AUTOMATIC DIALING TO ANY PHONE USING I2C PROTOCOL ON DETECTING BURGLARY

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Abstract — The main objective of this paper is to intimate the concerned authorities about an unauthorized access of secured areas such as museums, residential houses, banks etc. As crime rate is on the rise and burglars are getting smarter, the security system for banks, shops and houses needs to be full proof. This proposed system ensures that at any moment if any unauthorized person tries to open the bank locker; a mobile number will be dialed through the GSM modem connected to it.

Keywords - GSM Modem, EEPROM, Fingerprint scanner, ATMEGA328, I2C Protocol, arduino compiler.

I. INTRODUCTION

The main objective of this paper is to intimate the concerned authorities about an unauthorized access of secured areas such as museums, residential houses, banks etc. As crime rate is on the rise and burglars are getting smarter, the security system for banks, shops and houses needs to be full proof. This proposed system ensures that at any moment if any unauthorized person tries to open the bank locker; a mobile number will be dialed through the GSM modem connected to it.

This paper uses a microcontroller from AVR family. An external memory EEPROM is interfaced to the microcontroller to store the contact number to which the call is to be made. The arrangement is made in such a way that when someone tries to open the door forcefully even when it is locked the ATMEGA328 gets an interrupt through a hidden switch mechanism interfaced to it. ATMEGA328 will automatically dial to the number which is stored in the EEPROM through GSM modem interfaced to it. ATMEGA328 fetches information from external memory like EEPROM using I2C (Inter IC communication) protocol.

Further this paper can be enhanced to use a cell phone or GSM modem with a serial camera connected to it. The camera will take photographs and sends it over MMS/ email attachment to the concerned authorities.

II. SYSTEM REQUIREMENTS

For the system we need following Hardware Components - ATMEGA328, EEPROM, GSM Module, LCD, Resistors, Capacitors, Diodes, Transformer, Voltage Regulator, Crystal, LED, Relay, Transistors, Fingerprint scanner, Push Buttons. For Software Interface we use Arduino compiler, Language Embedded C or Assembly.

1. GSM MODULE

4 Frequency GPRS/GSM Module is an ultra compact and reliable wireless module. It is a breakout board and minimum system of SIM900 Quad-band GSM/GPRS module. It can communicate with controllers via AT commands (GSM 07.07, 07.05 and SIMCOM enhanced AT Commands). This module support software power on and reset.

The GPRS is configured and controlled via its UART using simple AT commands. Just connect on the Arduino/Raspberry Pi/AVR/PIC/ARM/FPGA board, you could easy to use AT

command control it. This board can be connect to PC via FT233RL or USB-to-Serial Bridge Controller.

2. EEPROM

This specification covers a range of 16K bits I2C bus EEPROM products, the ST24/25C16 and the ST24/25W16. In the text, products are referred to as ST24/25x16 where "x" is: "C" for Standard version and "W" for hardware Write Control version. The ST24/25x16 are 16K bit electrically erasable programmable memories (EEPROM), organized as 8 blocks of 256 x 8 bits. These are manufactured in SGS-THOMSON's Hi-Endurance Advanced CMOS technology which guarantees an endurance of one million erase/write cycles with a data retention of 40 years. The ST25x16 operates with a power supply value as low as 2.5V. Both Plastic Dual-in-Line and Plastic Small Outline packages are available.

3. FINGERPRINT SCANNER

Fingerprints are one of those bizarre twists of nature. Human beings happen to have built-in, easily accessible identity cards. You have a unique design, which represents you alone, literally at your fingertips. How did this happen?

People have tiny ridges of skin on their fingers because this particular adaptation was extremely advantageous to the ancestors of the human species. The pattern of ridges and "valleys" on fingers make it easier for the hands to grip things, in the same way a rubber tread pattern helps a tire grip the road.

A fingerprint scanner system has two basic jobs -- it needs to get an image of your finger, and it needs to determine whether the pattern of ridges and valleys in this image matches the pattern of ridges and valleys in pre-scanned images.

4. SERIAL TO USB CONVERTER

The CP2102 is a highly-integrated USB-to-UART Bridge Controller providing a simple solution for updating RS-232 designs to USB using a minimum of components and PCB space. The CP2102 includes a USB 2.0 full-speed function controller, USB transceiver, oscillator, EEPROM or EPROM, and asynchronous serial data bus (UART) with full modem control signals in a compact 5 x 5 mm QFN-28 package. No other external USB components are required.

The on-chip programmable ROM may be used to customize the USB Vendor ID, Product ID, Product Description String, Power Descriptor, Device Release Number, and Device Serial Number as desired for OEM applications. The programmable ROM is programmed on-board via the USB, allowing the programming step to be easily integrated into the product manufacturing and testing process.

5. INTERUPT SWITCH

The Programmer's key, or interrupt button, is a button or switch on a computer which causes an asynchronous interrupt request (IRQ) to be sent to the processor.

6. ARDUINO COMPILER

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them.

Programs written using Arduino Software (IDE) are called **sketches**. These sketches are written in the text editor and are saved with the file extension .ino. The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and also displays errors. The console displays text output by the Arduino Software (IDE), including complete error messages and other information. The bottom righthand corner of the window displays the configured board and serial port. The toolbar buttons allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor.

7. EMBEDED C LANGUAGE

Embedded C is a set of language extensions for the C Programming language by the C Standards committee to address commonality issues that exist between C extensions

for different embedded systems. Historically, embedded C programming requires nonstandard extensions to the C language in order to support exotic features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations.

In 2008, the C Standards Committee extended the C language to address these issues by providing a common standard for all implementations to adhere to. It includes a number of features not available in normal C, such as, fixed-point arithmetic, named address spaces, and basic I/O hardware addressing. Embedded C uses most of the syntax and semantics of standard C.

