TWO FACTOR AUTHENTICATION BASED ACCESS CONTROL

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Abstract
In this digital era, confidential information can be accessed by third parties easily who use it to their advantage without being known. Safeguarding confidential information and avoiding security breaches becomes an arduous task. A Two Factor Authentication System has been proposed which involves combination of fingerprint and One Time Password (OTP). A web page is used to display the user authentication status. A web server is used to store authentication information of various user's which can be downloaded and viewed.

Keywords*:* Two Factor Authentication System, fingerprint, One Time Password (OTP), web page, web server

INTRODUCTION

Every organization has security as main priority because vital information such as details of various projects, R & D activities can be leaked by hacking which can be done easily by decrypting the static passwords within few hours.

To avoid such complex situations an extra layer of security is needed which cannot be hacked. The proposed project presents a solution to this problem by design and implementation of a two factor authentication system. Fingerprint and Generated One Time Password are used as two factors for authentication.

This project also provides support for multi factor authentication by adding an RFID card as an additional authentication factor.

OBJECTIVE

The objective of this project is to ensure reliable authentication of the user and enhancing security by implementation of two factor authentication system.

TWO FACTOR AUTHENTICATION

Two Factor Authentication is a method of verifying a user by combining a physical factor of user such as fingerprint, eye iris, voice, typing speed, pattern in key press intervals, etc with a possession factor such as password.

Two Factor Authentication provides an additional layer of security and makes it harder for attackers to gain access to a person's devices and online accounts, because knowing the victim's password alone is not enough to pass the authentication check

HARDWARE COMPONENTS

1. LPC2148
2. R305
3. SIM900 GSM/GPRS Modem
4. RFID Card Reader
5. LCD

LPC2148

ARM7 is one of the widely used micro-controller family in embedded system application. ARM is a family of instruction set architectures for computer processors based on a reduced instruction set computing (RISC) architecture.

A RISC-based computer design approach means ARM processors require significantly fewer transistors than typical processors in average computers. This approach reduces costs, heat and power use. These are desirable traits for embedded systems.

LPC2148 is the widely used IC from ARM-7 family.LPC2148 provides 8 to 40 kB of on-chip static RAM and 32 to 512 kB of on-chip flash program memory, 128 bit wide interface/accelerator which enables high speed 60 MHz operation

PROPOSED METHOD

To ensure reliable security, here we developed a Two factor authentication system as shown in Fig 1. The user authentication data is sent to web server through LPC2148. The Two factor authentication system contains LPC2148, R305 fingerprint module, SIM900 GSM/GPRS Module, RFID Card Reader and LCD to display the status.

TWO FACTOR AUTHENTICATION SYSTEM

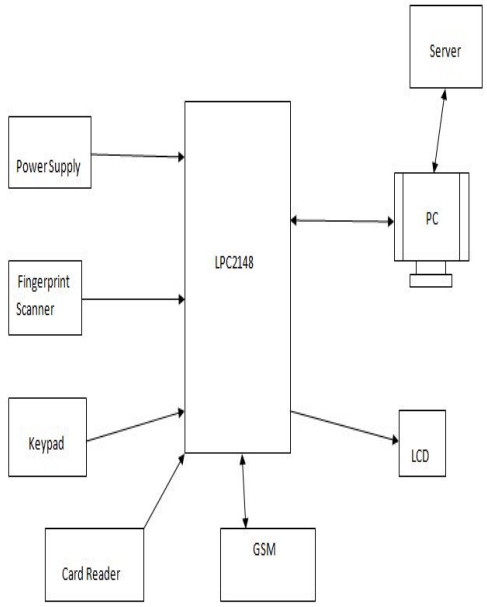

Fig 1: Working principle of Two Factor Authentication system

The kit is connected to the server by establishing a TCP connection. The user authentication data will be posted to the server on every attempt.

Captured fingerprint image is matched with database and match found is indicated in LCD as shown in Fig 3.In the next step a One Time Password is sent to the user's mobile. On Entering the correct password user authentication is said to be successful and indicated in LCD as shown in Fig 4.

The uploaded details can be viewed in the web page as shown in Fig 5. User Information and authentication details can be downloaded from the server and can be opened in text file format as shown in Fig 6.

