FINGERPRINT AUTHENTICATION AND THEFT DETECTION IN ATM USING ARDUINO

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ABSTRACT: In this paper we proposed, to add more security to all the ATM systems by using biometric and system specification GSM technology. In this method identification is based on ATM card and static 4 digit password. Whereas in our proposed system, Bankers will collect the customers fingerprints and mobile number at the time of opening the accounts then only customer will be able to access ATM machine. The initial step of this project is to verify currently scanned fingerprint with the fingerprint which is registered in the bank during the account opening time. At the same time we connect the vibration sensor in ATM. If anyone broken the ATM, GSM send a message to nearby police station.

KEYWORDS — ATM, GSM, BANKERS, FINGERPRINT.

I INTRODUCTION

Present industry is increasingly shifting towards the automation. Two principle components of today’s industrial automations are programmable controllers and robots. In order to aid the tedious work to serve the mankind, today there is a general tendency to develop an intelligent operation. In our paper “Fingerprint authentication and theft detection in ATM security system” is designed and created to accomplish the various tasks in an adverse environment of an industry. The intelligent using of Microcontroller, LCD, Fingerprint sensor, vibration sensor, Arduino UNO, GSM, PC. This paper is an owe to the technical advancement. The prototype system can be applied effectively and efficiently in expanded dimension to fit for the requirement of industrial, research and commercial applications. Microcontroller is the main part of the device which handles all the sub devices connected across it. We have used as microcontroller. It has flash type reprogrammable memory. It has some peripheral devices to play this paper perform. It also provides sufficient power to inbuilt peripheral devices. We need not give individually to all devices. The peripheral devices also activates as low as power operation mode. These are the advantages appeared here.

II HARDWARE SPECIFICATION
1. Arduino uno mega
2. LCD display
3. Finger print
4. Vibration sensor
5. SCU
6. GSM
7. Driver circuit
8. Relay
9. RS232
10. PC

BLOCK DIAGRAM

BLOCK DIAGRAM DESCRIPTION

ARDUINO UNO

Arduino/Genuino Uno is a microcontroller board based on the ATmega2560. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, 16 MHz quartz crystal, USB connection, power jack, an ICSP header and reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a Analog to Digital converter adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.
The Uno board has version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, is now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for an Arduino platform for an extensive list of current, past or outdated boards see the Arduino index of boards. You can find here your board warranty information’s.

Power

The Arduino/Genuino Uno board can be powered through the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an Analog to Digital converter adapter (wall-wart) or battery. The adapter can be connected by plugging 2.1mm center-positive plug into the board’s power jack. Leads from a battery can be inserted in GND and Vin pin headers of the POWER connector. The board can operate on an external supply from 6 to 20 volts. If supplied with less than 7V, however, 5V pin may supply less than f 5V and the board may become unstable. If using more than 12V, the voltage regulator may overheat and damage the board. There commended range is 7 to 12 volts. Where Vin- The input voltage to the Arduino/Genuino board when it’s using an external power source). You can supply voltage through this pin, or if voltage supplies through the power jack, access it through this pin. 5V- This pin regulates the output 5V from the regulator on the board. The board can be supplied with power either from the DC power jack (7 - 12V), USB
connector (5 Volt), or the Vin pin of the board (7-12 Volt). Supplying voltage via the 5V or 3.3V pins bypass the regulator, and can damage your board. We don't advise it. 3.3V. A 3.3 volt supply generated by the on-board regulator.

Memory

The ATmega2560 has 32 KB (with 0.5 KB occupied by the boot loader). It also has 2 KB of SRAM and 1 KB of EEPROM (which can be read and written with the EEPROM library).

LCD DISPLAY

III INTRODUCTION

Liquid crystal displays have materials which combines the properties of both liquids and crystals. Rather than having a melting point, they have a temperature range within which the molecules are almost as possible as they would be in a liquid, but are grouped together in an ordered form similar to a crystal. An LCD consists of two glass panels, with the liquid crystal materials and switched between them. The inner surface of the glass plates are coated with the transparent electrodes which define the characters, symbols or patterns to be displayed in the polymeric layers are placed in between the electrodes and the liquid crystal, which makes the liquid crystal molecules to maintain a defined orientational angle. This polarisers would rotate the light rays passing through them to an accurate angle, in a particular direction. When the LCD is in the off state, light rays are rotated by the two polarisers and the liquid crystal, such that the light rays come out of the LCD without any changes in the direction, and hence the LCD appears transparent.

POWERSUPPLY:

The power supply should be +5V, with maximum allow able transients of 10mv. To achieve a better and suitable contrast for the display, the voltage (VL) at pin 3 should be adjusted properly. The module should not be inserted or removed from a live circuit. The ground terminal of the power supply must be isolated properly so that they have no voltage is induced in it. The module should be isolated from the other circuits, so that stray voltages are not produced, which could cause a flickering display.

HARDWARE:

If a parallel port is used to drive the RS, Read / Write and ‘E’ control lines, setting the ‘E’ bit simultaneously with RS and R/W would violate the module’s set up time. A separate instruction should be used to achieve proper interfacing timing requirements.
CRT (cathode ray tube) displays in the applications. They are usually more compact, lightweight, portable, less expensive, more reliable, and easier on the eyes.

