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IMPLEMENTATION OF HOME AUTOMATION USING CHATBOT

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Abstract: In recent times, the world is running in the need of added comfort, where to obtain such comfort the world is in the need of technology and advancements to make their living easy, simple and sophisticated. Home automation is one of the technologies which is used to control the home appliances and smaller tasks at home in a click of a button or by simply sending a text message. The home appliances can be accessed and controlled from a remote location by the use of IoT (Internet of Things). when the physical devices such as lights, fans, and other home appliances are interconnected with necessary software then it is said to be home automation. Here in the following paper, we have the concepts of IoT, Natural language processing (NLP) and chatbot which put together provides a simple home automation system. The main feature of the system proposed is that the input can be given through text which would provide a essential feature to people who are in the silent vicinity and for the physically challenged users.

Keywords: IoT, NLP, Home Automation, Node MCU

I. INTRODUCTION

In today's world, home automation is facing a rapid growth and advancement. The advancement in these technologies is will achieve its role only when it provides its utility to the senior citizens, disabled people, which would serve as a support system to them in making their living better, easy and simple. Home automation must provide a helping hand in the society especially to the people who live all by themselves. Home automation must be built in such a way that its easily compatible with the home appliances and devices used at home. The advancement in home automation technologies will have a great effect on the lifestyle and the living of the people. Home automation concentrates on two different people, where one would concentrate on the luxury and sophistication and another kind of people would concentrates on the differently abled, basic needs of the people and the society. IoT is one of the most important technologies used in the home automation system. This connects various physical devices over internet, where these devices can share various data and information independently without any human involvement. The IoT has amazed the world by its effective and wide range of application, the advancement and growth of various industries and fields depends upon IoT. The salient feature of IoT is error detection and correction, task monitoring, deploy, management and interconnection of various other IoT devices.

IoT involves various technologies in its applications which involves:

- wireless sensor networks
- cloud computing
- big data analytics
- Embedded Systems
- Security Protocols and architectures
- communication protocols
- web services
- Mobile Internet, and
- Semantic Search engines.

Here in our system, we have made use of Telegram Chatbot which acts as an important software which is used to access and control the home appliances in the home automation system. Chatbot serves as a tool in controlling the home appliances in a most simple and effective manner. A chatbot is nothing but an computer program based on the AI technology used to conduct an on-line chat conversation and processing human conversations. This understands human abilities, needs and requirements because of which they are often termed as the digital assistants. The function of Bots is to explicate the user intent, process their requirement and request, and then final provide the user with the necessary response or bring out relevant answers. These bots can communicate through different modes where the most widely used modes are voice and text. In the proposed system we have made use of the text based chatbot in order to communicate. A text input is given by the user through the chatbot which in return provides the user with the expected reply in the text form as per the user's needs and requirements. Bots can be brought to effect action with the help of websites, application

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and various other messaging channels, which is used by almost every individual in day-to-day life such as Facebook Messenger, Twitter, WhatsApp or Telegram. We have made use of the Telegram message channel, which is easily accessible, free of cost, and simple. Here in the proposed system, we have used telegram bot, these telegram bots are nothing but a telegram account which is not operated by the people but it is operated by the software. These kinds of Bots often consist of AI features in-built in them, which provides the ability to do various functions such as broadcasting, connecting and integrating with other devices and services, passing necessary and general commands to the IoT. The users are allowed to use the bots in sending text messages, commands and requests based on their requirements. The bots in the Telegram messaging channel is application that runs within the Telegram as a third-part application. The user is allowed to control the bot with the help of Hypertext Transfer Protocol Secure request (HTTPS) to our own Bot Application Programming Interface (API). The core Bot or the center medium of all the bots is the Bot Father which helps the user to create new personalized bots for their use and are allowed to change settings and other features according to the need and requirement of the user.

