SMART HOME AUTOMATION SYSTEM USING Node MCU(ESP8266)

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OBJECTIVE

- The project aims to monitor, control and automate the home appliances using Node MCU.

LITERATURE SURVEY

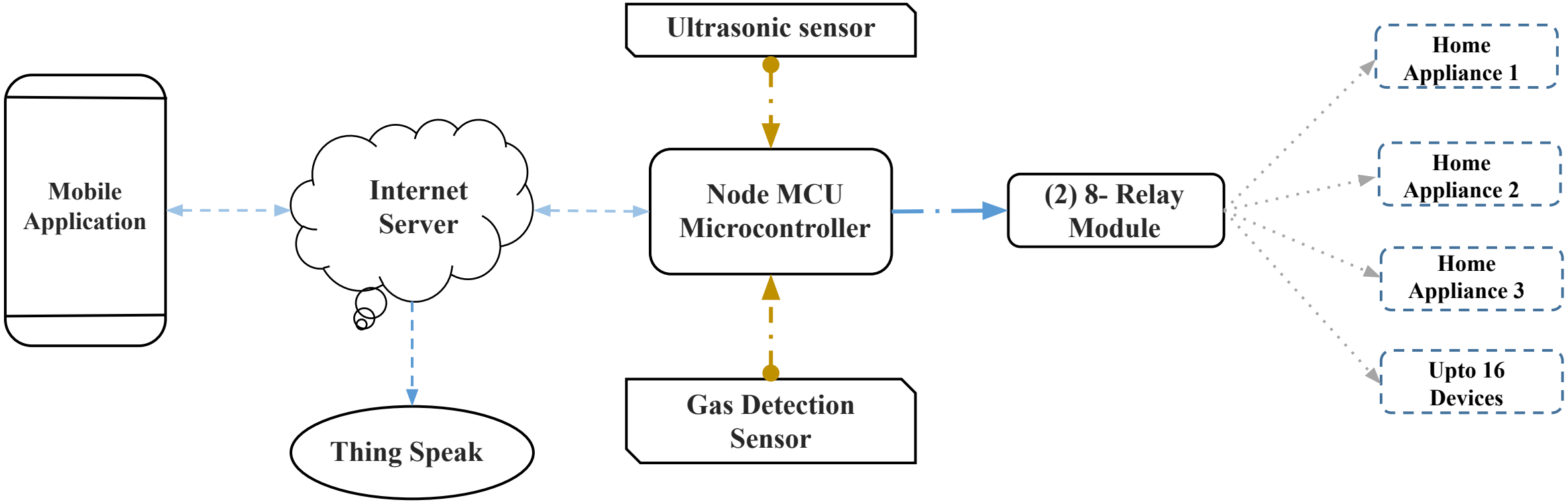
	PAPERS	USED METHODOLOGY
1.	Swetanjal Murati Dutta, Pitanjal Murati Dutta a, Debasish Dutta a, Dr.Debasis, "Home Automation" International Journal of Scientific & Engineering Research, Volume 6, Issue 12, December-2015	Remote control and GSM phone were used for monitoring and controlling home appliances .
2.	Pritham Maji, Padimala Prashanth, Joel Prashanth Kumar, Gojula Maheshwar Reddy "An Advanced DTMF Based Home Automation" Journal for Studies in Management and Planning I SSN: 2395-0463 Volume 03 Issue 03 Special Issue, 2017.	A Home automation utilizing Dual Tone Multi Frequency (DTMF) that is paired with a wireless module
3.	Pankaj Jadhav ,Amit Chaudhari , Swapnil "Home Automation Using Zigbee Protocol" International Journal of Computer Science and Information Technologies, Vol. 5 (2) , 2014, 1778-1780, 2009.	ZigBee Communication protocol presents its potential deployment in smart home environment.

	PAPERS	USED METHODOLOGY
4.	Lakshmi Prasanna Polana, Sireesha Potla, Venkata Triveni Vudata, Naga Lakshmi Vuyyala , Shalini Tadi, “Home Control ” International Journal of Advance Research and Development, Volume 6, Issue 12, 49 ISSN 2229-5518, December-2015.	Node MCU controls the appliances through relay using Blynk application.
5.	Prasanna G. and Ramadass N. College of Engineering Guindy, “Home Automation using offline Speech Recognition” International Journal of Signal Processing Systems Vol. 2, No. 2, December 2014	Raspberry Pi and speech recognition for controlling home appliances.
6.	E Fatkiyah, D Persada and D Andayati, “Detection of Leaks on Gas Cylinders Using Arduino Based MQ-6” Journal of Physics: Conference Series PHYS.: CONF. SER. 1413 012030, 2019.	Gas leakage is detected using the MQ-6 and the controlling measures are followed.

