International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 06 | June 2020 www.irjet.net p-ISSN: 2395-0072

Home Automation using AI

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Abstract - *AI is that the simplest solution to manage huge data flows and storage within the IoT network. IoT nowadays becoming more and more fashionable the inventions of highspeed internet networks and lots of advanced sensors which will be integrated into a microcontroller. The flowing data in internet now will contain sensors data furthermore as user data which will send and receive from the workstations. With the rise in the quantity of workstation and multiple sensors, few data could actually be facing issues on the storage side, delay, channels limitation and suffocation within the networks. To avoid of those problems, there are many algorithms were proposed within the past of 10 years. Among all the algorithms, AI still being the only solution to the information mining, manage and control of congestion within the network. The aim of this paper is to present the appliance of AI system within the IoT. The importance of information mining and management are highlighted within the paper. Also, the tactic utilized within the synthetic smart like fuzzy logics or neural network are visiting be discussed during this paper in conjunction with IoT network. The self-modifying networks and software in defined network are components of the crucial parameters within the AI IoT System.*

Key Words: **IoT Implementation using Artificial Intelligence as Google Assistant**

1. INTRODUCTION

Human assistants like housekeepers were how for millionaires to stay up their homes within the past. Nowadays when technology is so easily handled enough only the smart people in society are much blessed with these new smart home device applications, as these device applications costs are a bit high. However, not most are wealthy enough to be ready to afford a person's assistant, or some smart home kit. Hence, the necessity for locating a cheap and smart assistant for normal families keeps growing. We have came up with a inexpensive system. It contains the Virtual Google Assistant from google, the IFTTT web application, the Blynk application and the NodeMCU microcontroller as the major components. Natural language voice is employed to offer commands to the Google Assistant. All of the hardwares are connected over the internet using Wi-Fi that puts this technique under the IoT. Interest in making the house hold appliances more easy to handle and operate is because of the work the goes into to operate the appliance by going physically over there and use it. The control of appliances inside the house can become a reality and it surely reduces efforts as well as it gives very easy access of the appliances from any corner of the world.

2. PROBLEM STATEMENT

Today people are watching ways and means to raised their life-style using the newest technologies that area available. Any newer facility or hope of new appliance that promises to secure their life-style is taken by the consumers. The more such facilities and appliances are added, it becomes inevitable to possess easy and convenient process and means to regulate and execute these devices or appliances. Typical wall buttons or switch are situated in different places of a house and hence necessity manual controls like to switch on or off to control various appliances. It gets very hard and virtually impossible to keep track of appliances or devices that are running and also to monitor their performances.

3. EXISTING SYSTEM

The initial smart homes were just idealists, not actual physical structures. For decades, fantasy has explored the thought of home automation. Prolific writers, imagined a future where homes were communicate, and seemingly execute themselves. In Bradbury's cautionary story , "There Will Come Soft Rains" were he himself describes an automatic home that continues to runs even after human beings have died out. Even though the thinking of home automation has been around for a few time, actual smart homes have only existed a brief while. This particular timeline focuses on hardware; ie, actual inventions leading up to the smart homes we all know today and may expect from the near future.

4. WORKFLOW

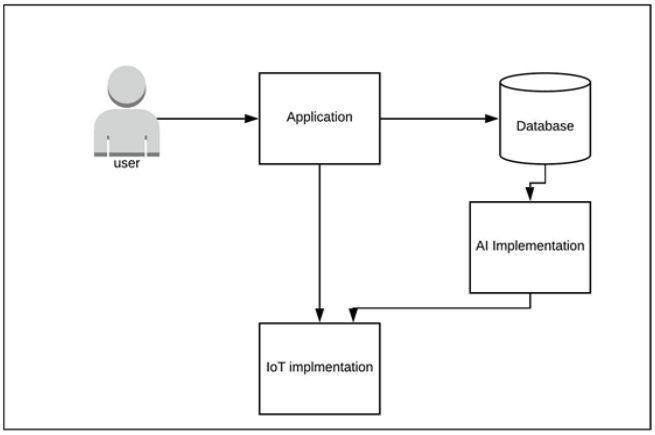

Fig -1: Workflow of proposed system

The figure shown above is the flow of the project. In which, The User has an Application in his mobile phone, through which the activity of the User gets stored on the Cloud database. Based on the data stored on the Cloud database, the system creates a pattern of the user and based on that pattern the implementation of AI is done. Then the output of the AI is given to the IoT system, based on that output IoT system performs the action. The user also has the manual control to the IoT system through Application by which He/She can manually control the System based on the needs.

