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Design of Banking Security System Using Mems And Rfid Technology

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----------ABSTRACT----------
This paper concentrates on building up a system that will increase the Banking security. The loss of materials and equipment's due to theft is currently a massive problem in most of the firms. Stealing can be significantly reduced through proactive management techniques that stress the implementation of rigorous project specific security plans. We adopted an enterprise to improve banking locker security system which is based on RFID, GSM system and microcontroller devices. Here we have carried out some extra safety features in the existing scenario so the arrangement could become more secure than ever it would be. In this system we added a very interesting feature like the addition of a MEMS technology. MEMS accelerometer is implemented using embedded microcontroller. MEMS accelerometer can sense motion in 3 axes (X, Y and Z). The user can assign a predetermined password by a fixed set of motions as decided by them. Once the Microcontroller senses any motion, system is asking for a password. If anyone presses the wrong password then the system will be blocked. This progressed to the develop a Banking security system more safe as compared to that authenticates the user merely simply by using a PIN or password.

KEYWORDS: *RFID tag, MEMS Technology, GSM system, Microcontroller.*

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I. INTRODUCTION

In the 21st century people are concerned about their safety, for their valuable things. Old concepts and devices are getting modified as per requirement of people. In day to day life we need to seek new security arrangement. Thus we evolve to provide the maximum level security scheme. In this present age, safety was becoming an all important event for most of the masses, especially in the rural and urban regions. Some people will try to cheat or steal the property which may endanger the safety of money in the bank, house, and office. To defeat the security threat, a most of people will install a bunch of locks or alarm system. There are many types of alarm systems available in the market, which utilizes different types of sensor. The sensor can detect different types of changes occur in the surrounding and the changes will be processed to be given out an alert according to the pre-set value. By the same time this scheme may not be beneficial for all the time. Sensing elements are small hardware devices similar in flavor to RFID tags. While RFID tags emit identifiers, sensors emit information about their environments, like ambient temperature or humidity. Sensors typically contain batteries, and are thus larger and more expensive than passive RFID tags. Between active RFID tags and sensors, however, there is little difference but nomenclature. For example, some commercially available active RFID devices are designed to secure port containers. They emit identifiers, but also sense whether or not a container has been opened. Given such examples, there is surprisingly little overlap between the literature on sensor security and that on RFID security. The boundaries between wireless-device types will inevitably blur, as evidenced by the dual role of reader and tag played by NFC devices. Using machine motion techniques, in our approach logical patterns are obtained from physical sensor attached to the system [1].

II. EXISTING SCENARIOS

Especially all Indian banks use the old security system as compared to international banks, they are applying a mechanical arrangement to protect the lockers with the aid of two keys all, out of which one is for authorized person and another is with bank authority. When both keys are placed simultaneously the locker can be operated but sudden failure in the gears of the system or loss of keys occurs, then user has to face many difficult situations in this addition this system is time consuming also. Enormously growing banking technology has altered the way banking activities are treated with. Security measures at banks can play a critical, contributory role in preventing attacks on customers. These standards are of paramount importance when

considering vulnerabilities &causation in civil litigation and banks must meet certain criteria in order to guarantee a dependable and secure banking environment for their clients.

III. REVIEW OF LITERATURE

Shweta J Suggest that earlier security for Bank system is not very much efficient. Banks provide a locker system for their customers for safe keeping. In the current locker system, there is no separate banker to bring maintenance and pay heed to people wishing to access lockers. Her project aims to change the existing system and automate the locker system using RFID tags for customer identification. Every client is granted a unique RFID card with a unique number so that the customer can be identified and access can be allotted to the customer's locker [4].R Ramani & P. Niranjan et al. Expresses his view like that is to design and implement a bank locker security system based on RFID and GSM technology which can be organized in banks, secured offices and homes. In this system merely an authentic person can be recovered money from bank locker. They have carried out a bank locker security system based on RFID and GSM technology containing door locking system using RFID and GSM, which can activate, authenticate, and validates the user and unlock the door in real time for bank locker secure access. It is a low cost, low in power conception, compact in size and stand alone system. The microcontroller compares the passwords entered by keyboard and received through a mobile phone [2].

