Smart Cupboard: Safe and Secure System

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Abstract: As burglary is increasing in these days, measures and steps have to be taken to prevent this action and to keep commodity safe and secure. Many security systems are available in market like CCTV, home security systems, alarms etc to provide security. This paper presents a multi level model to develop a security system for cupboard. As the statistic of levels increases, the productivity of security will rise. This work incorporates primary level which consists of unique password and RFID technology, and secondary level includes finger print authentication. Any security failure detected will alert the authorities with the aid of GSM technology, and therefore taking the urgent actions immediately. IOT technology is also adopted for the real time data capturing.

Index Terms: GSM shield, Hex Keypad, RFID, Raspberry pi, pi camera, Finger print module.

I. INTRODUCTION

Theft rate in India is increasing day by day which is the basic motivation of this paper. Seriousness of guarding is essential for every systems and organizations in this increasing hacking environment. Many layer of security are essential for effective guarding. To accomplish safety aspects, security systems are crucial for all houses and industries. Security defines safeguard of life and property. This paper defines a system for cupboard that provides better assistance at low cost compared to the existing systems. Automatic door system for cupboard or locker have turn into a classic feature of different buildings and houses. There was a prerequisite to automate door of cupboard or locker so user can take favor of GSM technology, IOT and computer control system.

II. SYSTEM ARCHITECTURE

Fig 1 shows the block diagram of the smart cupboard security system. The access of the door of cupboard or locker is controlled with the aid of two different levels[1]. The first level has an Arduino microcontroller as its control unit comprise various input components such as RFID reader, Hex keypad[2]. These two components have their predefined unique password and RFID tag[3]. The output from the controller is given to the actuators attached with the modules to open the door, when enrolled the correct password and reads the respective tag .If the tag and password entered is invalid then alarm buzzer will turn on and a message will be forward to the corresponding person about the unauthorized access. The second level consist of a Raspberry pi microprocessor[4] as its control unit,and its input components are arduino, finger print sensor and ultrasonic sensor. Finger print sensor[5] stores the finger print of authorized person and ultrasonic sensor[6] will detect the motion. If fingerprint sensor scans the wrong finger print and also detect a motion without enrolling the registered fingerprint then an alert message will be send to the predefined number. Internet Of Things[7] is an ecosystem of associated physical objects that are accessible through internet. Incorporate IOT with this system is to notice the accessing information.
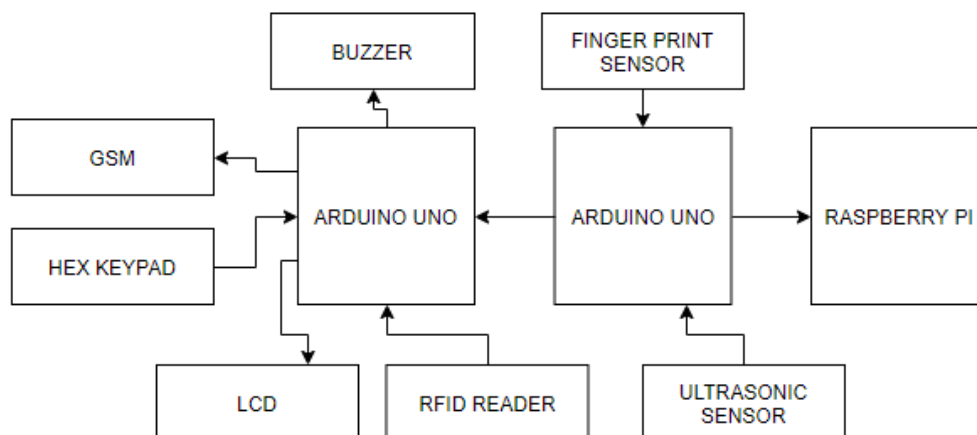

Fig 1 Block Diagram of the Smart Cupboard

At the primary level when system receives unique password and scans the authorized tag will open the door and enters into secondary level where valuables are kept. If the password and tag went wrong then an alert message will send to a predefined number by GSM technology [8] and also buzzer will turns on. Fig 2 shows the flowchart of primary level.
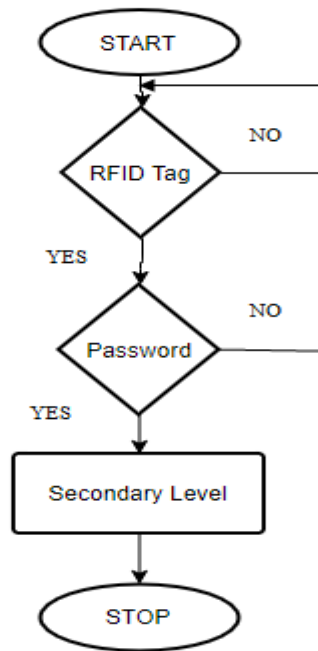
Fig 2 Flow chart of primary level

In secondary level, when scans the correct fingerprint [9] , can access the level and opens the next door.If the valuables are picked without scanning the fingerprint or without the correct protocol,ultrasonic sensor will detect the unauthorized motion and alert the authorities.Fig 3 shows the flowchart of secondary level.
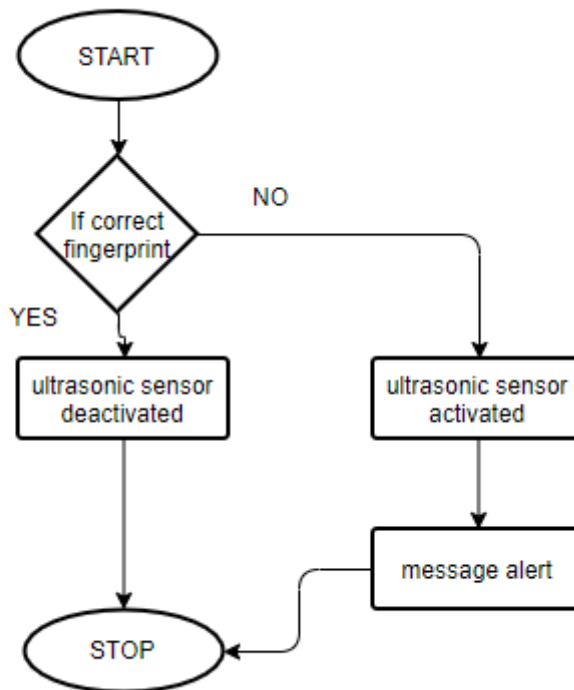

Fig 3 Flow chart of secondary level

In addition IOT technology is also used, where an app is created to store data about who and when the system is accessed.

III. CONCLUSION AND FUTURE SCOPE

Design a multilevel security system with two different levels i.e primary and secondary level to enter into the vault and to access goods. In primary level it includes Hex keypad and RFID. In secondary level it consist of fingerprint module and ultrasonic sensor to access the valuables stored inside the cupboard. As the level increases, security also rise to maximum. Real time data capturing is also achieved by IOT technology which gives extra advantage.

Facial detection using Pi camera can be implement in future aspect which will increase the level and hence security. And real real time image capturing can also add to identify the unauthorised person, which will improves the benefit of the system.

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