II. Related Works

Naveen Hariharan, Naren and Sathish are the authors who have discussed in detail about home automation systems using various methodologies which include GSM, Bluetooth and phone-based automation. They have also compared consolidated report in detail with cost, number of devices and primary communication. The authors Pankaj, Paras and Prashant have made a comprehensive study on various home automation techniques and also discussed comparison between them. Arun and Thilak.R are the authors who have demonstrated a model using Internet of Things (IoT) for home automation based on Chatbot. The authors Akash and Nikitha have discussed in detail about how a Chatbot and an android application can be used in Home Automation. Rohan.K and R.Haldar are the authors who have explained about the architectural elements that are used in Chatbots in IoT. In addition to this, they have also elaborated in detail about the opportunities in applying Chatbots.

III. Materials and Methods

3.1 Methodology –
We have created a simple home automation system using the telegram chatbot which is easily accessible, easy to build and cost efficient. The method that we have used to build our system is less complicated and the cost of building is cheap and effective. It is user friendly, affordable and it is designed in a such a way that every individual can access it without any negative impact. It is economically feasible and ever individual can afford it. The entire flow of the proposed system is given below in Figure 1.

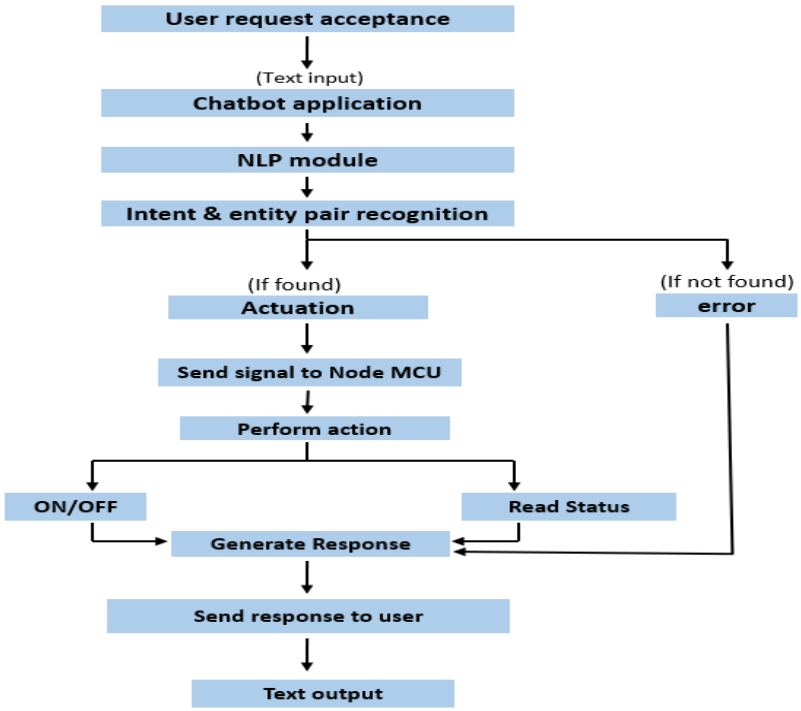

Figure 1. The flow chart of the proposed system

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In this project, we have used Node MCU, led bulb and Relay Module for the execution along with the software, the Telegram Bot which gets connected through the Wi-Fi and power supply, the entire system is controlled using the Telegram Bot. Based on the conditions, it provides output to the user in the form of text and then if any values mentioned doesn't meet its needs or requirement, it then sends the required error notification to the user.

3.2 Relay Module –
The Relay Module is operated via electromagnet. This is done by using a signal of low power through a micro-controller. This Relay is used to switch a high – powered device with the help of Arduino. It is rated till 10 Armstrong per channel at the volt of 250 VAC and 30 VDC. When it is on the bulb in the relay will glow and thus results that the connection, we connected it correct. Relay module is connected to the Node MCU board's Vin and GND and the IN pin of Relay module is connected to the digital pin 1 on the Node MCU board.

3.3 Node MCU –
Node MCU is the hardware that is used to connect the different hardware through it which helps in Wi-Fi connection. It is used to access internet type of projects. In our project we connect the Node MCU board to Arduino IDE software in the laptop and to the Telegram Bot through the Authentication token, wi-fi name and passwords are connected.

