

# SMART LOCK SYSTEM

*Pattern recognition*



*By*  
*Ishita Acharya*  
*Ritika Hassanandani*  
*Team 11*

# INTRODUCTION

---

Security is a major concern in our day to day life, and digital locks have become an important part of these security systems.

There are many types of security systems available to secure our place.

Here is a list of available technologies and their limitations

- Lock and key (old school) - The most common and widely used type of lock available in the market is lock-key. While the key is easy to lose, this type of security is not entirely safe.
- Cards - These types of locks are card-based and are not secure mainly because of the possibility of card loss and misuse.
- Finger scan – Finger scan is now most widely used security system mainly in the electronic gadgets. While these are safe, they are not pocket friendly.
- Other Biometric Identifications – Other Biometric-scans are not easy to use and are quite costly.
- Key / pin protected – The key or pin protected locks are widely used these days but the problem with such locks is, they are not easy to install and also, they are quite costly.

## What else?

All the current lock systems that are being used today, are not suitable for people with special needs. A person with disability will find it hard to use a card or key to unlock the systems, and the biometric scanning will again pose problems for people with vision impairment.

# FEATURES AND FUNCTIONALITIES

---

The main idea is to create a pattern recognition safety system that will allow users to set and enter knocks/patterns. The master user will enter his/her knock pattern which will then get saved and the subsequent inputs will be checked based on that. This allows secure access and password in this case, cannot be lost or stolen!

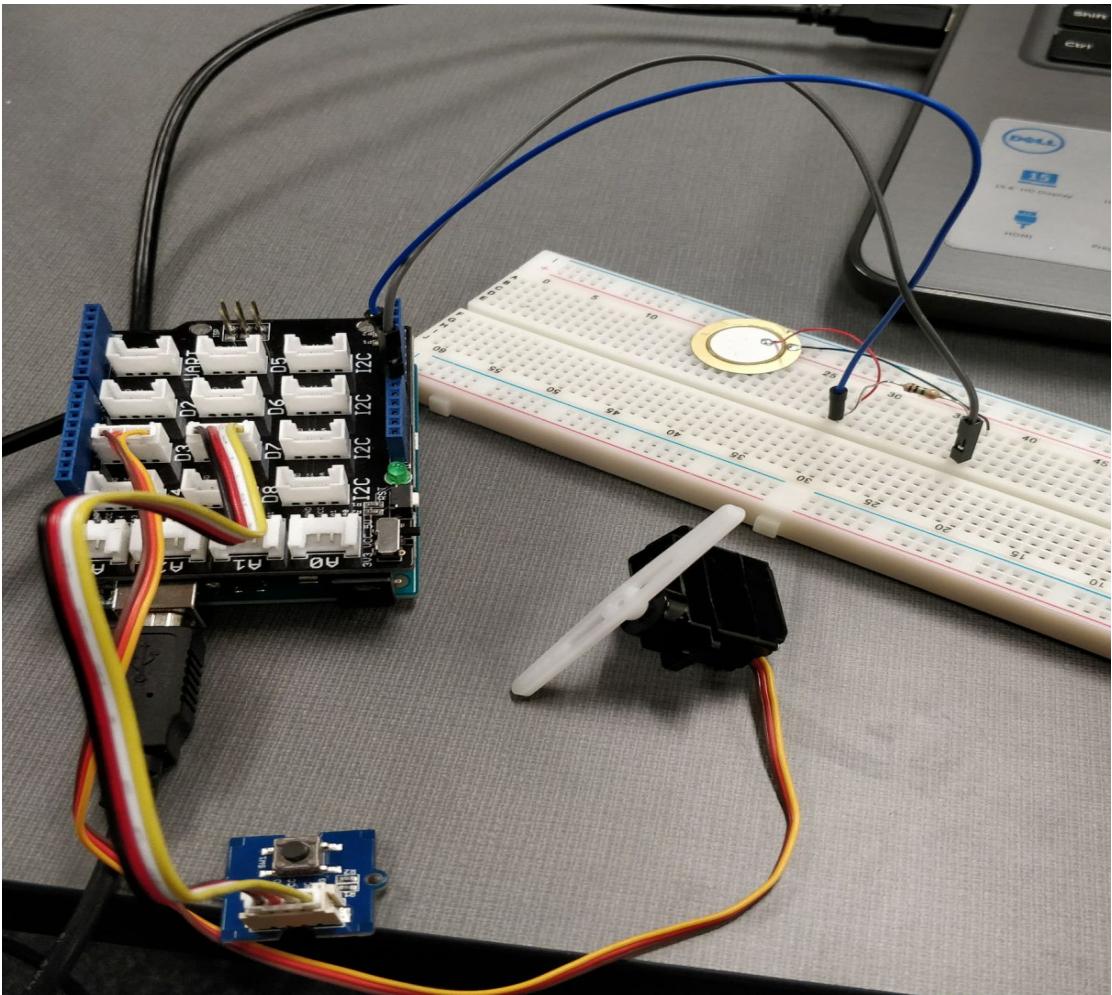
- This smart lock stores the patterns and checks for the subsequent inputs given by user/s.
- This is a Secret Knock Detecting Door Lock using Arduino which can detect the pattern of your knocks at the door and will only open the lock if the knocking pattern matches with the correct pattern.
- The pattern (password) is getting stored in the cloud (using Azure Blob storage) and with each input, this stored value is checked and analyzed.
- If the input value matches the stored pattern, then the door unlocks