LIMITATIONS OF THE EXIXTING SYSTEM

- ZigBee based system supports only limited range and it may interferes with other wireless system.
- Only limited number of devices can be connected in DTMF.
- Home automation system using raspberry-pi makes the system more expensive.
- The system faces interference and the range is short.
- On using Blynk application we can't Control all appliances only limited devices could be controlled.
- Not more economical android applications has not been developed for the home automation.
- On using an Arduino UNO board we have to use separate board for connectivity like Bluetooth & WiFi.
- The Home automation systems face challenges like high cost of ownership, inflexibility, difficulty in achieving security and poor manageability.

Proposed System Architecture:



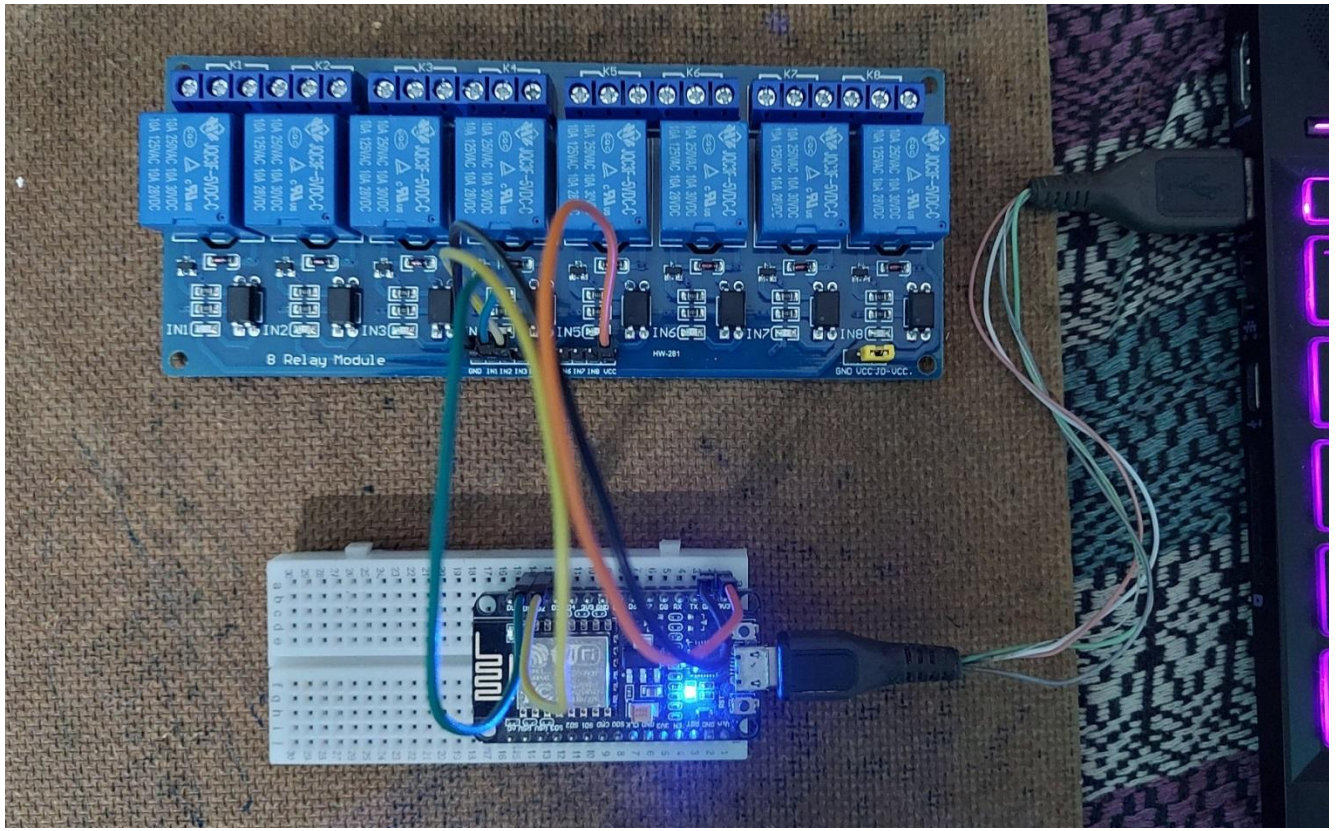
Proposed system

- ✔ The proposed system allows the user to control the home appliances via internet using the android app which gets the user command and transfer the control signal to the microcontroller through the internet server.
- ✔ A DC power supply of 5V is used as the power source for node MCU, sensor-modules and the relay board. The Node MCU connects to the Internet. Sensor-modules send the variable data to the Node MCU.
- ✔ The user gets these data in his mobile application via internet server and then decides his action to control the appliances. On pressing the suitable button in application, node MCU gets the instruction via internet server and provides output signal to the relay modules.
- ✔ When the relay is turned on, the appliances get the power from 230V AC source. The switching circuit used for turning light on/off can be used for turning the other household appliances like fan, air-conditioner, room heater, microwave oven etc. on/off as well.

