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SMART LOCKER WITH WIRELESS CONTROL USING IOT TECHNOLOGY

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ABSTRACT:

Recently, the use of Internet of Things (IOT) technology in all aspects of life has increased, and the most important areas that have been affected by this development are locks, security systems, and remote-control technologies. In this project, the proposed Smart Locker based on the WIFI technique can be controlled remotely using a mobile phone application to design the interfaces that help to enhance security and convenience. In addition to that, an alternative technique will be provided to open the lock by using a Keypad 4x4 when the mobile phone is not available.

I. INTRODUCTION:

The internet of things has been rumored to be the next big thing.The internet of things is a network of physical objects embedded with electronics that enable them to collect and exchange data.The application of these devices often make our live much easier,but with the rapid development of these instruments we often overlook security. As we start increasing the connectivity of physical devices they often become susceptible to breaches in security.With the development of new IoT devices security is often overlooked and this makes these devices especially vulnerable.Security firms like Kaspersky have shown the vulnerabilities in systems like smart homes,baby monitors,car washes and police surveillance systems. Whether a hacker wants to wash their car free of charge, or stalk someone via their fitness tracker IoT security flaws make it possible. Wind River published a white paper on IoT security in January 2015 and one of their main points was that its an unrealistic expectation that it is somehow possible to compress 25 years of security evolution into novel IoT devices. Despite glaring and gaping holes in many IoT devices they continue to be released, and the world that we are living in has continued to become more connected. For instance, as recently as May 2016 it has been released that computer scientists at University of Michigan have discovered vulnerabilities in Samsungs Smart Home automation system that allowed them to carry out a host of remote attacks, including digitally picking connected locks from anywhere in the world. Samsungs SmartThings system is one of the leading Internet of Things platforms for smart homes and the researches discovered that the attacks were made possible due to two intrinsic design flaws that are not easily fixed. Information such as this forces us consumers to think twice before using systems such as this to connect locks and other security-critical devices. Sadly many people dont think twice because as time goes on we are becoming more and more conditioned to trust technology.

II. POWER SUPPLY

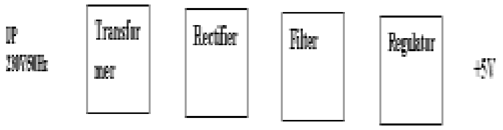


Figure: Power Supply

III. HARDWARE

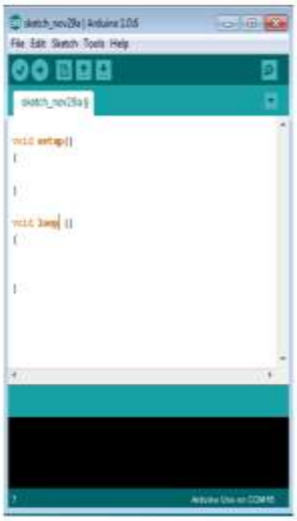
3.1Arduino

Arduino is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programed (referred to as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board.

The key features are −

- Arduino boards are able to read analog or digital input signals from different sensors and turn it into an output such as activating a motor, turning LED on/off, connect to the cloud and many other actions.

- You can control your board functions by sending a set of instructions to the microcontroller on the board via Arduino IDE (referred to as uploading software).
- Unlike most previous programmable circuit boards, Arduino does not need an extra piece of hardware (called a programmer) in order to load a new code onto the board. You can simply use a USB cable.
- Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program.
- Finally, Arduino provides a standard form factor that breaks the functions of the micro-controller into a more accessible package.



```
void setup()
{

}

void loop()
{

}
```

3.2 Liquid Cristal Display

A liquid crystal display (LCD) is a thin, flat display device made up of any number of color or monochrome pixels arrayed in front of a light source or reflector. Each pixel consists of a column of liquid crystal molecules suspended between two transparent electrodes, and two polarizing filters, the axes of polarity of which are perpendicular to each other. Without the liquid crystals between them, light passing through one would be blocked by the other. The liquid crystal twists the polarization of light entering one filter to allow it to pass through the other.