3.4 Power Supply –
Power Supply is used to send the electricity to the modules that are used in the project.

3.5 Wiring the Components –
Wiring is the primary and pre-liminary step in making the connection. This connection is done via the circuit diagram and those are properly connected without any issues. The pins of the Relay and the led bulb are properly connected to the Node MCU board and also correctly linked to the Telegram Bot and those configurations are correctly coded in the Arduino IDE.

IV. BLOCK DIAGRAM

In our project, Node MCU plays a major role of controlling the internet, Relay which is used to connect the home appliance (led bulb) and the Node MCU in order to perform its function. Node MCU board is correctly linked to the Telegram Bot and those configurations are correctly coded in the Arduino IDE. The Telegram Bot processes the input text request using the NLP module in the Node MCU and then the response is given back in the form of text through the Telegram Bot. A power supply is connected with the Node MCU which provides energy for the running of the system. When the process is accomplished successfully then the led bulb connected, will turn on leaving a message through the Bot stating that the bulb is ON else, it provides a response stating that the Bulb is in OFF state. The ON/OFF state of the Bulb is regarded or considered as the output.

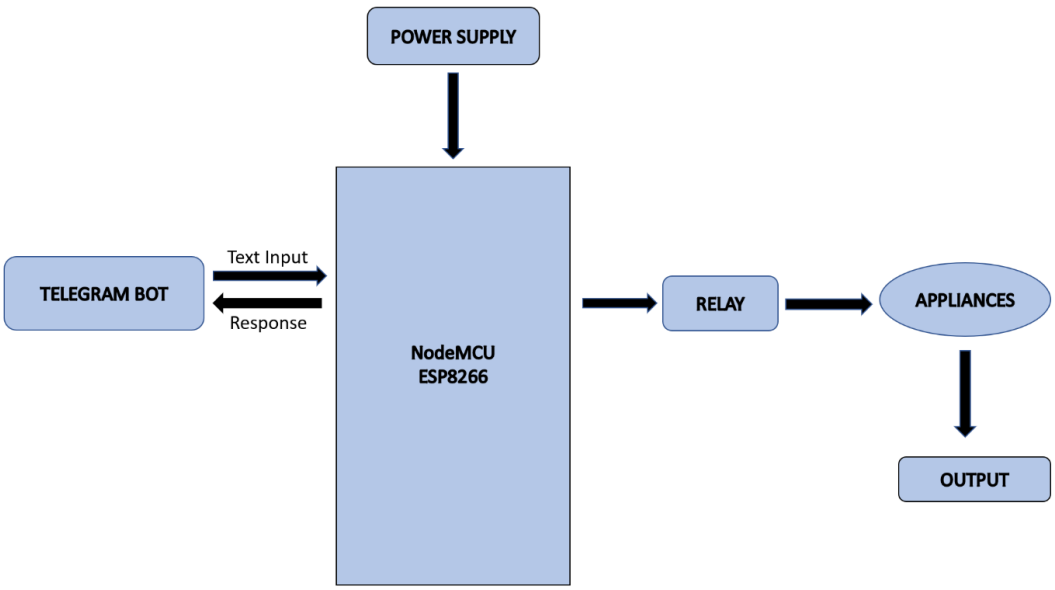

Figure 2. Block diagram of the System

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It will be easy for the user to identify if the any home appliance at home is switched ON/OFF from a remote location and this would help the user in saving up electricity and also provided safety when dealing with the electric appliances at home. The user would only need to send a text message through the Telegram Bot to know if the home appliances are turned ON/OFF and the user would receive a return response in blink of an eye.

V. IMPLEMENTATION

After the set up of the proposed system is done, we connect Node MCU to the laptop using charger pin and to the Telegram Bot via internet. Every module connected is ON which says it through the glow of LED light. First, the led bulb is kept in OFF condition and when the text input is given by the user commanding the telegram bot to on the led bulb, the led bulb glows and the telegram bot provides a reply in the form of text to the user, stating that the led bulb is in ON condition. When the user provides a text input to turn off the led bulb, the led bulb immediately turns off and the telegram bot will send a confirmation text message which reads that the led buld is now turned off.

