Biometric Authentication System for Landline Users

Borse Madhavi A.[1], Dr. S.D.Markande[2]
[1]NBN Sinhgad School of Engineering, Pune, India
[2]NBN Sinhgad School of Engineering, Pune, India
(E-mail: borsemadhavi@gmail.com)

Abstract — As a telephonic devices continue to evolve in terms of the capabilities and services offered, so they introduce additional demands in terms of security. An issue that has traditionally been poorly served is user authentication, with the majority of devices relying upon problematic secret knowledge approaches. Use of mobile telephones in many of the educational and corporate organization is prohibited because of the advanced features in mobile telephones as camera, audio recording facilities etc. So in such cased need of landline telephones is must. However, in such cases in absence of authorized users of that landline telephone unwanted calls are made by other peoples working in the organization. It results in user to suffer from un-necessary increase of telephone bills. All this happens because of lack of security feature in landline telephones. In this project we are going to provide biometrics security feature to a landline telephones.

System implements user level authentication using fingerprint module before call is made from landline. At the time of incoming call, call attended directly by detecting ringer frequencies.

Keywords — *Landline telephone; user authentication; biometric fingerprint technology.*

I.   INTRODUCTION

In current scenarios security is important aspect in all electronic consumer products. In daily lifestyle telephone is main entity that is requirement of everyone. A telephone, or phone, is a telecommunications device which allows two or more users to have a conversation when they are not in the same vicinity of each other to be heard directly. A telephone translate sound, usually and most efficiently the human voice, into electronic signals suitable for communication via cables or other communication medium over long distances, and replays such signals simultaneously in audible form to its user. Main objective of project is to focus on the user level authentication of landline telephones.

In many of the organizations unwanted calls are made from the landline phones which are authorized to a principles or managers of organizations. There is need to provide user authentication in such a cases to avoid misuse of telephones by other members of organization.

Use of traditional mechanisms like PIN lock or mechanical locks results many drawbacks to user level. Main drawback is that mechanisms are providing poor security, we can lose a mechanical key or anyone might get your PIN to access

telephone. As the scope of information and administrations grows, it is progressively alluring for supporters of ensure their gadgets through appropriate validation procedure. The primary strategy for accomplishing this on current gadgets is the utilization of PIN, which can be connected to both the gadget and the client's SIM a removable token containing the cryptographic keys required for system verification. Now a day many other security mechanisms are provided in the telephones to provide user authentication. Recently used mobile smart phones include pattern lock facility to unlock it but which is also similar to the PIN lock. In addition, many mobile phones includes speaker or face recognition based biometric authentication techniques. So here we are going to design fingerprint based secure authentication to a landline telephone.

II.   SYSTEM ARCHITECTURE

For the proposed system, PCB design of ARM7 board with interfacing of fingerprint module and servo motor is done. When authorized fingerprint is recognized at that time servo motor operates and user get access over landline & able to make calls. When fingerprint doesn't match then user can not access the landline telephone.
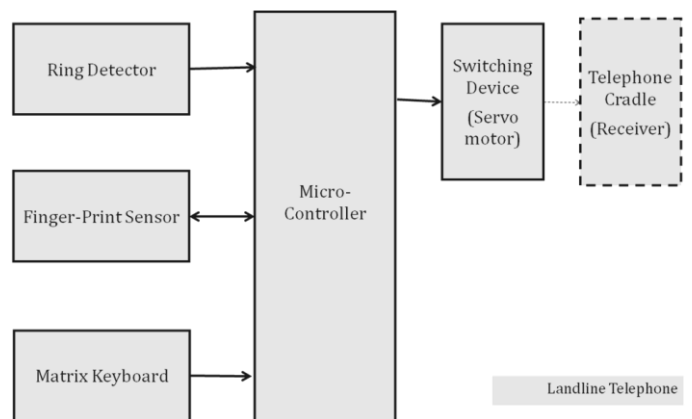
A. Block Diagram

Fig 1: Block Diagram of proposed system

The system block diagram is shown in above fig 1 the hardware consists of ring detector, Finger print sensor R305, microcontroller ARM-7 LPC2138, and switching device servo motor. Ring detector is used to detect receiving ring tones from calling phone to called phone. Microcontroller detects tones and after few seconds unlock telephone cradle/receiver so that user can attend incoming call. But when telephone is idle and use need to make call at that time first system will recognize

user by using fingerprint scanner if fingerprint matches with stored database at that time switching device make cradle/receiver of telephone unlock. So that only authorized user can make call from landline.