A program must interact with the outside world using input and output devices that communicate directly with a human being. One of the most common devices attached to an controller is an LCD display. Some of the most common LCDs connected to the contollers are 16X1, 16x2 and 20x2 displays. This means 16 characters per line by 1 line 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively.

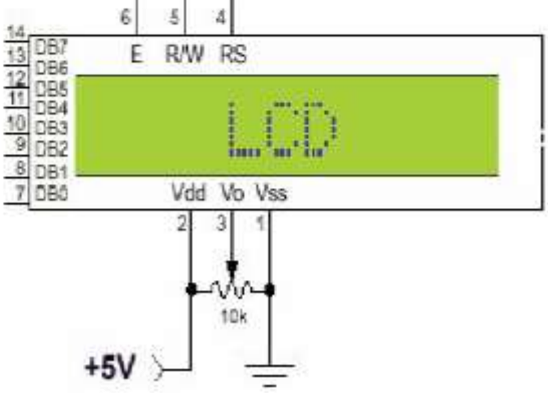


Figure :1. Pin diagram of 1x16 lines LCD

3.3 L293D

L293D is basically a high current dual motor driver/controller Integrated Circuit (IC). It is able to drive load having current up to 1A at the voltage ranging from 4.5V to 36V. Motor driver usually act as current amplifier because they receive a low current signal as an input and provides high current signal at the output.

Motors usually operates on this higher current. L-293D has to builtin H-Bridge driver circuits and is able to control two DC motors at a time in both clockwise and counter clockwise direction. It has two enable pins and they should be kept high in order to control the motor. By changing the polarity of applied signal motor can be rotated in either clockwise or counter clockwise direction. If L 293D enable pin is high, its corresponding driver will provide the desired out. If the enable pin is low, there will be no output. L-293D has different features including internal ESD protection, large voltage supply range, large output current per channel, high noise immunity input etc. L 293D plays a vital role in electronics era and has several different applications e.g relay drivers, DC motor drivers, stepping motor drivers etc. The further detail about L 293D motor driver/controller will be given later in this tutorial.

3.4 WIFI Module:

The ESP8266 is a low-cost WiFi module that can be integrated easily into IoT devices. We've featured several projects using this module, such as **How To Make Smart Home Electronics: A Smart Mailbox** and **How To Read Your Arduino's Mind: Building A Childproof Lock**. This tutorial will walk you through setting up ESP8266 Wifi module which can be used with Arduino. The ESP8266 comes in many models with different functionalities. We'll be focusing on the ESP8266 ESP-01 module, the most common and basic one available.

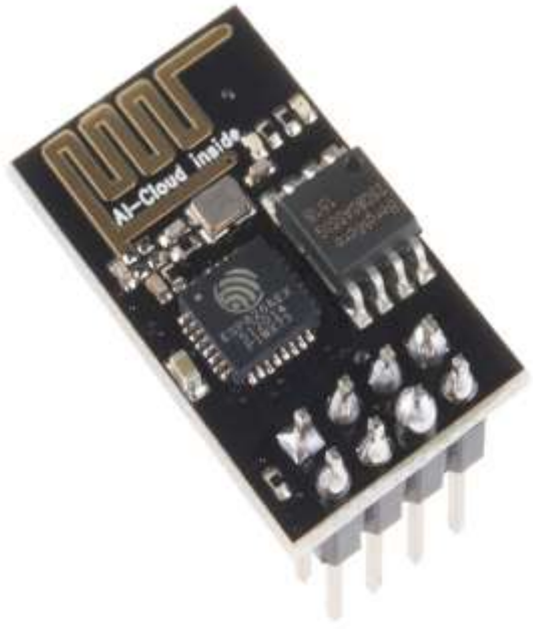


Figure 1. ESP8266 ESP-01 module / ©Sparkfun

Keypad (matrix)

A **keypad** is a set of buttons arranged in a block or "pad" which usually bear digits and other symbols and usually a complete set of alphabetical letters. If it mostly contains numbers then it can also be called a **numeric keypad**.