K Chandrasekar et al. They propose Motion Controlled Password Recognition system using MEMS accelerometer is implemented using embedded microcontroller. The accelerometer is a sensor which produces the electrical signal as per the movement. The proposed method uses the keypad to enter the password. Initially they have to set the position in accelerometer which is connected with the controller, so the controller gets the input analog signal and produces the respective ADC samples. When the controller realizes that the ADC samples are matched with the predetermined value in a controller, it will wait until we enter the password. If the entered password is matched, it will send the random password to the user mobile through the GSM technology and then the user enter the random password through the keypad interface. If the entered random password is checked, it will transmit the control signal to the driving circuit [3].

IV. METHODOLOGY

The conception of entire systems consisted of two sections which are hardware and software. The hardware is designed by the rules of embedded system, and the steps of software platform based on the programmed in C language with KeilμVision4.

The more details are presented as sticks with.

A. Hardware Design:

The LQFP64 chip is used as the core of entire hardware. Furthermore, the models of LCD, keyboard, alarm, Accelerometer sensor, GSM connect to the main chip (LQFP64).
On that point are some modules consisted of the system as follows:

- **RFID Fundamentals:**

Essentially, an RFID system consists of an antenna or coil, a transceiver (with decoder) and a transponder (RF tag) electronically programmed with unique data. There are many different types of RFID systems in the market. These are categorized on the base of their frequency ranges. Some of the most commonly used RFID kits are low-frequency (30-500 kc), mid-frequency (900 kHz-1500MHz) and high-frequency (2.4-2.5GHz). Essentially, an RFID system consists of three components: an antenna or coil, a transceiver (with decoder) and a transponder (RF tag) electronically programmed with unique data. An RFID reader is a device that is used to interrogate an RFID tag. The reader has an antenna that emits radio waves; the tag responds by sending back its data. An RFID tag is a microchip combined with an antenna in a compact package; the packaging is structured to allow the RFID tag to be bonded to an object to be covered. "RFID" stands for Radio Frequency Identification. The tag's antenna picks up signals from an RFID reader or scanner and then returns the signal, usually with some additional data (like a unique serial number or other customized information). A passive tag is an RFID tag that does not contain a battery; the power is supplied by the reader. When radio waves from the reader are encountered by a passive RFID tag, the coiled antenna within the tag forms a magnetic field. The tag draws power from it, energizing the circuits in the tag. The tag then transmits the data encoded in the tag's memory. The RX and TX pins of an RFID reader connected to the TX and Rx pins of ARM7 Microcontroller respectively. And so the reader senses the data from the Tag and transmits the sensed data to the microcontroller via serial port [2].

- **MEMS Sensor:**

Micro electro mechanical systems or MEMS are integrated micro devices or systems combining electrical and mechanical components. They are fabricated using Integrated Circuit (IC) batch processing techniques and can range in size from microns to millimeters. These systems can sense control and motivate on the micro scale and function individually or in arrays to generate effects on the micro plate. "The area of MEMS is based on the use of IC fabrication techniques to create devices capable of working as mechanical, electrical, and chemical transducers for applications in fields such as automotive and medical industries." It can be hard for one to imagine the size of MEMS devices. The general size of MEMS is on the order of microns (10 powers -6 m). The primary characteristic of MEMS is their diminished size. Due to their size, MEMS cannot be viewed with the unaided eye. An optical microscope is usually required for one to be able to see them.

The ADXL330 is a modest, slender, low power, complete 3-axis accelerometer with signal conditioned voltage outputs. The product measures acceleration with a minimum full-scale range of ±3 g. It can evaluate the static acceleration of gravity in tilt sensing applications, as well as dynamic acceleration resulting from motion, jar, or vibration [3].

- **GSM:** This GSM modem is an extremely flexible plug and play quad band GSM modem for direct and easy integration to RS232. Supports features like Voice, Data/Fax, SMS, GPRS and integrated TCP/IP stack [5].

B. Software Design:

The embedded platform discussed above is programmed in C language with KeilµVision4.

