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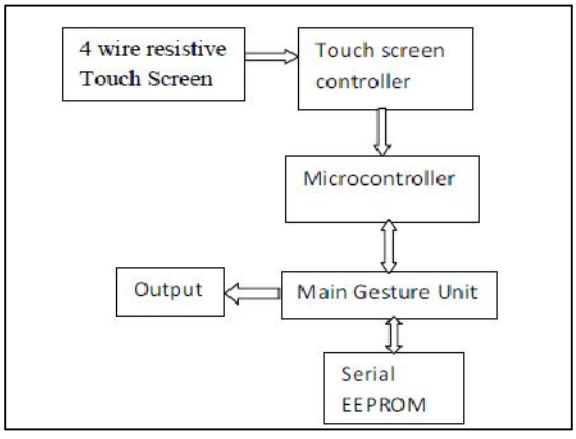
Abstract - The purpose of the project is to present a new approach on the design of security systems by using a touch sensitive device. Security is a permanent concern in a variety of environments ranging from physical access restriction in home and industrial settings to information security in digital systems. Numeric passwords, fingerprint recognition, and many other techniques have been extensively implemented in the past but they present certain drawbacks. The proposed technique makes use of a touch device to recognize symbols as passwords and takes time into account to add a new dimension and prevent password theft. We implemented a prototype that demonstrates the capabilities of the proposed security approach by showing one direct application in physical access restriction systems. For example your password can be:

I. INTRODUCTION

Security is very important aspect in our life we need to feel safe and secure. And for that we install various types of security at our workplace or house, gates, locks, security guards, alarms system, access control all are part of it. Recently there is inclination towards electronics security and access control system. During 2005 every 1 in 4 in US is having security system installed at home. Still many people are using same old methods of security, which has many disadvantages. Our Aim in this project is not only to design a innovative security system, but we are here learning few new technologies and developing algorithms.

Touch screens we have seen a lot but in this project we are using it first time and designing its controller from the scratch from easily available components.

II. BLOCK DIAGRAM



II. DESCRIPTION

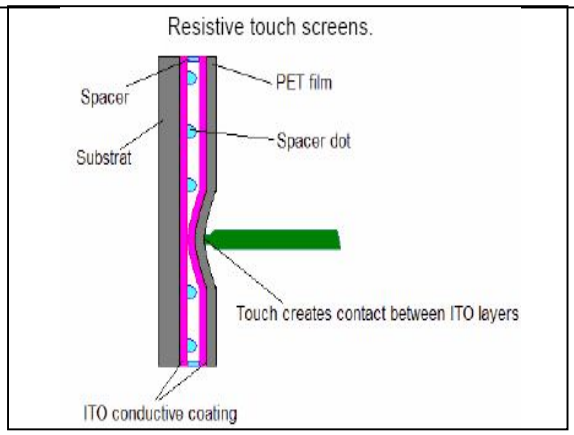
Input is given on the touch screen which stores in microcontroller and interfaces with the gesture engine. This gesture is then compared with the gesture present in EEPROM, if it matches we can access the system if not access is denied.

A. Four wire resistive touch screen

Various touch screens are available, but we will use resistive touch screens. A resistive touchscreen panel is composed of several layers, the most important of which are two thin, electrically conductive layers separated by a narrow gap. When an object, such as a finger, presses down on a point on the panel's outer surface the two metallic layers become connected at that point: the panel then behaves as a pair of voltage dividers with connected outputs. This causes a change in the electrical current, which is registered as a touch event and sent to the controller for processing.

A four- wire resistive touch screen is a sensor consisting of two transparent resistive plates, ideally of uniform resistivity, normally separated by insulating spacers. The metalized contacts of the “x” layer run along the y -direction and thus the resistance is measured between the two x-direction ends. Similarly, the “y” layer has metalized contacts that run in the x-direction so that the resistance is measured along the y-axis.

When touched with sufficient pressure, the top plate deforms making contact with the bottom plate. At the point of contact, the bottom layer effectively divides the top layer into two resistors in series, in a manner similar to the way the wiper on a potentiometer divides the potentiometer in to two series resistors. Similarly, the bottom layer is effectively divided into two resistors at the point of contact with the top layer. Each plate is analogous to the two ends of a potentiometer where the other plate serves as the wiper. By proper biasing, each plate can function as a voltage divider where the output (wiper) voltage represents the rectangular co-ordinate of the point of contact.