B. Hardware Specifications

1. The Fingerprint Sensor

Automated fingerprint identification is the process of automatically matching one or many unknown fingerprints against a database of known and unknown prints. The fingerprint sensor module have TTL UART interface for direct connections to microcontroller UART or to PC through MAX232 / USB-Serial adapter. The user can store the finger print data in the module and can configure it in 1:1 or 1: N mode for identifying the person. The FP module can directly interface with 3.3v or 5v Microcontroller. A level converter (like MAX232) is required for interfacing with PC serial port.

Fingerprint sensor detect the finger identify it and match with stored database if match found then send acknowledgment signal to microcontroller to process further.

2. Matrix Keyboard

Matrix keyboard is used to assign unique ID to authorized person. Keypads are often used as a primary input device for embedded microcontrollers. The keypads actually consist of a number of switches, connected in a row/column arrangement. In order for the microcontroller to scan the keypad, it outputs a nibble to force one (only one) of the columns low and then reads the rows to see if any buttons in that column have been pressed. Keypad is made up of 0-9 digits and two functional keys including CLR (clear) & ENT (enter).

3. Ring Detector

Ring detector circuit is made up to detect incoming ring sound. For that purpose audio amplifier circuit is design. Incoming ring signal is detected by this circuit and for further response send to the microcontroller.
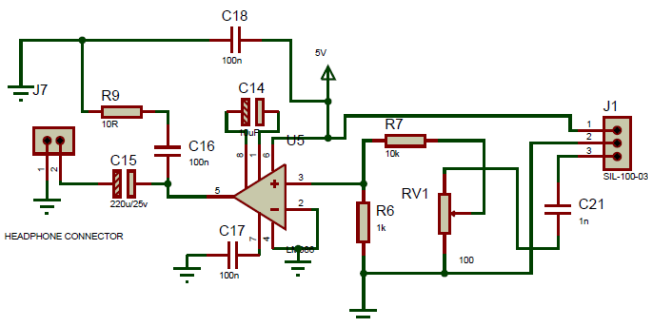

Fig 2: Ring Detector Circuit

4. Servo Motor

A servomotor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback.

5. Microcontroller ARM-7 TDMI

The LPC2138 microcontrollers are based on a 32 bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combines the microcontroller with 256 kB of embedded high speed Flash memory.

Microcontroller is used due to its tiny size and low power consumption to perform synchronized operation in whole system.
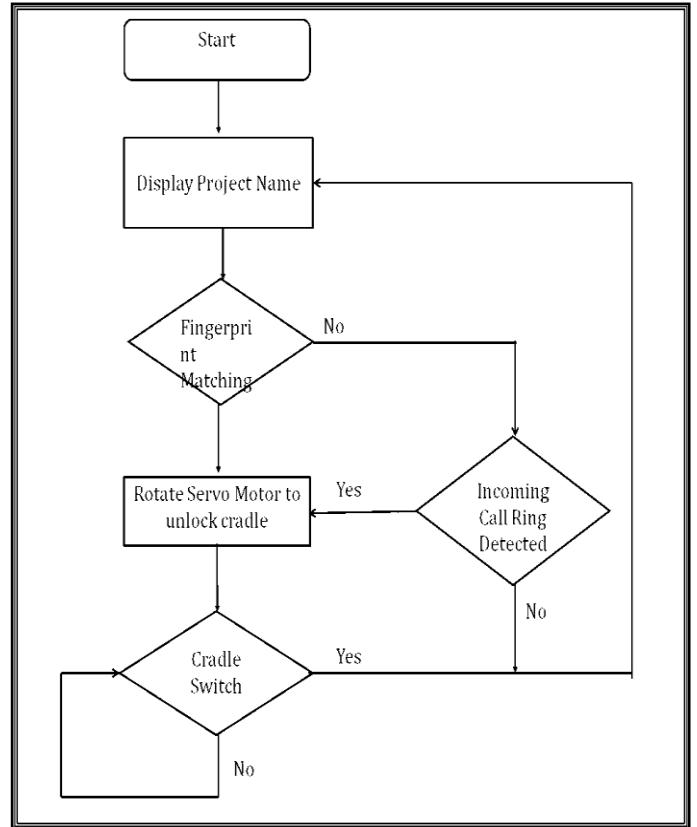
III. SYSTEM FLOW DIAGRAM

Fig 3: Software Flow diagram

The software flow for the given system is given in Fig 3. Fingerprint matching, servo motor mechanism is operated as per the software programming.

IV.   RESULT

Fig 4: System Setup

Fig 5: Fingerprint from authorized user

Fig 6: Incoming Call Ring Detected for Receiving

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Ms. Borse Madhavi A. Born on 26th sept 1989. Currently persuing ME Embedded and VLSI Tech./ E&Tc

Dr. S. D. Markande, ME, Ph.D. (Electronics Engg.) in 2010. Principal & Professor / E&TC Engg. STES's NBN Sinhgad School of Engineering, Ambegaon, Pune-41.