Arduino Security Panel System

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***Abstract*—In this article, we will talk about a research proposal to do some modifications to an existing system built on the concept of interactive hardware. The system which we have chosen is a security system which is named as Arduino Security Panel System and was developed by Mert Arduino [1]. In this system, the person trying to get access to the property needs to enter a secret passcode. The system is straightforward and serves the purpose of security. However, we will extend this project to make it more efficient and usable.**

***Index Terms*—design, security panel, digital locking, CS 807**

I. Existing System

THE Arduino Security Panel System which was developed by Mert Arduino is a device which can be used as a lock to a door. It has a simple user interface to interact with the person. The person needs to enter the passcode in order to open the lock. An LCD is used to display some message or to show the input given from the keypad. A potentiometer is used to control the brightness of the LCD. Two LEDs one green and one red is used to provide some indications. The green LED will glow if the passcode entered is correct and the red LED will glow if the passcode entered by the person is incorrect. Overall the system provides security to the component to which it is attached.

II. Motivation

We were given a task by the professor to choose an existing project and make some modifications to it. The project which we have chosen seems to be missing some functionalities which could attract more users. In this modern era, everyone wants to connect from anywhere to anything. So, we will try to make it accessible that way. And also provide some more functionalities to give flexibility to the user to maintain the device, for example:- changing the passcode. Many digital locking systems are already available in the market, but they are a lot more expensive. So, we will also keep the cost factor in our mind and make this device as cheaper as possible. This system will be more usable after making the changes which we are planning to perform.

III. Project Proposal

A. Suggested Modifications

The existing system looks like a simple security system. However, we can add some more functionality to make it more efficient and easy to use. This system does not have any internet connectivity which makes it impossible to interact with the device from a remote location. So, we can add a wifi module to the system which will help to interact with the system anywhere from the world. Also, the system is just showing the logic but does not have any real use so we can merge the lock with the device by the help of a motor. We will also develop some logic to turn on the device when it detects a person within some distance. Also, some notification can be sent to the security in charge if a person has crossed his limits of entering the passcode. We will also introduce an alarm which will make noise when a person goes beyond the accepted limits to enter the passcode. An IR Remote control can also be integrated which will help the security personnel to control the alarm. We will also convert text displayed on the LCD to speech through a speaker which will make the system more interactive.

B. Materials Required

The list below shows components required for the implementation of Arduino Security Panel System :

- Microcontroller
  - Arduino Uno
- Sensors:
  - Ultrasonic Sensor
  - Keypad
  - IR Sensor
  - Wifi Module ESP8266
  - IR Remote Control
- Actuators:
  - LCD screen
  - RGB LED
  - 10K ohm Potentiometer
  - Speaker
  - Buzzer
  - Stepper Motor
- Prototyping Breadboards
- Jumper Wires
- Various Resistors

C. Scheduling

The list below outlines the timeline of developing the project:

- **Milestone #1:**
  - Gathering the required components
  - Due March 11th
- **Milestone #2:**
  - Complete assembling the items
  - No coding done yet
  - Due March 13th

- **Milestone #3:**
  - Complete construction of the existing system with coding
  - Testing the prototype
  - Due March 21st
- **Milestone #4:**
  - Text-to-Speech functionality is added
  - IR Remote control interface is implemented
  - Alarm is implemented and tested
  - Motor is integrated
  - Due April 1st
- **Milestone #5:**
  - Arduino Security Panel System Panel prototype works with no failures
  - Try to implement remote access to the device through WIFI
  - Due April 9th
- **Goal Milestone :**
  - Testing of final prototype
  - Complete documentation of the implemented design
  - Due April 14th

D. Workload Distribution

The tasks for this research project is divided among the team members as follows:

- Trushil Patel
  - Documentation, coding and construction
- Akash Singh
  - Designing, testing and coding.

IV. Summary

We have been thinking of a security system as our research project which was assigned by our professor. In this proposal, we have described the changes which we will be doing to an existing system. The entire workflow of the development of this project was described in this article. This project once completed and if it works according to the plan will make it more efficient, economical, interactive and a user-friendly security system.

References

[1] Mertarduinotutorial.blogspot.com. (2017). Security Panel System with using Keypad and LCD. [online] Available at: http://mertarduinotutorial.blogspot.com/2017/01/arduino-tutorial-22-security-panel.html [Accessed 5 Mar. 2019].