B. Touch screen controller

Touch-Screen Controller includes a driver for the panel, a multiplexer, and an ADC. The driver in the touch-screen controller independently powers both coordinates of the touch panel to ON or OFF. The amount of current conduction through the touch panel is approximately equal to the power-supply voltage divided by the touch-panel resistance. The ADC inside the touch-screen controller measures the touch position and pressure, by converting the analog voltage from the touch screen into digital code. Typically, the ADC topology is a successive approximation register (SAR) with resolutions of 8 to 12-bits. Finally touch screen controller give x, y output via digital bus it can be I2C, SPI, UART etc.

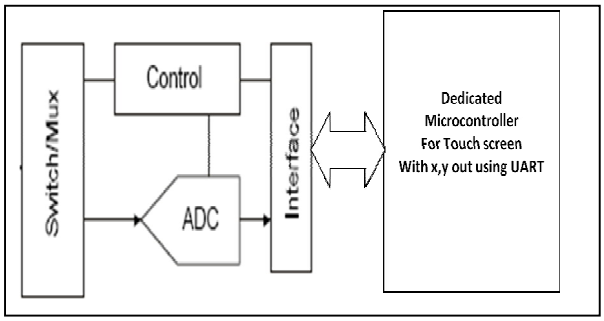


Fig: Touch screen controller

C. Main gesture unit

This system integrates all the systems, when gesture is registered via touch screen, it converts gesture movements in the small strokes and it compares theses strokes to strokes stored in EEPROM memory. And at the end it concludes whether the gesture entered via touch screen is same as stored in EEPROM, then access is granted and required action are taken, and after that other gesture for device controls can be entered, which again will be compared to gestures stored in EEPROM as strokes and if any matches then corresponding actions are taken this is extra feature added to enhance the system usability so apart from access control at can be used for home or office automation.

D. *Serial EEPROM*

It is I2C based Serial EEPROM which is used to store password gestures and utility gestures in form or strokes and time stamps, which are used by main system to compare with gestures entered via touch screen.

E. Device control, input and status output:

Few switches are provided for user interface and for selecting different modes of operations, status output is used for audio visual indications of gesture registration, identification or rejection. Finally for access control and utility device control a relay board is used through which access control mechanism and devices are controlled.

F. PC Interface:

Finally a PC interface is provided to update configurations, monitoring, debugging and to view statistic of entered gestures.

IV. APPLICATIONS

Security systems are playing a important role in present world and it will keep on growing in US almost every house has some sort of Security or Alarm system, our system has straight forward use wherever security is required. First use is in Access control system, in many places, companies, or organizations some places are restricted and its access is limited to authorized personals only in such places our system is very useful only one or two gestures you make on screen and you are allowed to go in secured area.

In bank locker, electronic safe and similar applications our system can be used because of its compact size and easy interface. Even in ATMS, mobile phones gesture can be used as password instead of numbers. In defence so many weapons rooms are there, missiles, tanks, air craft for all of them code locks are there which can be replaced by our security system.

Finally our system is also useful in home and office automations as it allows you to make any gesture and which can be used to control appliances or some industrial devices.

V. FUTURE ENHANCEMENT

Our aim is to build a very strong security system, and which is hard to breach along with that it should have long life, durable, simple user interface and our future enhancements are towards enhancing these features. First of all instead of touch pad, gesture can be made in air and system would read those via accelerometers or cmos image sensors. This will lead to touch less and hence system life and durability will increase.

Wi-Fi will make our system, to reach anywhere and control things from anywhere so we intend to use

Wi-Fi in our future systems which will make them more usable and can be use to access or control things via internet. Even Alphanumeric password can be implemented with shuffling key positions so that marks are not left on keypad so no one can guess by marks or dyes fading of keypads keys, as keys are at different position every time you use keypad.

VI. EXPECTED RESULT:

The gesture is entered using TSC and compared with EEPROM, if they are matching then it activates the output mechanism and give access granted message on the LCD, and if they don't match then access denied message is displayed on the LCD.

VII.CONCLUSION

In this project we will design our own touch screen controller and interface it with gesture engine via multi-microcontroller communications using RS232/UART protocol, we implement a pattern recognition algorithm for gesture matching and mechanism control for access. All will be done in embedded C using KEIL.

VIII.ACKNOWLEDGEMENT

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