5. MODULES

5.1: Module 1: Login

The user needs to login in their account by the provided username and password so they can access the Blynk App and can create even their own buttons for the devices they wants to control. The Login username and password can be changed even after the installation of the device.

5.2: Module 2: User Interface

After the Login process is done then the user can control its devices which are connected to the NodeMCU by either their manual options which are provided or by the AI option which is Google Assistant. This User Interface contains three different types of system which can be seen or monitored individually. All the three user interfaces have different work and can show data to the user according to the machines input.

5.3: Module 3: Devices

The Devices which are connected to the NodeMcu can also be changed if the user installs new devices and want to upgrade the module of the system. These devices can be upgraded using very basic GUI and can be made by the user itself.

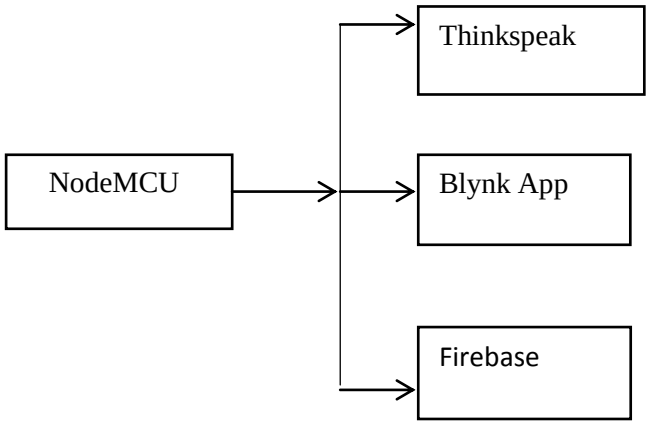

Fig -2: Customer User Interface

6. FLOWCHART

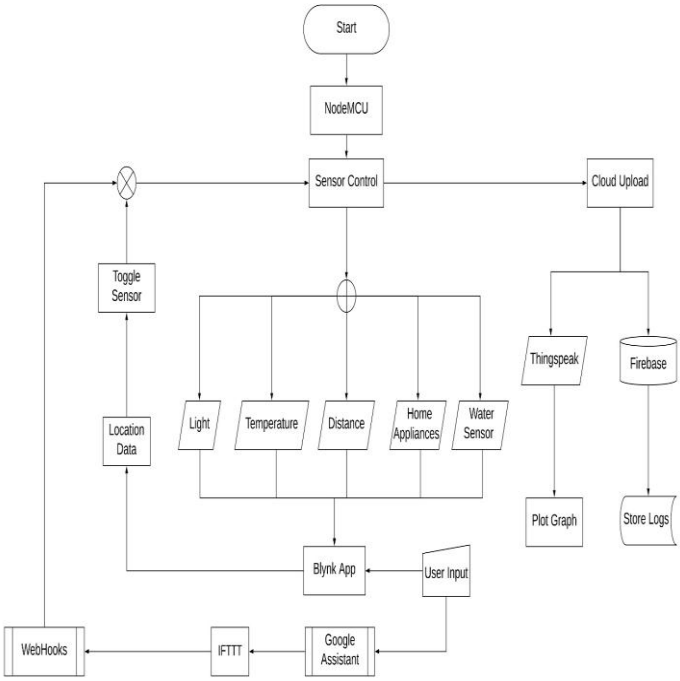

Fig -3: Flowchart Diagram

7. CLASS DIAGRAM

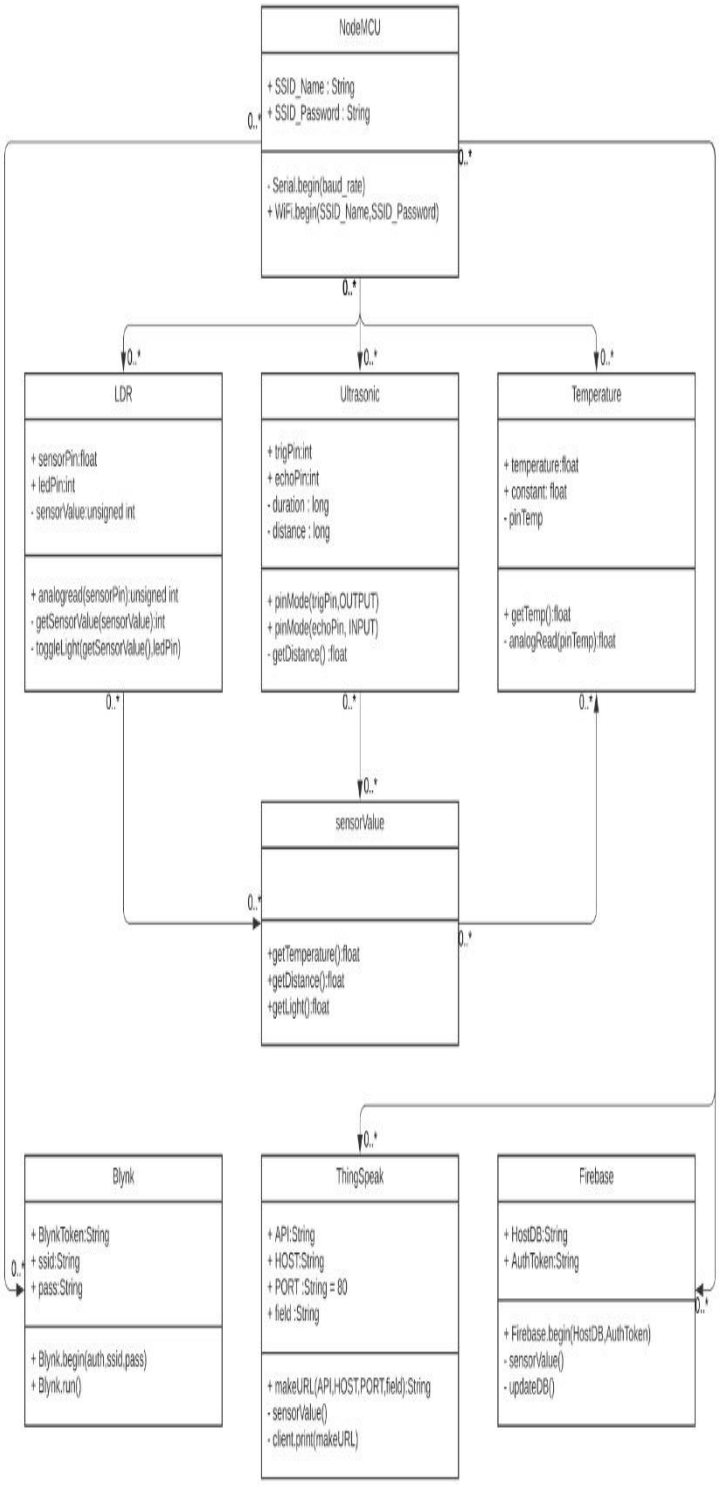

Fig -4: Class Diagram

8. BASIC ARCHITECTURE

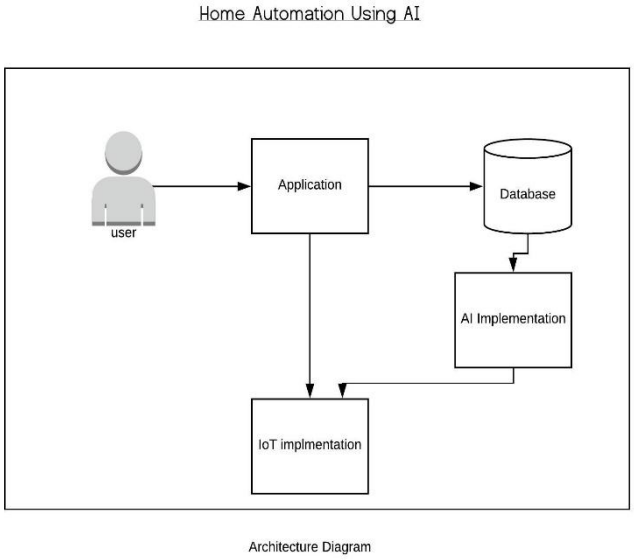

Fig -5: Basic Architecture

9. USECASE DIAGRAM

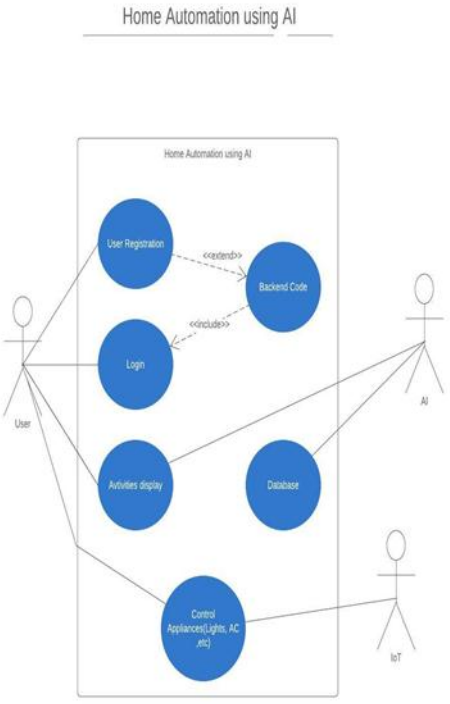

Fig -6: UseCase Diagram

10. TEST CASES

Id	Description	Test Steps	Test Data	Expected Output	Actual Output
T-01	Check if the Sensors are connected properly	Connect the pins of the sensors with the Arduino	Light Sensor, Ultrasonic sensor and Arduino	It should show the desired readings	Actual readings shown
T-02	Check if the data of the sensors are storing in the cloud	Connect the Arduino to the network.	Arduino code, Cloud configuration	It should store the data in the cloud database	There are no readings stored in the cloud storage. Storage failed
T-03	Check if the sensors are managing the appliances	Connect the sensors to any appliance through an wired connection.	Sensors, LED (for appliances)	The LED should be on if the sensors reading are calculated.	LED is enabled.
T-04	Check if all the sensors are working together in a local network	Connect the sensors to multiple appliances which can be controlled by the reading of the sensors.	Sensors, LED (for appliances)	All the LEDs should be on after the sensors reading are calculated.	All the LEDs are turned on.
T-05	Check if all the sensors are working together in a local network.	Connect the sensors to multiple appliances which can be controlled.	Sensors, LED (for appliances)	All the LEDs should be off after the sensors reading are calculated.	All the LEDs are turned off.