**FINGER PRINT SENSOR**

The fingerprint sensor transforms the fingerprint information of a finger under exploration into an electric output signal. The sensor incorporates a contact devices or sensor plate of a piezoelectric material. This sensor plate has a contact surface. The finger exercises a contact pressure thereon and changes thereby the distribution of electric charges on the contact surface. The new charge distribution is in the accordance with fingerprint pattern of the finger. The sensor further incorporates an electric device which provides the electric output signal in accordance with the distribution of charges.

The arch pattern. The loop pattern. The whorl pattern.

**VIBRATION SENSOR**

A piezoelectric sensor is a device that uses the piezoelectric effect to measure the pressure, an acceleration, a strain or force by converting them to an electrical signal.

**Electrical Properties**

Schematic symbol and electronic model of a piezoelectric sensor is a piezoelectric transducer has very high DC output impedance and can be modelled as a proportional voltage source and filter network. The voltage at the source is directly proportional to the applied force, the pressure, or a strain. The output signal is then related to this mechanical force as if it had passed through the equivalent circuit.
Sensing materials

Two main groups of materials are used in this piezoelectric sensor which is piezoelectric ceramics and a single crystal materials. The ceramic materials (such as PZT ceramic) have a piezoelectric constant / sensitivity that is roughly two orders of magnitude higher than those of a single crystal materials and can be produced by inexpensive sintering processes. The piezoeffect in piezo ceramics is "trained", so unfortunately their high sensitivity degrades over time. The degradation is highly correlated with temperature. The less sensitive crystal materials (gallium phosphate, quartz and tourmaline) have much higher values – where carefully handled, almost infinite – long term stability.

GSM MODEM

A GSM modem is the special type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. For the purpose of this document, the term Global System for Mobile Communication modem is used as a generic term to refer to any modem that supports one or more of the protocols in the GSM evolutionary family, including the 2.5G technologies GPRS and EDGE, as well as the 3G technologies like WCDMA, UMTS, HSDPA and HSUPA. A GSM modem broadcast an interface that allows applications such as SMS to send and receives the messages over the modem interface. To perform these tasks, a GSM modem must support an “extended AT command set” for sending/receiving SMS. In most parts of the world, GSM modems are cost effective solution for receiving SMS, because the sender is paying for the message delivery. A GSM modem can be used to dedicate the modem devices with a serial, USB or Bluetooth connection, such as the light-weight, wireless modem that provides EDGE, GPRS and GSM connectivity for portable, handheld computers and others. To begin, insert a GSM SIM card into the modem and connect it to an available USB port on your computer.

PERSONAL COMPUTER (PC):

A personal computer is general-purpose computer whose size, capabilities, and original sales price make it useful for users and which is operated directly by an end of the user with no intervention computer operator. This is in contrast to the batch processing or time-sharing models which allowed large expensive mainframe systems to be used by many people, usually at the same time, or a large data processing the systems which required a full-time staff to operate efficiently personal computer may be a desktop computer, a laptop, a tablet PC, or a handheld PC (also called a palmtop). Personal computers have connections to the Internet, allowing access to the World Wide Web and a wide range of other resources. A personal computer may be used at home or in offices. Personal computers may be connected LAN, either by a cable or a wireless connection. While early PC owners usually had to write their own programs to do anything useful with the machines, today's users have to access a wide range of commercial and non-commercial software, which is provided in ready-to-run or ready-to-compile form.

SIGNAL CONDITIONING UNIT (SCU):

The signal unit accepts input signals from the analog sensors and gives a conditioned output of 0-5V DC corresponding to the entire range of each parameter. This unit also accepts the digital sensor inputs and it gives outputs in 10 bit binary with a positive logic level of +5V. The calibration voltages* (0, 2.5 and 5V). Microcontrollers are widely used as controller in power electronics. They provide real time control by the processing analog signals obtained from the system. A suitable isolation interface needs to be designed between the control circuit and high voltage hardware. The signal conditioning unit which provides necessary interface between a high power grid inverter and a low voltage controller unit.
ADVANTAGE:

1. Low power consumption
2. Improve security performance in the ATM machine
3. We can avoid the forgery access.

APPLICATION:

This project is very useful for Banks and ATM centers.

IV CONCLUSION

The process in the science & technology is a non-stop process. New technology is being invented. As the technology grows day by day, we can imagine about the future in which thing we may occupy every place. The proposed system based on Arduino microcontroller is found to be more compact, user friendly and less complex, which can readily be used in order to perform several tedious and repeated tasks. Though it is designed by keeping in the mind about the need for industry, it can extended for other purposes such as commercial & research applications. Due to the probability of high technology (Arduino microcontroller) used this “Fingerprint authentication and theft detection in ATM using Arduino” system is fully hardware controlled with less software circuit. In feature this system makes the base for future systems. The principle of the development of science is that “nothing is impossible”. So we shall look forward to a bright & sophisticated world.

V RESULT

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VI REFERENCES