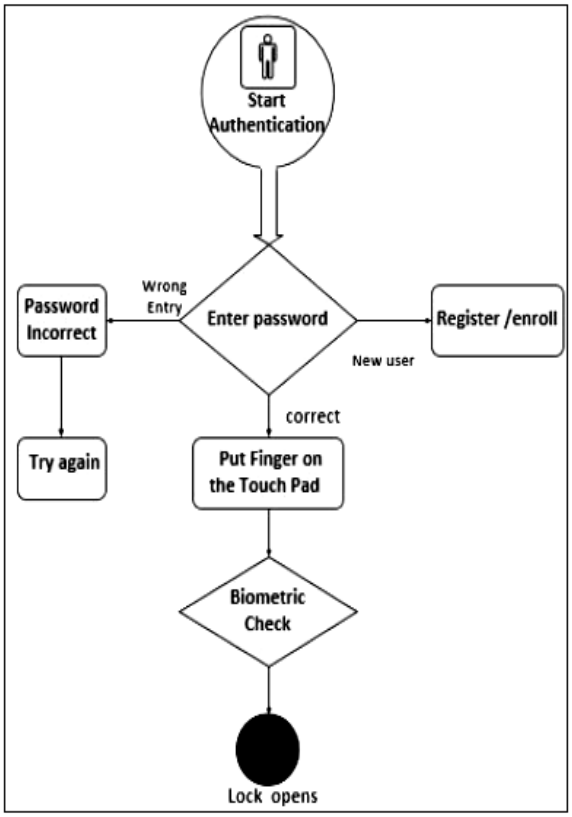

Figure: 2. Workable Flowchart

IV. DESIGN DESCRIPTION

The implemented design met the following requirements to furnish.

Power supply requirements: Since the design requirements need a low power regulated DC supply up to 5v, therefore it is feasible to provide the supply through a 9v portable battery easy available in the market. Secondly, we can use the household supply too for this design, for that we need to build another circuit in order to step-down the 220v to 5v DC regulated supply. The 5v dc supply can be obtained using the step-down 9v transformer. The input to the primary of the transformer is 230v and at the output, we obtain the voltage of about 0-9v with approximately of 2 amperes current. After that, this particular supply is fed to the inputs of the bridge rectifier and a supply of approximately 5-6 v DC is obtained. Capacitor c1 is there to filter this current and finally to get the regulated voltage supply of 5v, we have put a 7805 IC for the same purpose and finally, we have the output DC supply of 5v.

Software and hardware requirements:

The implemented design met the following requirements of softwares.

I. Kiel compiler: this compiler was used to run our program and generate the required "hex" file to be burned in the microcontroller.

II. G540 Burner: The "hex" file was loaded into microcontroller using this particular software.

III. Proteus 7: The hardware was first tested and analyzed on this software for changes and modifications.

Hardware requirements: the major components, which helped to furnish the design are viz;

- "AT89S52 Microcontroller" from the Atmel Corporation.
- "Finger Touch Module" from the sunrom technologies (vendor) India.
- LCD 16×2 display.
- Push Button for Password entry.

V. WORKING DESCRIPTION

Firstly, we have set a master password for the design implemented, which will help the administrator to add, delete or modify any user. The working starts from the step of enrolling the fingerprint of the users and registering for individual passwords. After enrolling, when the user tries to access the entry, the system firstly asks for a password. In case the password is correct, LCD displays the message swipe finger or put a finger on the screen and again the microcontroller checks for the registered user and if found correct, the green led glows, thereby indicating the door opens. On the other hand, if the password or the finger swipe of the user is incorrect, the red led glows and the buzzer makes the noise of the wrong entry, thereby authenticating the false user. The design has individual passwords and finger authentications for the individual user.

VI. PESUDO CODE OF THE DESIGN

```
#include<AT89x52.h>
unsigned char // processing data in the whole design
void main()
{
lcdcmd(0x01,0x08,0x82)// commands to LCD
lcd data("FINGESECURITY");//data to LCD
void unlock();
{
lcd data();//enter the password
if incorrect
{
lcd data();// wrong password-register
else correct
{
```

```
lcd data();//put finger on the touch screen
if wrong finger
{
lcd data();//wrong entry
else correct finger touch
{
lcd data();//done & lock opens
return;
}}}}}
```

VII. FOOT WORKS OF THE DESIGN

The design implemented was tested by the various users. The results from these trials were found quite accurate and matching. Basically the enrollment/swipe and password entry, we obtained the percentage accuracies of ourselves, which are described in the table shown below:

Table 1: Attempt Characteristics Accuracy

	Attempt Statistics		
S.No	Total	Successful	%age Accuracy
User1	100	98	98%
User2	50	46	92

VIII. PROS AND CONS OF THE IMPLEMENTED DESIGN

The design implemented worked precisely and it was tested one at a time for no of users. Since nowadays, as we see around us, the people are often worried about their belongings of getting stolen or in another way of losing their keys. This design will help & benefit the people greatly, as the security system is up to themark, providing a dual lock/unlock system of biometric and password entry. The design, on the other hand, needs care and safe handling, as any error in the system or any kind of breakage, will lead to the complete block of the door or any type of equipment on which the design is implemented.

IX. COST AND POWER CONSUMPTION ANALYSIS

The overall cost of the design doesn't exceed $50 US dollars, which indicated that the cost has been reduced up to the maximum extent. Further, while sketching the circuitry of the above design, the power reduction factor was the main motive to ensure the minimum power consumption by the design.

X. FUTURE WORK OF THE IMPLEMENTED DESIGN

The implemented design can be further modified by adding some new type of biometric identities, such as iris scan etc. By this modification, the mode of locking/unlocking system will be more secure.

XI. CONCLUSION

While concluding the methodology of the above design, we came across the fact, that this design will really help and benefit people who mean to have security for many doors or lockers etc. in the developing country like India. Further, this design will remove the burden of carrying keys and the ultimate of losing or the theft by using the Master keys or the other Duplicate Key. Moreover, the design was implemented and tested successfully and the results are in this paper.

ACKNOWLEDGEMENT

Firstly we are much thankful to almighty God that we have come successfully to the end of this project. Secondly, we are immensely thankful and express our deep sense of gratitude to the faculty members of Integral University Lucknow for their kind and lovable guidance during the entire design work. Lastly, we are much thankful to our parents, who encouraged and supported us timely during this design work.

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