- ✔ A telegram bot is created to monitor the status of the devices connected to the relay.
- ✔ The gas sensor(MQ2) is implied in the system which checks for any gas leakage in the house.
- ✔ The ultrasonic sensor checks for any intruders at the doorstep.
- ✔ The data from the sensors are reflected in the telegram bot.
- ✔ The appliances real time usage is monitored by the Thing speak plat form .

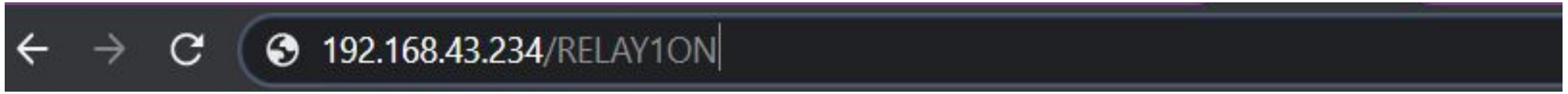
MODULE IMPLEMENATION:

- The relay module is turned on by giving the command along with the IP address of the microcontroller followed by the “/”.

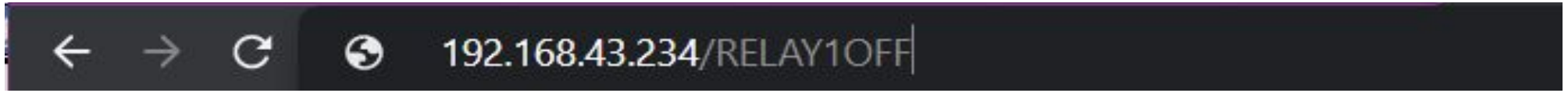


Node MCU and relay module before turning on any devices.

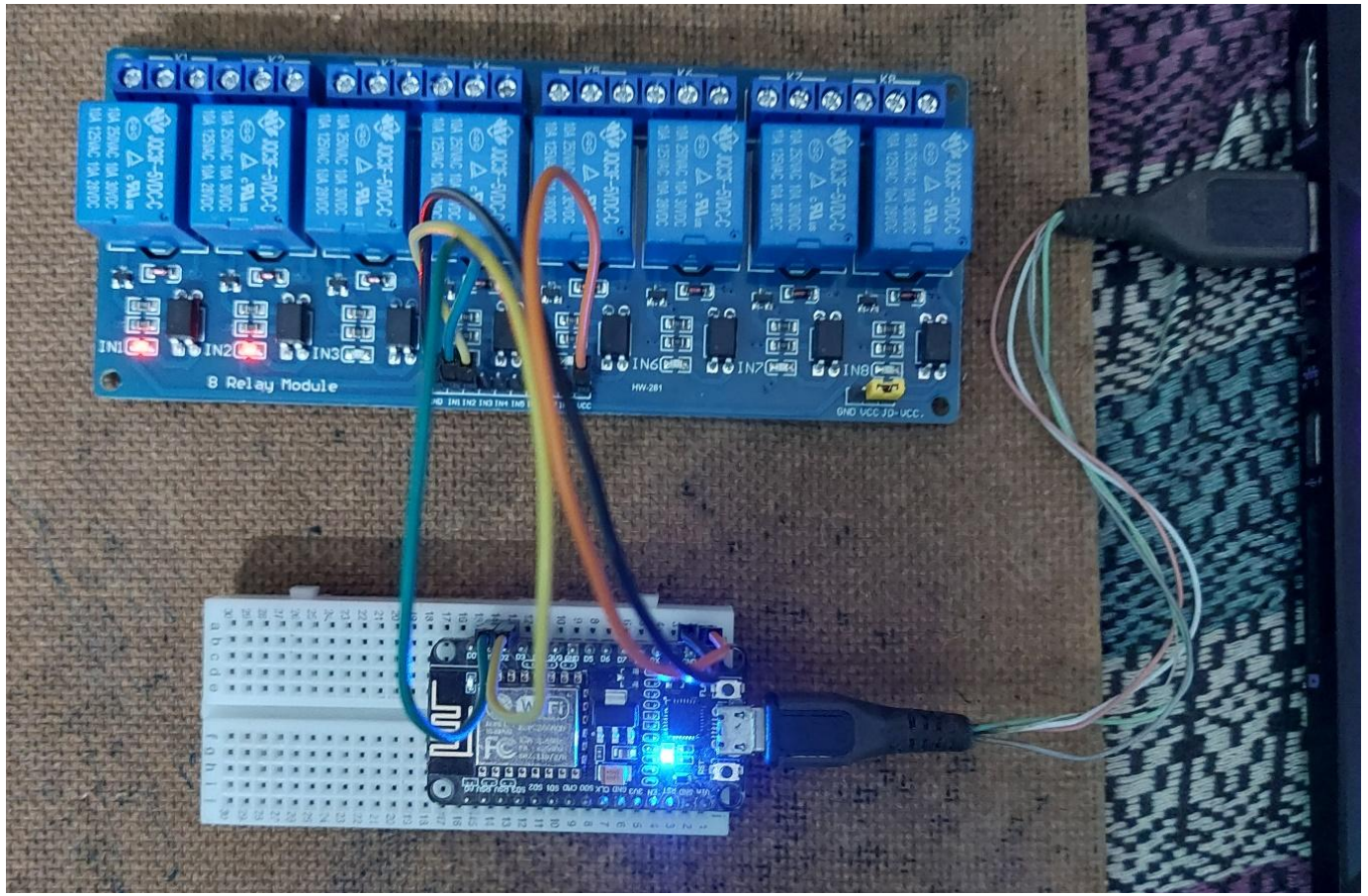
- The turn ON commands to switch ON the devices.