III. SYSTEM DESIGN

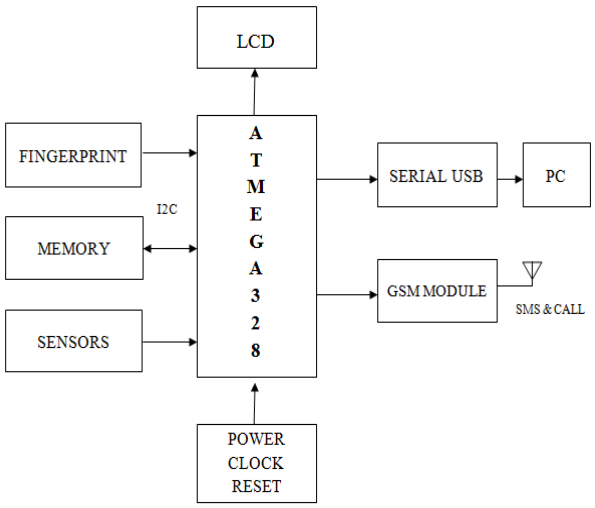

Fig. 1 System Design

The working is start with entering fingerprint by the fingerprint scanner. if entered fingerprint is matched with stored fingerprint the door will opened otherwise door is closed. If any anotherised activity is happening in front of the door and anyone trying to break the door, the relay contact will break. It causes an interrupt which is received by computer and GSM module. Camera attached to computer will turned on and take the picture of front door and store it in different separate folder with date and time. At the same time GSM module first send the SMS on the mobile number which is stored in EEPROM and after that it connect call on that mobile number.

The LPG leakage, overflow of water and unotherised opening of window also causes interrupt and above procedure will repeat. After entering the fingerprint we have to push verify button to verify the fingerprint which is entered. At enroll switch with the help of enroll key we can add number of fingerprint which will become key of the door and with the help of this fingerprint we can open the door. At the same time we can delete the fingerprint of the people which is entered at the time of testing by pressing delete buttob. the whole verify, enroll and delete operation status will display on 20X4 LCD.

The block diagram consist of controller, LCD, serial to usb converter, Gsm module, sensors, memory, fingerprint scanner, power. For controller we used ATMEGA328 because of the desirable result given by this IC. At fingerprint scanner block the GT511-C1 device used , for GSM Module SIM 900 and for serial to USB converter CP2102 is used. For memory block 24c16 is used.

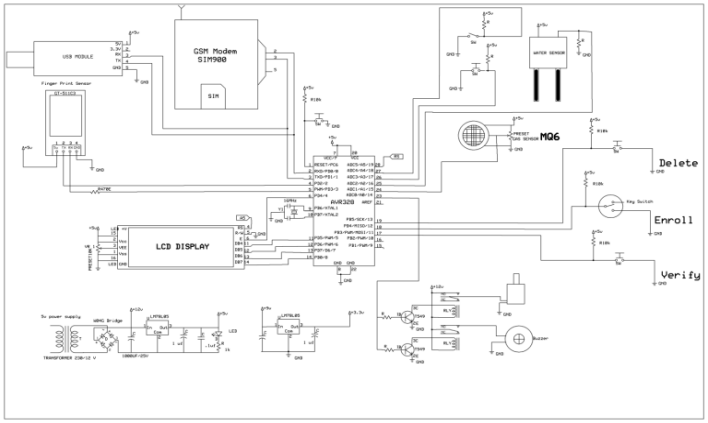

Fig. 2 Circuit Diagram

For sensor block limit switch, micro switch and NQ6 is used for Door, Window and LPG ges detection respectively. For LCD 20X4 display is used. In power block step down transformer is used to step down the 230V to 12V. It is further filtered to obtain 12V DC voltage.

1. ADVANTAGE

- I2C only requires two signal lines.
- Require low power supply that is 5V.
- Using AVR controller, working speed of system is best.
- Using EEPROM adding and deleting of contacts possible.

- Sending SMS on each member of family is possible due to gsm module.
- Buzzer, water sensor, LPG sensor micro switch and limit switch make hose free from all unauthorized access.
- I^2C protocol require only two signal lines.
- Collision detection for longer distance is possible only in I^2C protocol.
- In case of power cut it will work on battery also.
- Flexible data transmission rates.
- Each device on the bus is independently addressable.
- Devices have a simple Master/Slave relationship.

2. DISADVANTAGE

- Since only 7-bits (or 10-bits) are available for device addressing, devices on the same bus can share the same address.
- Only a few limited communication speeds are available and many devices do not support the transmission higher speeds.
- The shared nature of the I2C bus can result in the entire bus hanging when a single device on the bus stops operating.
- Using all pins of ardunio will increase the chance of data hang, to resolve it there is reset button on AVR controller, which reset the AVR.
- If registered mobile is power off then call couldn't make. only SMS on other registered number is indication, but probability is very small.
- If fingerprint scanner will destroyed, it will very difficult to open the door, but it also resolved by advance technology.
- The system make our house full secure, ultimately cost high.

IV. CONCLUSION AND FUTURE SCOPE

Improvement can be done by using a cell phone or GSM modem with a serial camera connected to it. The camera will take photographs and sends it through MMS/ email attachment to the concerned authorities. The main objective of this project is to intimate the concerned authorities about an unauthorized access of secured areas such as museums, residential houses, banks etc. As crime rate is on the rise and burglars are getting smarter, the security system for banks, shops and houses needs to be full proof.

By Increasing the storing capacity of memory and fingerprint scanner it will used in museums, banks, factory etc. In future smart cities with availability of internet live video and MMS can also available on the device using by owner. Interfacing the Morden accident (which may happen in house) sensor interfacing with AVR , the will make it updated.

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