Wireless Home Security System with Arduino

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October 27,2019

**1 Problem Statement**

Rapidly increasing population, theft is causing an increase in events.That’s why people need security systems.Most intelligent home systems connect the internet which is IoT.Now, many security products using their software in IoT devices.Because, IoT devices can be independent that mean , one security sensor communicate to one software in your phone. In this project, we will try create a small wireless security system with arduino and it will be communicate an android phone.

**2 Current System**

Multiple intelligent security systems currently using in many homes.And also many products are available now.You can buy a wireless security sensor for window side after you can check window is open or now in your phone with product’s software.Also you can agree with a security firm which are pronet etc. Then they will establish the all security systems in your home.

**3 System Overview**

Our purpose is make a wireless security system with arduino and IoT.Arduino is an open-source electronics platform based on easy-to-use hardware and software. User community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical and digital world.We will use MTQQ protocol in our project.Because we need to transfer wi-fi data and spending less energy. And also , this protocol provides max performance with min energy consumption and low tempeture values.Also this system has 7x7 meter range in a room.

**3.1 Android Application**

Our software will show the sensor’s instant values.It means when open the program , you can follow the sensor status it is active ? or not.Also if any sensor found a mobility, program will send a message to user. MTQQ protocol is a open source and also available online.

**4 Hardware Requirements**

**4.1 Arduino Uno R3**

It is an open source platform.It can be easy codable.Also , it supports Wi-Fi connections and easy to transfer data.We’ll use 2 modul on arduino for Wi-Fi communication which are RF Transmitter and RF Receiver.These moduls have 150m range (open area).

Some features ;

1. İt is hardware
2. Wi-Fi module supporting
3. Cheap

**4.2 Other Materials**

RF Transmitter-receiver module (433MHZ) , PIR sensor,

9V battery(2x),buzzer,led,resistor,bread board,jumper wires,

perforated board,header connectors,switches,project enclosure.

**5 Software Requirements**

**5.1 Use Cases**

|  |  |  |
| --- | --- | --- |
| Title | Description | Scenario |
| Send Command | Operation From Phone | User want to know the house hall sensor status, he/she open the program and press the check sensor status. |
| Send warning message | Operation From Sensor | One of sensor catch a motion, it sends message to user phone |
| Feedback Sending | Operation From Sensors | After checking procedure all sensors send a feedback about instant status to user |

**5.2 Functional Requirements**

* Android application must be able to communicate over the MTQQ protocol.
* Arduino device must be able to at least subscribe to MTQQ channels
* Our program must have a simple User Interface.

**5.3 Non-Functional Requirements**

* Our program should be able to develop.
* Must be reliable
* The MTQQ service should be available any time

**5.4 Test Details**

We are at the end of the term. We've finished our tests. First of all, we have worked hard to establish a wireless connection between two arduino . Then, we established the interconnection. In the second stage, we installed the sensor connections. Then we wrote the codes for sending the data received from the sensor to the receiver, which is arduino. It came out in the code we originally wrote. And, unfortunately, we noticed that the products we received also appeared. And our sensor is out of order. As a result, we corrected the codes and we got new materials to correct the command. As a result, our system is active. We have 1 receiver and 1 transmitter. And we decided that we could improve this for the future and we decided to add protocol. We are using Bluetooth for the sending data. So our MAC protocol is automatically come from Bluetooth. Because bluetooth is a MAC protocol.Blutooth is comminicate between receiver and our android software. And we didnt use any Routing protocol.We need just MAC protocol . Because , in future we can develop our Project. For example, we can increase number of the nodes which are number of transmitter ( sensors).As a result, our Project working now.

**5.5 Performance Tests**

In our performance tests, we connected the arduino to the batteries. In the interconnected connections, problems arose, but we did the research on the internet and solved them. Then we started working for the wireless connections between the two arduino. We used 2 modules for the wireless connection. These are receiver and transmitter modules. After installing these modules in Arduinos, we had to introduce them to them. We wrote the code for this with the arduino s own program. We have successfully established and tested the communication. Arduinos could now transfer data between them. Then we added our sensor to the system. We've added some code to our system to send the data from the sensor to the receiver, the arduino. And we continued the tests. We were able to successfully send the data from the sensor to the recipient. Finally, we used bluetooth to send the data to our android program. Our system is currently active.

**References**

1. <https://www.instructables.com/id/ARDUINO-WIRELESS-HOME-SECURITY-SYSTEM/>

2. <https://en.wikipedia.org/wiki/Arduino>

3. <https://www.arduino.cc/en/Guide/Introduction?from=Main.GenuinoBrand>

4. http://mqtt.org