- The turn OFF commands to switch OFF the devices.

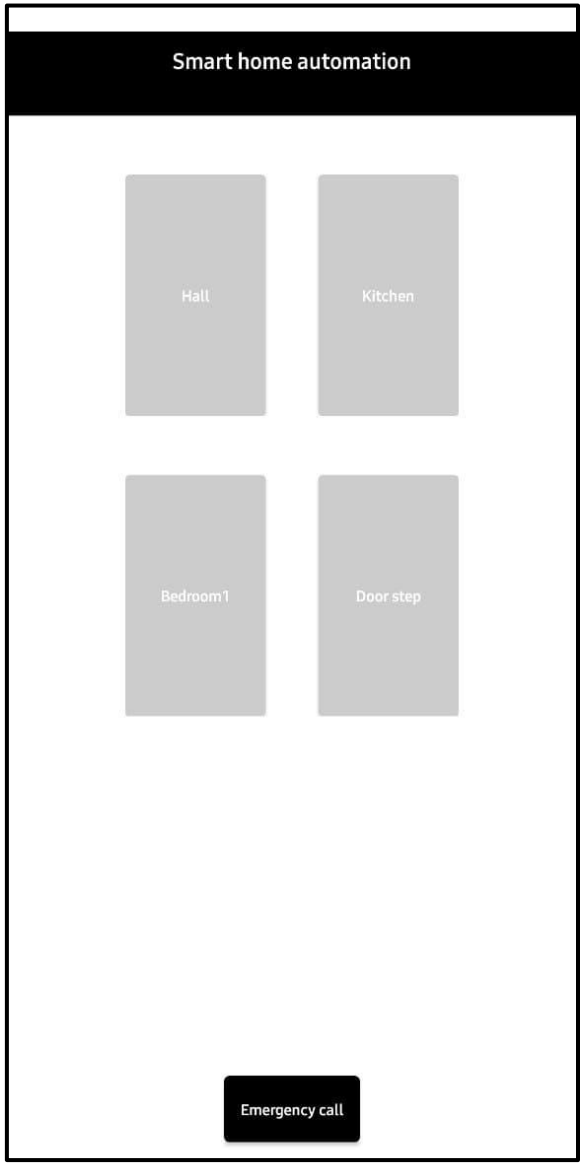


- Relay module showing light indication after turning ON two Relays.



APPLICATION MODULE

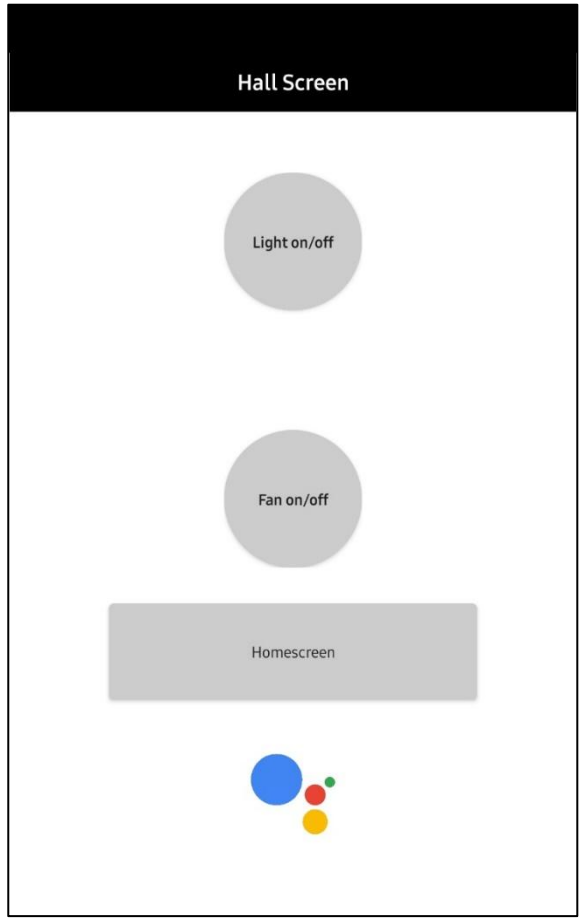
The front screen of our application:

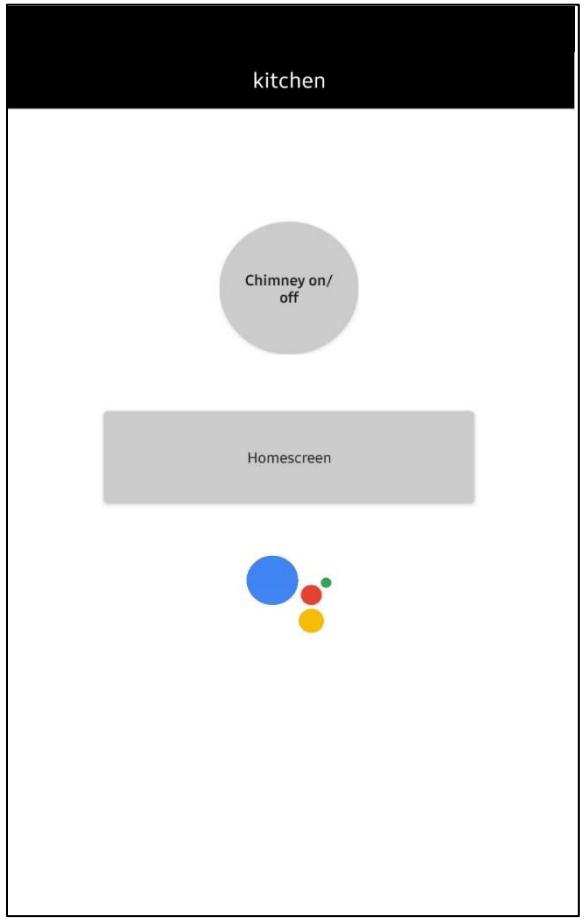


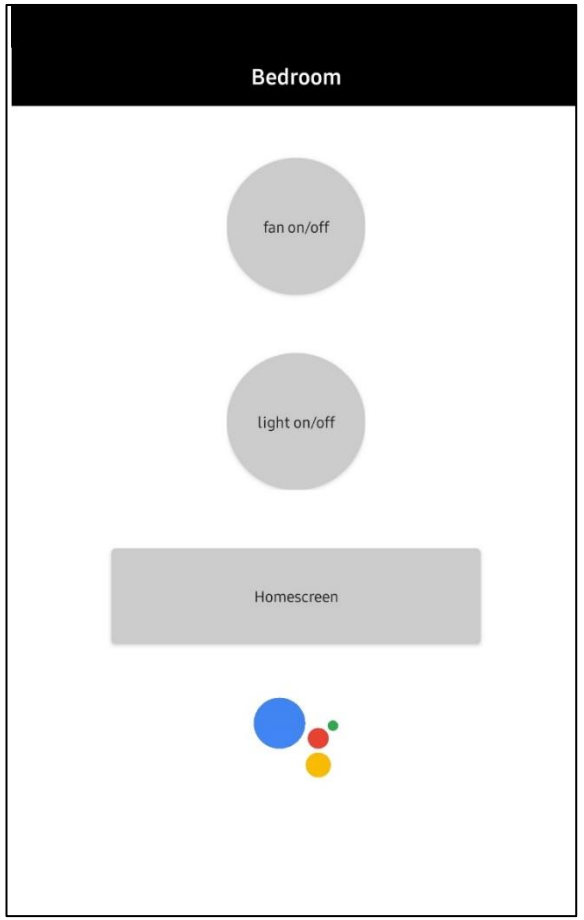
Description:

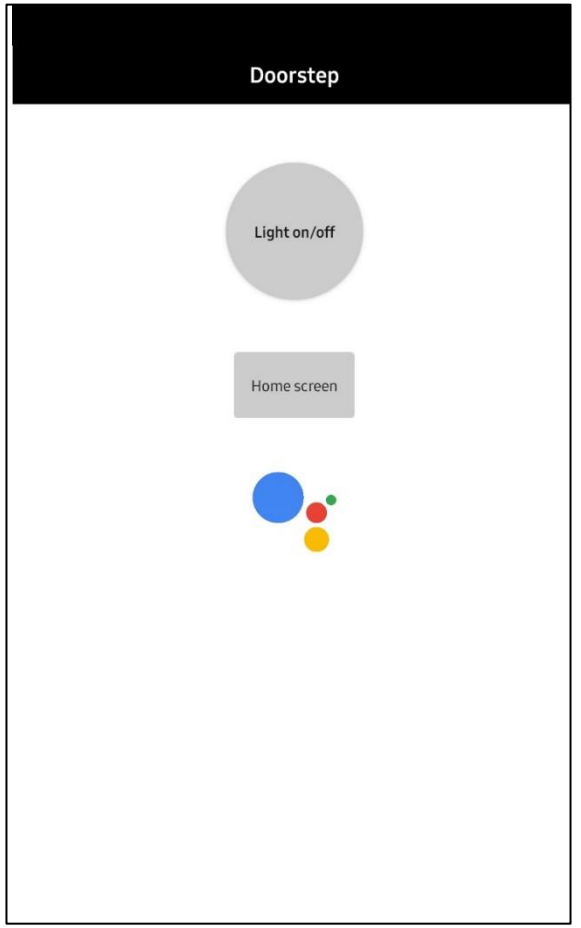
- The front screen of the application contains four buttons for hall, kitchen, bedroom and doorstep.
- Separate screens are created for each room to control the appliances.
- If any of the button gets clicked it redirects to its respective screen.
- When the emergency call button is pressed it calls the phone number linked to it.

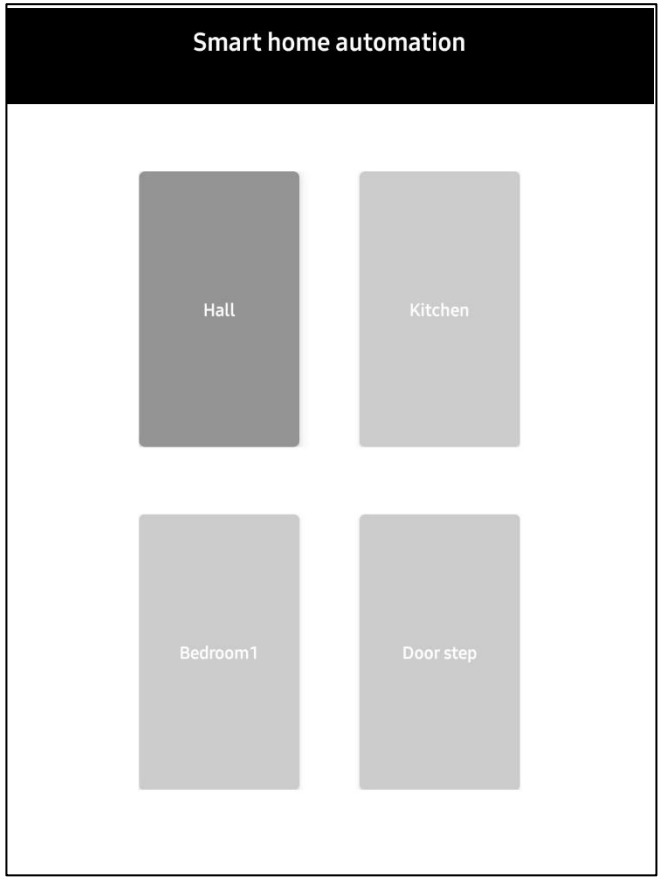
The images of other screens:











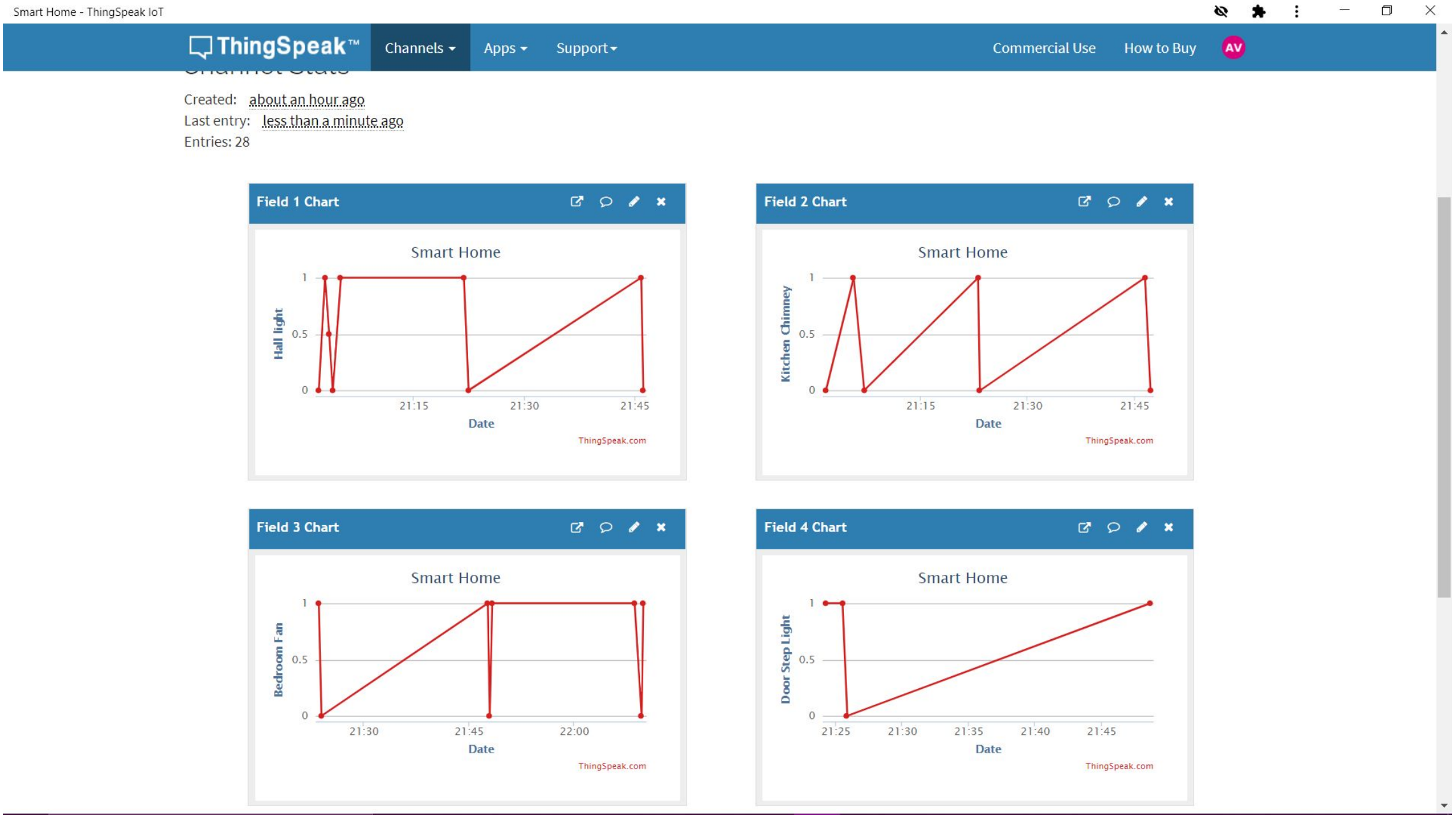
- Here the hall button is getting pressed which redirects to the hall screen.

- The pressed button is highlighted here.

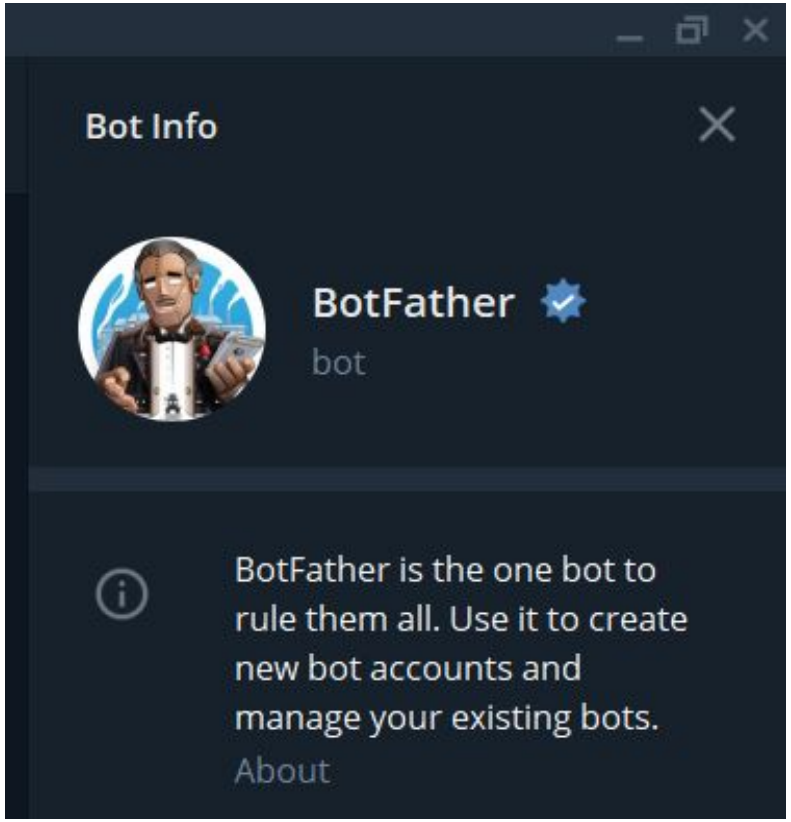
http://ai2.appinventor.mit.edu/b/5fbg

- This is the QR code to download our application.