Keil µVision4: The LPC2148 is programmed with KeilµVision4. It is a Windows-based software program that combines a robust and modern editor with a project manager and make facility tool for growth. It integrates all the tools to develop embedded applications including a C/C++ compiler, macro assembler, linker/locator, and a HEX file generator. µVision helps expedite the growth process of embedded applications by providing the IDE (Integrated Development Environment). KEIL is used to create the source files; automatically compile, link and covert using options set with an easy to use user interface and finally simulate or perform debugging on the hardware with access to C variables and computer storage. Unless we have to use the tolls along the command line, the choice is open. This IDE, i.e. KEIL Greatly simplifies the procedure of producing and testing an embedded application. The user of KEIL centers on projects. A project is a list of all the source files needed to construct a exclusive application, all the tool options which define exactly how to make the application, and if required how the application should be imitated. A task is exactly the binary code required for the application. Because of the high level of flexibility required from the tools, there are many choices that can be set to configure the tools to maneuver in a specific and desired way. It would be very tedious to have to set these options up every time the application is being built; therefore they are stored in a project file. Loading the project file into KEIL informs KEIL which source files are involved, where they are, and how to configure the tools in the right manner. KEIL can then execute each tool with the correct options. Source files are added to the project and the tool options are set as required [5].

V. PROPOSED SYSTEM

The purported plan is drawn up of hardware and software tools, the hardware used are RFID tag& reader, MEMS sensor, LCD, GSM module, all is interfacing with the help of ARM7 and the software is designated by the Keil µVison software.We offered the idea using RFID & MEMS technology along with GSM modem for authentication of clients. When an authorized person comes to the door which consists of RFID tags, the person has to insert the ID card in predefine space. The card contains a unique barcode number which is the identity of an authorized person. As soon as a person inserts the card, the system will ask for the sensing the motion; MEMS accelerometer can sense motion in 3 axes (X, Y and Z). Initially we have to specify the position in accelerometer which is united with the controller, and then the controller receives the input analogue signal and brings forth the respective ADC samples. When the controller sees that the ADC samples are paired with the predetermined value in a controlled. If the motion will not detect by the system within the predetermined time instantly message will forward to higher authority and the nearest police station. If the system will detect the motion, it will ask for password again if the user will not press correct password, a message, will send to the higher authority through the GSM technology and then the user enters the random password through the keypad interface. If the entered random password is matched, it will send the command signal to the driving circuit. Driving circuit receives the command and forwards the signal to unlock the doorway.

The user can put a predetermined password by a defined set of motions as decided by them. Once the Microcontroller senses any motion, system is asking for a password. If any one person presses the wrong password, then system will be blocked. The individual will get three opportunities to enter the right password. If he enters the correct password, then the door of the locker will get opened, otherwise the main door will remain closed and buzzer will start as an indication of an unauthorized individual is attempting to enroll into a banking way. If any thief is standing behind user or authorized individual with any weapon at the time of user collect the hard currency/document. In this situation we have provided a switch which is placed exactly foot of the authenticate person. When user will press foot switch the system will blocked and display will shows 'system error' message simultaneously at the same time within 10seconds the door will be closed as well as buzzer GSM is used for sending a message to higher authorities when RFID READER, MEMS accelerometer sensor & password provided by bank will not detect. These technologies are a safe way of authentication because data of both technologies are unique, cannot be shared, and cannot be missed. Our project secures the money, valuable documents along with minimum risk factor.
The proposed block diagram of the Bank security system as recorded under:

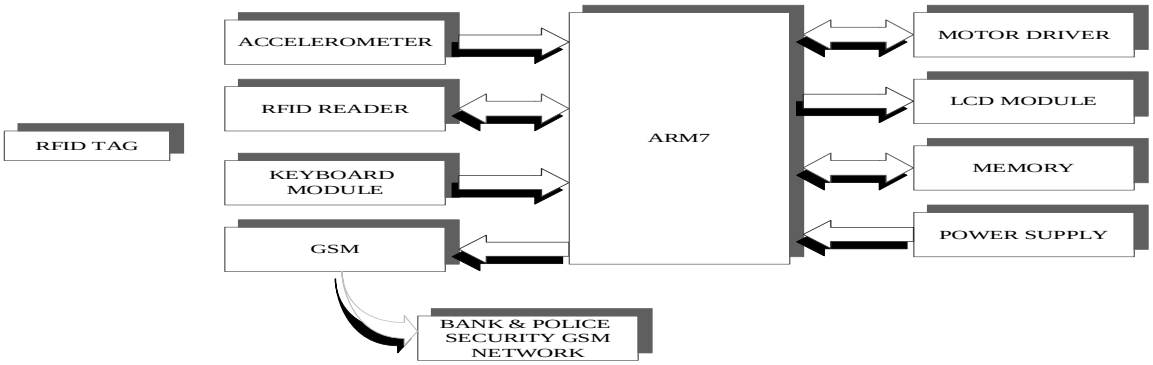

Fig. 1 Basic block diagram of Bank security system

Proposed design methodology:

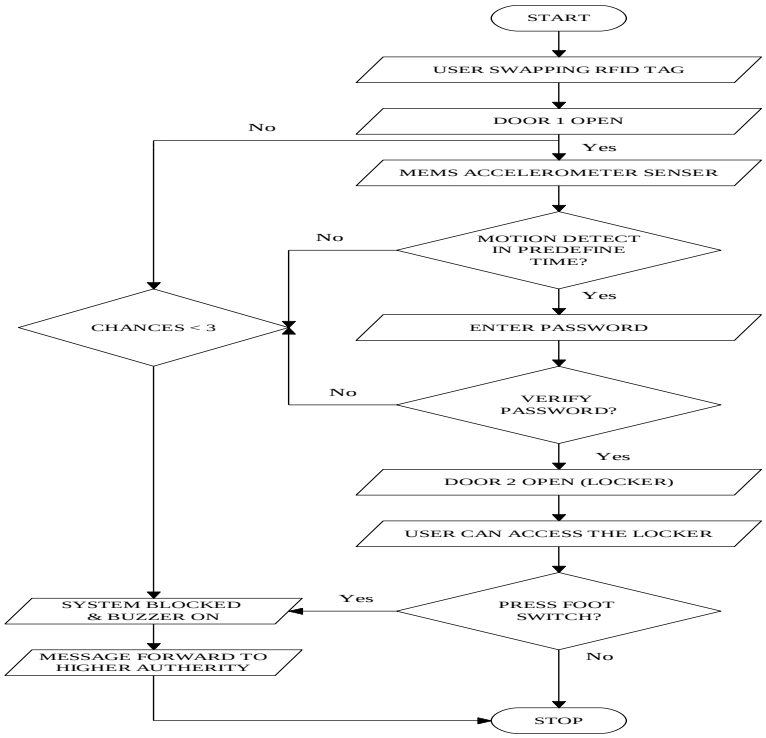

Fig 2: Flow chart of proposed system

VI. CONCLUSION

From review of various papers, I conclude that the growth in the electronic transaction scheme has resulted in a greater demand for accurate & fast user identification and authentication. The system consist of RFID tag and reader after scanning the tag the both doors will be open at 2000 milliseconds and practically time is taken by the door is 3000 milliseconds, then user will get three chances of inserting the right password with a wait of 1000 milliseconds, after completing the cognitive operation of dealing the first door will open at 2000 milliseconds then second door will open at 3000 milliseconds practically. We also included GSM modem for sending the text message to the user and the bank authorities, The Response time of GSM modem to transmit the message to user and authorities is 1000 milliseconds and the total time is consumed by the GSM modem to transmit the message [Practically] 5000 milliseconds. So we have found that with the help of Experimental result is in real time system intends to get delayed by fractions of moments. The accelerometer is a sensor which produces the electrical signal as per the movement.The Implementation of Banking security by utilizing RFID and MEMS Technology with GSM Modem took advantage of the constancy and reliability. The security features were enhanced largely for the reliability and stability of owner recognition. The whole organization was built on the technology of embedded system which clears the system more secure, reliable and comfortable to apply.

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