

Home Automation System

Project Proposal



Submitted to:

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Identify your team members.

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Identify a project (and provide the source)

The concept of Smart Home was introduced in 1998 and was majorly developed in the early 2000’s [1]. Since then many attempts have been made to design a system that could be used in almost any type of a house. The project taken as a base is a similar attempt. It was found on Arduino Project Hub named *Home Automation Using Arduino and Bluetooth Control*.[2] It is an Arduino based system comprising of several sensors and actuators along with a Bluetooth module for control via mobile device. The functionalities include controlling lights, door, TV and temperature. Sensors namely Infrared (IR), motion sensor (PIR) and ultrasound are used for detecting human presence. Temperature sensor has also been used to monitor temperature inside the house. Servo motor and LED’s are used to simulate the effects of controlling lights, TV and door.

Purpose behind selecting this project as a base is that it has all the basic functionalities a home automation system should have. Yet there is huge scope of improvement. There is lack of security, redundancy in usage of different types of sensors and the sensors available in the system can be used as input for several other control systems.

Suggest a modification to the project.

Security is a major concern for every house owner, thus a home automation system should have better security. Following security additions are to be done:

1.       Entry into the house should only be allowed after verifying a person’s identity, planned to be done using RFID tags and reader.

2.       There should also be an alarm system which could be turned off by entering a code.

3.       Perimeter of the house should be monitored for possible intrusions.

Along with security, comfort is crucial. Following functionalities can be added to create increase the user’s comfort:

1.       Controlling light intensity

2.       Automatic operation of perimeter lights.

3.       Monitoring temperature and controlling Air Conditioning systems

4.       Garage door control

5.        Providing better access and control of the system via Mobile devices using Bluetooth or WiFi.

The system should also have all the functionalities offered in the base project.

Describe your motivation behind the project you've identified / the modifications you've decided upon.

The motivation behind choosing Home Automation System as a project for the group, is as a result of the current trend in the Internet of Things. Which plays a great role in devices connected to the internet, also aiding sensor deployment in various environment, one which is of interest to this project is Smart Building/Home. An automated home is a user-friendly home, which is a sensor controlled as to what is being sensed in its current surrounding. The ability for a TV or Light to know when it should come ON based on sensing the presences of the owner in the house or movement in the room, is called a smart home. A smart home allows the owner absolute control over it, some of the control is possible through the internet, where an alert can be sent to the owner if there is an intruder in the house. With smart home, property safety can be improved as home owners can communicate with their homes from anywhere.

A list of materials required.

The below table shows a list of components intended for the implementation of the Home Automation System. The components have been separated into two categories such as Sensor and Actuator. Where information is read or sensed by the Sensor and Actuator acts based on the information collected by the sensor.

|  |  |  |
| --- | --- | --- |
| Sensor | Actuator | Others |
| RFID reader and Tag | LEDs | Arduino Mega2560 |
| Keypad | Buzzer | Breadboards |
| Potentiometer | LCD screen | Jumper wires |
| Infrared sensor | Motion Sensor | Resistors |
| Photoresistor | Servo Motor | Capacitors |
| Motion Sensor | DC Motor |  |
| Temperature Sensor |  |  |
| Ultrasonic Sensor |  |  |
| Bluetooth module or Wi-Fi (NodeMCU) |  |  |

At least four (4) realistic milestones and corresponding dates and a fifth "reach" milestone. More is good. Less is bad.

1. Gathering hardware and designing a schematic of the system.
2. Door security and alarm system
3. Light control (both in-house and perimeter)
4. Garage door access and Temperature control
5. Perimeter security
6. Remote access via mobile device (Only if time permits)

Identify the role of each team member (if you're in a team).

Vivek Pujara: Programmer and Progress Manager

Gideon Eromosele: Programmer, Latex and Github Repo

Mikhail Shchukin: Testing, Documentation and Latex

Oluwatobi Adegbola: Requirement Review and Documentation

Provide a summary

Home automation provides homeowners the opportunity to monitor and control the activities in their home in near real-time [3]. Homeowners can get intruder notifications which helps keep the home safe, and control appliances which help to manage energy among other things. This was why the group decided to embark on a home automation-based project to help reduce the security concern of a homeowner. The system is going to be based on the Arduino Microcontroller and is an upgrade to the project by Shubham Kumar [2]. As a differentiating factor, we will add controlling light intensity, automatic operation of perimeter lights, temperature monitoring and controlling air conditioning systems, garage door control, and better access and control of the system via Mobile devices using Bluetooth or Wi-Fi. All these to help the homeowner with comfort and less security concern. The project will go through diverse stages including; gathering hardware and designing a schematic of the system, door security and alarm system, light control (both in-house and perimeter), garage door access and Temperature control, perimeter security and remote access via mobile device (Only if time permits).

Provide any citations

Hendricks, D. (2014). The History of Smart Homes. Retrieved from https://www.iotevolutionworld.com/m2m/articles/376816-history-smart-homes.htm

Kumar, S. (2019). Home Automation Using Arduino and Bluetooth Control. Retrieved from https://create.arduino.cc/projecthub/Shubhamkumar97/home-automation-using-arduino-and-bluetooth-control-404e9c?ref=platform&ref\_id=424\_trending\_\_\_&offset=0

Pavithra, D., & Balakrishnan, R. (2015). IoT based monitoring and control system for home automation. *2015 Global Conference on Communication Technologies (GCCT)*, 169-173. doi: 10.1109/gcct.2015.7342646