Keypads are found on many alphanumeric keyboards and on other devices such as calculators, push-button telephones, combination locks, and digital door locks, which require mainly numeric input. In keypad we have keys arrays in which keys can be arranged in different combinations and the matrix keypad in which keys are arrange in a particular rows and columns.

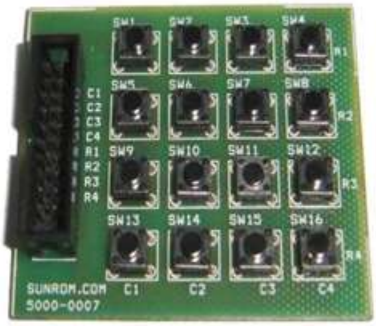
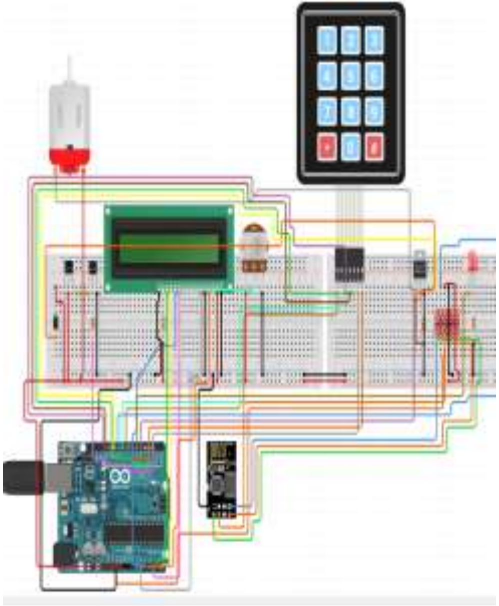


Figure: matrix keypad on PCB board.

3.5 Buzzer:

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

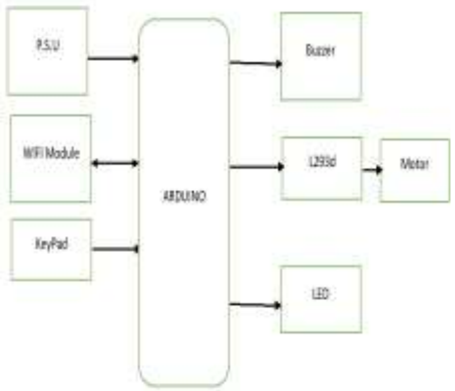
3.6 Schematic Diagram:



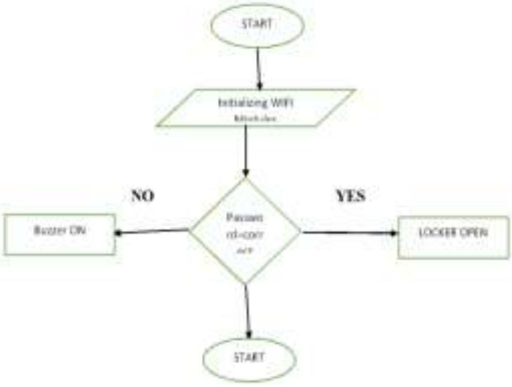
IV. Result:

4.1 WORKING And RESULT

Block Diagram:



4.2 Flow chart:



Working:

In this project, the proposed Smart Locker based on the WIFI technique can be controlled remotely using a mobile phone application to design the interfaces that help to enhance security and convenience. In addition to that, an alternative technique will be provided to open the lock by using a Keypad 4x4 when the mobile phone is not available.

V. CONCLUSIONS

A complete smart lock open-source system is implemented on a ARDUINO Microcontroller board. This means that system administrators can access the web server running on the board itself, and the users can enter codes that are validated by onboard software too. Authors provide a step-by-step guide to install and test the system. Besides, developers around the world can extend and modify the available source code with minimum complexity. Although this is the first available version of the proposed system, its architecture enables modular development, management, automation, and eases updating and maintenance by means of stable, professional, and widel accepted software tools.

VI. REFERENCES

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