Table -1: Test Cases

11. RESULTS

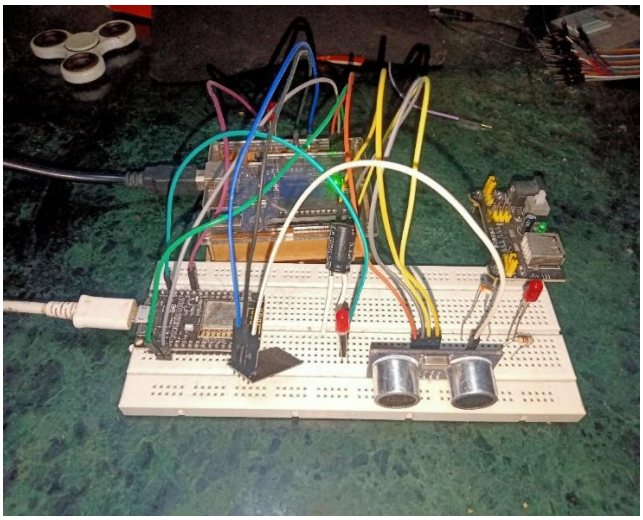

Fig -7: Appliances are turned OFF

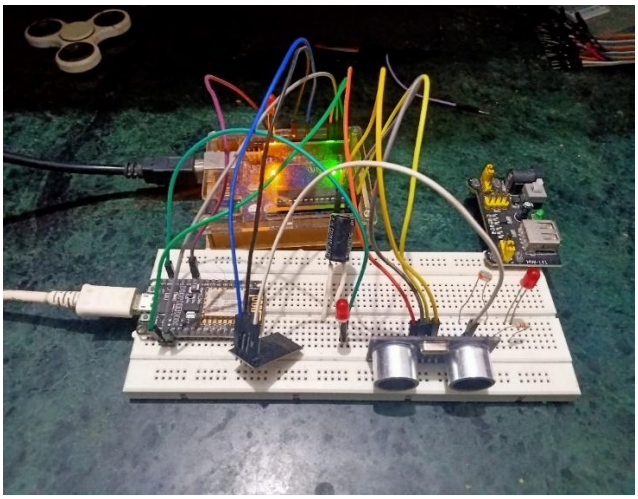

Fig -7: Appliances are turned ON

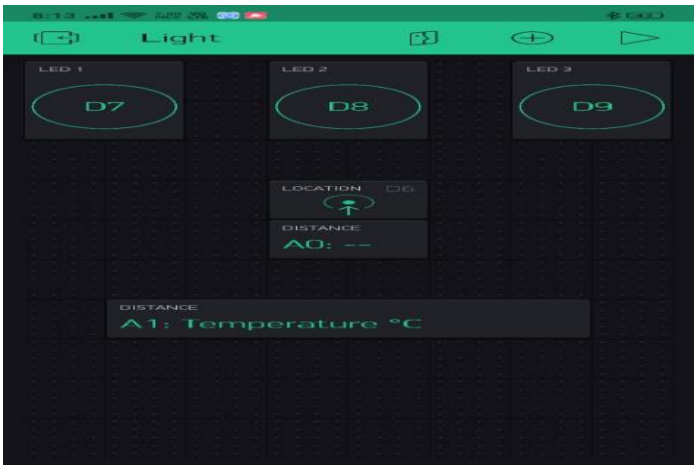

Fig -9: Light Sensors Representation in Application

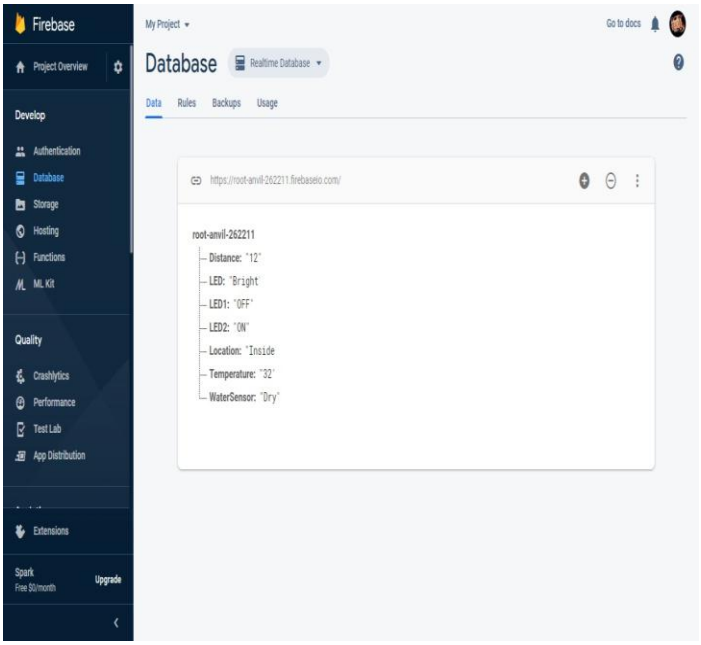

Fig -10: Firebase Database

12. CONCLUSIONS

The Home Automation system gives a common and simple control over the home devices and appliances with low cost devices and an smart intelligent system. The introduction of a personal Assistant, during this case Jasper, has terminated the necessity of other device which are smartphones or a Bluetooth connected device. The hands-free control over the appliances provides help and guidance for the disabled and elderly.

With the expansion within the field of Home Automation, the most aim of the project is to cause an Intelligent System to form day to-day household decisions. Using Natural Language Processing, the user's query is getting run and acknowledged by the Intelligent System. The AI developed does not only runs the devices but is also used to get information from the Internet depending on the query.

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