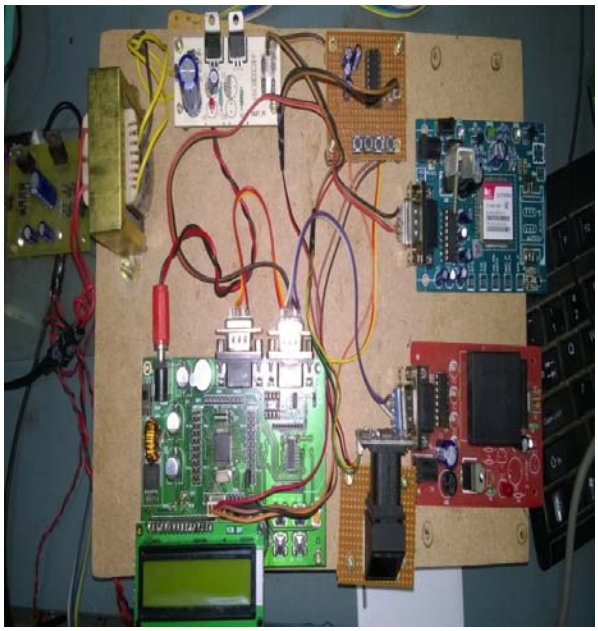

Fig 2: Two Factor Authentication System with hardware connections

SOFTWARE TOOLS

1. KEIL – C
2. FLASH MAGIC

I KEIL – C

µVision is a window-based software development platform that combines a robust and modern editor with a project manager and make facility tool. It integrates all the tools needed to develop embedded applications including a C/C++ compiler, macro assembler, linker/locator, and a HEX file generator. µVision helps expedite the development process of embedded applications by providing

1. Full-featured source code editor.
2. Project Manager for creating and maintaining your projects.
3. Flash programming utility for downloading the application program into Flash ROM.
4. True integrated source-level and assembler-level Debugger with high-speed CPU and peripheral Simulator.
5. Integrated Make Utility functionality for assembling, compiling, and linking your embedded applications.

II FLASH MAGIC

Flash Magic is a freeware windows utility tool for programming flash based microcontrollers from NXP using a serial or Ethernet protocol while in the target hardware. It can control the entry into the ISP mode of the devices by using the COM port handshaking signals.

Flash magic will automatically place the device into ISP mode at the beginning of an ISP operation. Flash Magic will then automatically cause the device to execute the code at the end of ISP operation.

RESULTS

Fig 3: User biometrics checked

Fig 4: User credentials checked

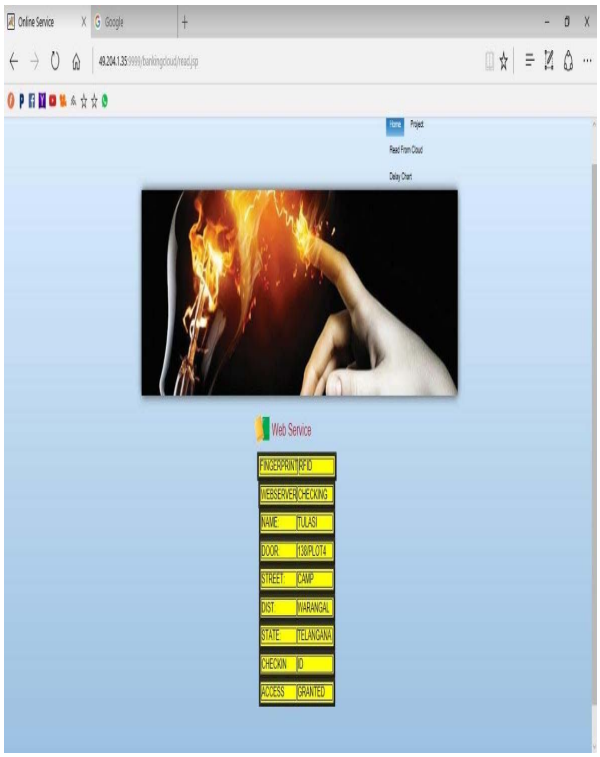

Fig 5: User details displayed in web page

Fig 6: User details in server checked

ADVANTAGES

1. Low cost
2. Enhanced Security
3. Easy to access
4. High accuracy

CONCLUSION

Integrating features of all the hardware components used have developed it. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit.

Secondly, using highly advanced IC's and with the help of growing technology the project has been successfully implemented.

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