

# Implementation of Security System on Arduino

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**Abstract:** In this paper we are providing enough security to satisfy the needs. The user will be prompted to enter a password to unlock the application. After successful password entry, the application will unlock for a specified amount of time enabling anyone to store or restore anyone's valuables, if the user enters an invalid password then it will intimate that the password is incorrect corresponding equivalent message will be displayed.

This implementation of "Arduino password based security system" can be used to provide enough security to avoid hackers in various places like bank lockers, security doors, BIOS locking in computer etc.

In this paper we use an Arduino Mega 2560 kit that consists of AT Mega2560 which is one of the most popular microcontrollers that consists of 54 pins and 16 pins are used for analog general purpose pins, EEPROM of capacity 4KB and a static ram of 8KB flash memory of 256KB implementation of security system on arduino atmega2560.

**Key Words** —Arduino kit Atmega 2560, Arduino software, Toggle switch connecting wires.

## I. INTRODUCTION

This paper is based on arduino Atmega 2560 security system. In this ever growing field of electronics everything which is manufactured is too compact and easy to handle and to understand. The world is moving towards the safe and secured, today's life of technology is improving new systems are introduced. Bank locker system is one of the ways of giving something new to world of traveling. Bank lockers are used to keep the valuable things, important documents etc. Bank locker security or everywhere the protection is needed for the safety of the valuables. There are many cases of bank robbery from the bank lockers. In today life bank ATM centers are also not safe enough as there has been some cases of money robbery from these ATMS.

### Existing system

In every bank locker system consist of two keys to open the locker of the bank. If any customer wants to open the locker, for that two keys must be inserted in the locker. One of the which belongs to manager and second belongs to another customer of the bank (cashier). The above system has many drawbacks such as 1) Both the bank manager and the customer must have to be present with the keys to open the locker 2) There is possibility of losing the key which makes the system insecure 3) The system is unable to match with today fast moving digital world 4) The keys can be manufactured exactly similar to original ones Considering all these drawbacks we have designed a bank locker system

which is small attempt to compete with the today's digital world.

### Proposed system

In this system we use arduino board on which we are doing some task for better security purpose. In this system first it will ask the password to unlock the locker or door if it is correct then it will unlock the door and the connected led will get turn on or else if the password is incorrect then it will intimate to enter again the password is wrong. But in that case we have to remember the default password which has been set already otherwise it will not unlock the door of the system. After that if we want to change the password of that system we have to press a switch (toggle switch) manually which is connected to the pin no 10 which is general purpose input output pin of arduino. Then after switching the pin it will ask again to enter current password after entering the current password then set a new password. So no one can hack the password of the system only that person can unlock who has set the default password. The password can be numeric, alphabet as well as special characteristics. It makes the system safe and secure.

## II. ARDUINO IDE

### 2.1 Software (IDE)

The Arduino project provides the Arduino integrated development environment (IDE), which is a cross-platform application written in the programming language Java. It originated from the IDE for the languages Processing and Wiring. It is designed to introduce programming to artists and other newcomers unfamiliar with software development. It includes a code editor with features such as syntax, brace matching, and automatic indentation, and provides simple one-click mechanism to compile and load programs to an Arduino board. A program written with the IDE for Arduino is called a "sketch".

The Arduino IDE supports the languages C and C++ using special rules to organize code. The Arduino IDE supplies a software library called Wiring from the Wiring project, which provides many common input and output procedures. Typical Arduino C/C++ sketches consist of two functions that are compiled and linked with a program stub main () into an executable cyclic executive program:

- Setup (): a function that runs once at the start of a program and that can initialize settings.

- Loop (): a function called repeatedly until the board powers off.

After compiling and linking with the GNU tool chain, also included with the IDE distribution, the Arduino IDE employs the program argued to convert the executable code into a text file in hexadecimal coding that is loaded into the Arduino board by a loader program in the board's firmware.

## 2.2 LIBRARIES OF ARDUINO

Libraries of Arduino: The Arduino environment can be extended through the use of libraries, just like most programming platforms. Libraries provide extra functionality for use in sketches, e.g. working with hardware or manipulating data. To use a library in a sketch, select it from Sketch>Import Library. A number of libraries come installed with the IDE, but you can also download or create your own. See these instructions for details on installing libraries.

### Standard Libraries

- EEPROM - reading and writing to "permanent" storage
- Ethernet - for connecting to the internet using the Arduino Ethernet Shield
- Firmata - for communicating with applications on the computer using a standard serial protocol.
- GSM - for connecting to a GSM/GRPS network with the GSM shield.
- Liquid Crystal - for controlling liquid crystal displays (LCDs)
- SD - for reading and writing SD cards
- Servo - for controlling servo motors
- SPI - for communicating with devices using the Serial Peripheral Interface

## III. TECHNICAL SPECIFICATIONS

### 3.1 Features of Arduino ide Atmega2560:

Microcontroller	Atmega2560
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	54
PWM Digital I/O Pins	15
Analog Input Pins	16
DC Current per I/O Pin	20 Ma
DC Current for 3.3V Pin	50 mA
Flash Memory	256 KB (Atmega2560)

8 KB used by boot loader

SRAM	8 KB (Atmega2560)
EEPROM	4 KB (Atmega2560)
Clock Speed	16 MHz
Length	101.52 mm
Width	53.3 mm