Thingspeak platform Implementation:



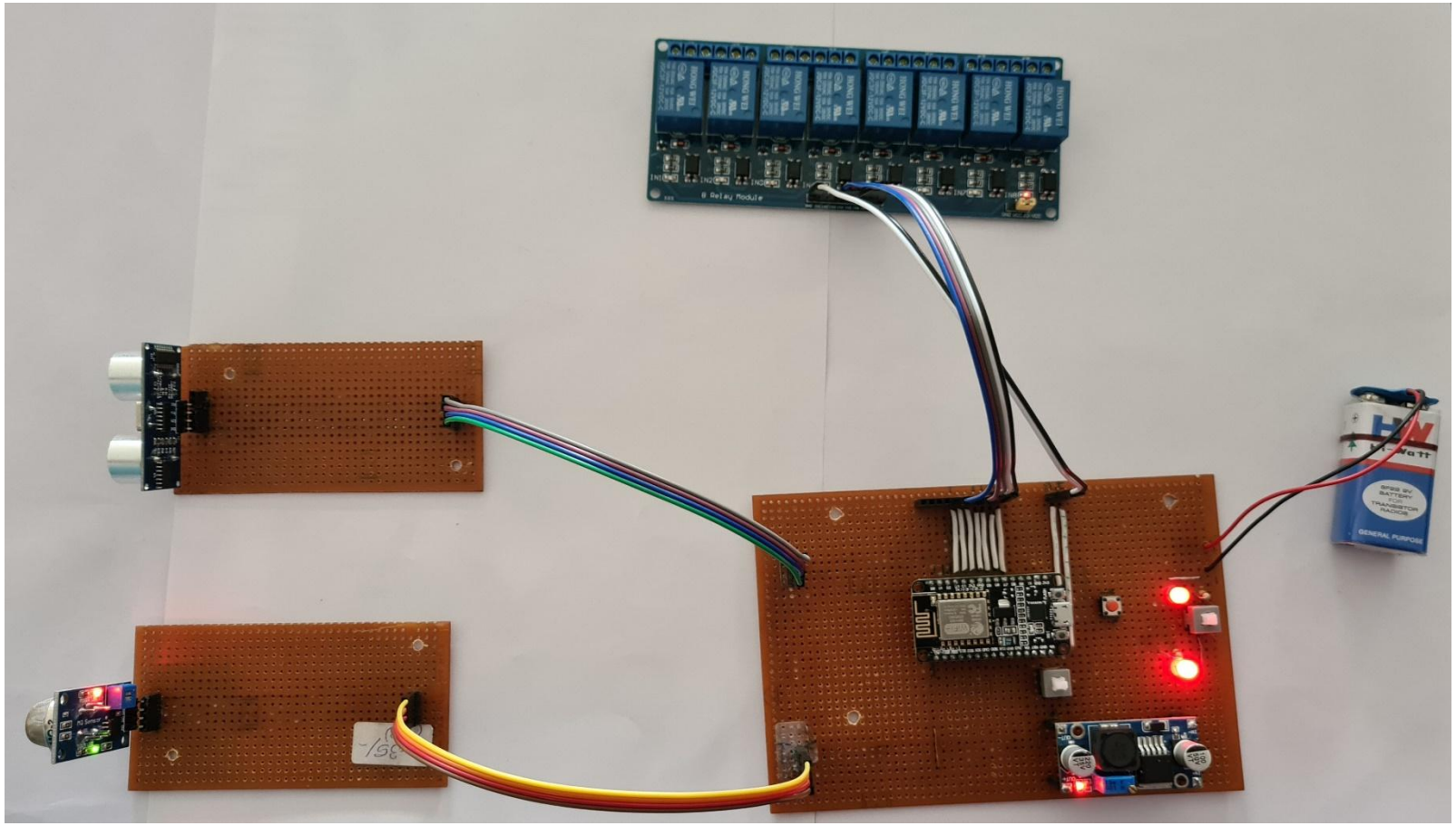
TELEGRAM BOT



- We are creating a telegram bot which interacts with the user and updates the status of the devices connected in the system.

- To create a chatbot on Telegram, you need to contact the BotFather, which is essentially a bot used to create other bots.

IMPLEMENTATION



- This picture shows the entire circuit connections of the proposed system.
- The circuit is powered by 9V battery.
- The voltage regulator regulates the input voltage into 4.5V to the nodeMCU.
- 8 module relay is connected to the nodeMCU.
- The ultrasonic and MQ2(gas sensor) are connected to the nodeMCU.

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5.Prasanna G. and Ramadass N. "Home Automation using Offline Speech Recognition" International Journal of Signal Processing Systems Vol. 2, No. 2, December 2014

6.E Fatkiyah, D Persada and D Andayati, "Detection of Leaks on Gas Cylinders Using Arduino Based MQ-6" Journal of Physics: Conference Series 1413 012030, 2019.

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