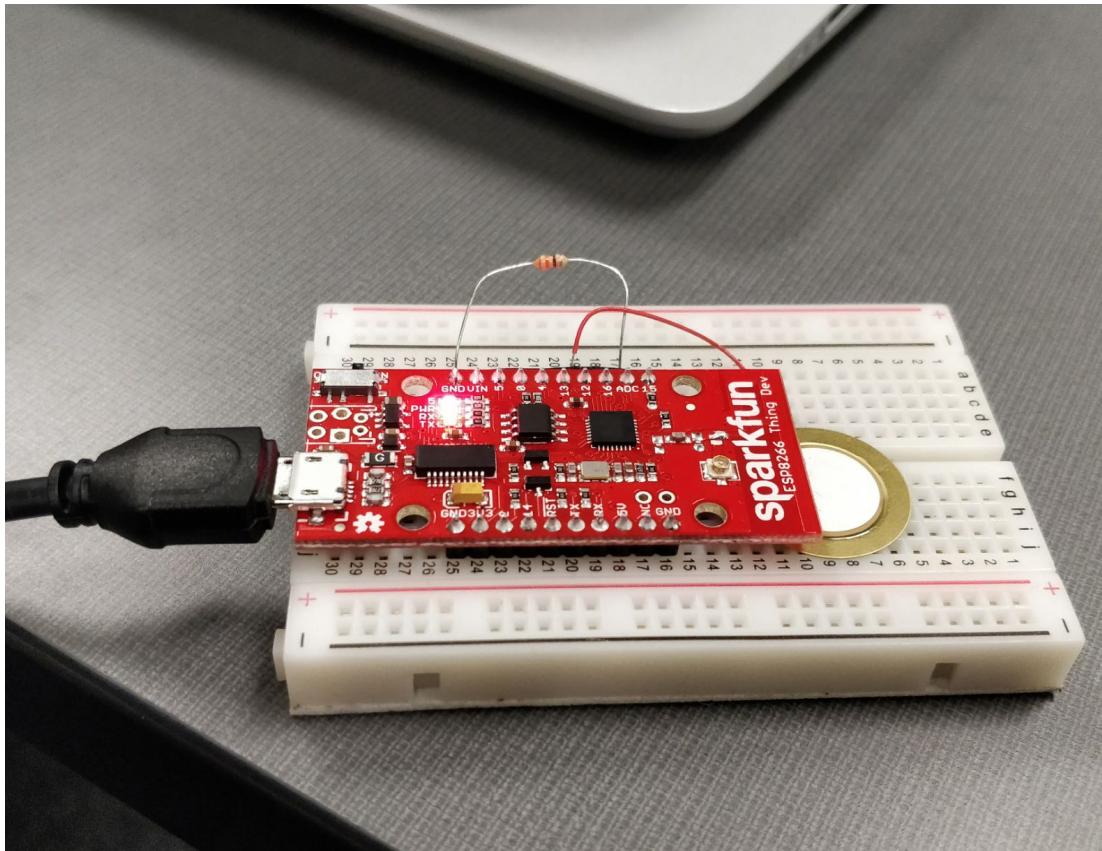
## WORKING

---

### Components:

1. Piezo Buzzer
2. Arduino Uno/Spark Fun
3. Servo motor
4. Resistor
5. Push Button
6. Connecting wires





- When the user wants to set the password, he presses the button once, and knocks the pattern that he wants to store.
- This pattern is stored in the cloud.
- Next, when he enters any pattern, it is checked against the stored pattern and opens the door if accepted.

## SECURITY

---

The door/cover which is deployed with such pattern recognition locks give an impression of having no locks at all! Thus, any attempt to breach such secure locks will have almost zero possibility of success. When the intruder doesn't know where the lock is, he/she cannot hack it!

Below is the list of security measures that are taken care of:

1. Wrong inputs are restricted

2. An alarm is generated and an email is sent to the user when there are any suspicious activities / wrong trials.
3. Patterns are very sensitive and any irregularity in input patterns will be detected and will not be authorized.  
Hence, password is not lost or stolen as it is very personal to the user.

## **EXTENSIONS AND FUTURE POSSIBILITIES**

---

- Multi password / Multi user – An important extension of Smart Lock System can be storing multiple passwords
- Alexa – Connecting to Alexa will not only give it an user-friendly and easy access but can also be used to implement in a manner which is helpful for people with disabilities.
- Portability and remote access – An interesting extension to the current project would be to have a portable Piezo buzzer to unlock from anywhere via cloud.
- User interface for an easy storage of name, email ID and/ or contact number for raising alarms in case of suspicious activities
- Reset - For resetting the pattern, only the master user shall have the access via mail.