## IV. ARDUINO SYSTEM

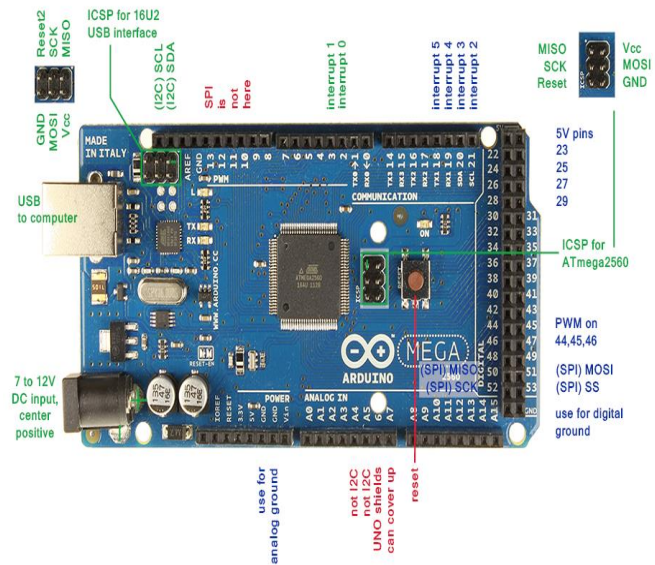


Fig:1 Arduino Atmega 2560

### 4.1 Power

The Arduino/Genuino Uno board can be powered via the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery.

### 4.2 SENSORS

Experts believe modern day security system may become more effective and secure by producing three dimensional images. Although the jury is still out on this matter, this may not change the fact that sensors and detectors are two of the most important input or initiating components of present day surveillance systems. Sensors and detectors may be two sides of the same coin, however, they serve the same purpose and that is to secure and protect.

#### Types of Sensors Use for Security Purpose:

Some of the types include glass breaking detectors, heat detectors, motion sensors, window and door switches, and

smoke detectors, pir sensor ,door sensor ,window sensors, video motion sensors They all serve different purposes and can add crucial value to any sophisticated home security system.

### 4.3 Passive Infrared (PIR)

A PIR or a Passive Infrared Sensor can be used to detect presence of human beings in its proximity. The output can be used to control the motion of door.

Basically motion detection use light sensors to detect either the presence of infrared light emitted from a warm object or absence of infrared light when a object interrupts a beam emitted by another part of the device. A PIR sensor detects the infrared light radiated by a warm object. It consists of pyro electric sensors which introduce changes in their temperature (due to incident infrared radiation) into electric signal. When infrared light strikes a crystal, it generates an electrical charge. The PIR sensor IC consists of 3 pins- vcc, Ground and Output.

### 4.4 Application using PIR Sensor

Automatic door opening system opening and closing of doors is always a tedious job, especially in places like shopping malls, hotels and theatres where a person is always required to open the door for visitors.

#### 7 Areas of Applications of PIR Sensors

- All outdoor Lights
- Lift Lobby
- Multi Apartment Complexes
- Common staircases
- For Basement or Covered Parking Area
- Shopping Malls
- For garden lights

## V. ALGORITHM

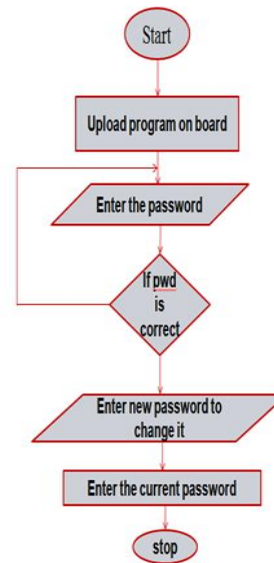


Fig: 2 Flowchart

First we have upload a program on board then, it will ask to enter the password if it is correct then it will unlock the system else we have to enter it again and it will intimate password is wrong after that if we want to change the password then we have to toggle the switch manually then we have enter current password then new password.

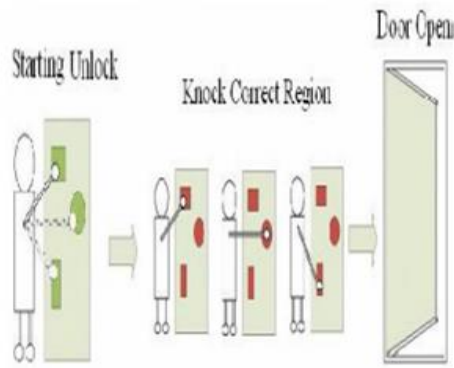
## VI. APPLICATION

### Door Unlocking By Using Security System



#### Process of door unlock

This system is useful for more secure and easily implemented in various places like offices, home automation, industrial automation etc. for giving the high protection.



In this door unlocking system provides the protection and that process is explained above.

## 6.1 APPLICATIONS

- Door Locker system
- Bank lockers
- In Vehicles mostly used
- BIOS locking in computer system
- Industrial purpose
- Mobile security system
- Alarm clock
- Firewall
- Army purpose

## CONCLUSION

This paper on implementation of security system is effective in providing enough security as long as the password is not shared. In future this implementation of "Arduino based password security system" can be provided maximum security by the above enhancements in order to completely satisfy user's needs. To change the password we have used one mode switch (toggle switch). So the switch needs to be pressed manually to change the password and set new password.

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