Fig.3 represents the telegram bot which shows the command given by the user and the reply given back to the user.

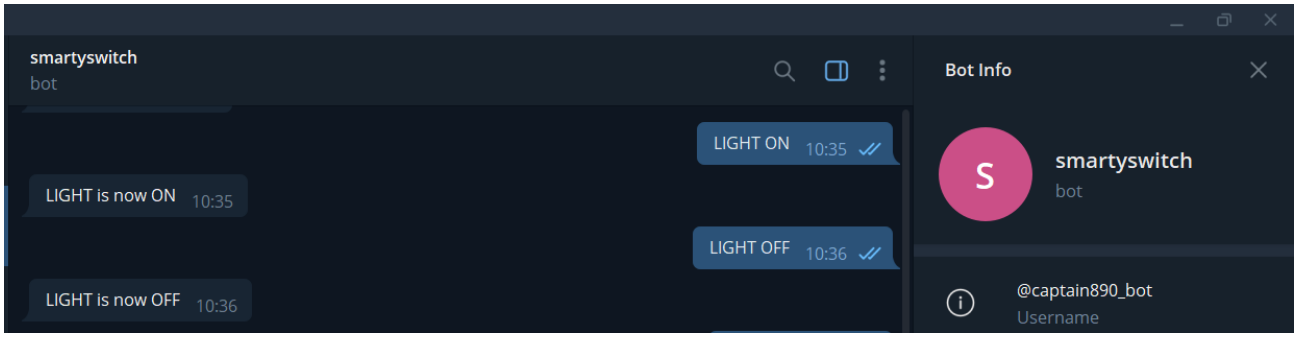

Figure 3. Created Telegram Bot's input text and response

Fig.4 represents the led bulb in Switched ON condition when the user provides a input text to turn ON the light through the Telegram Bot.

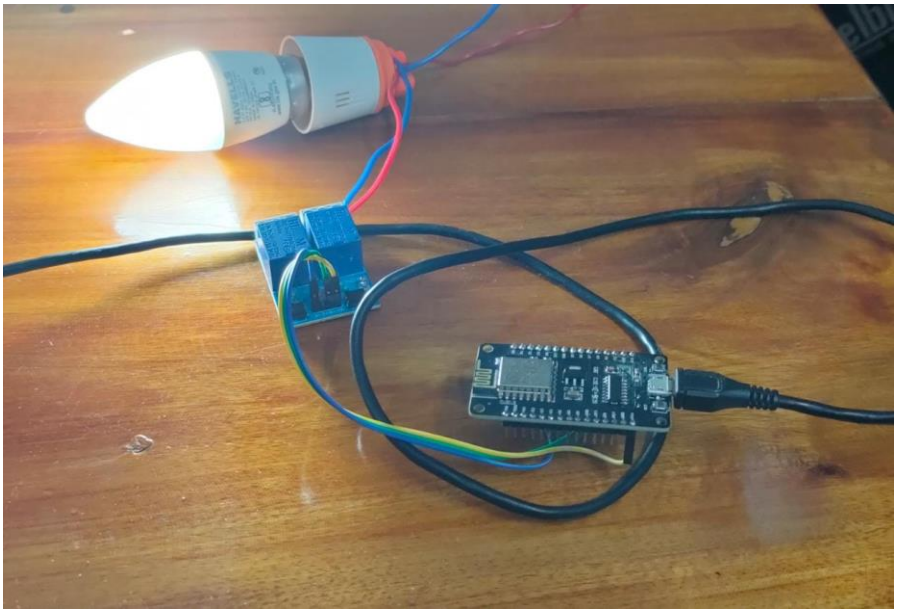

Figure 4. Led Bulb turned ON

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Fig.5 represents the led bulb in Switched OFF condition when the user provides a input text to turn OFF the light through the Telegram Bot.

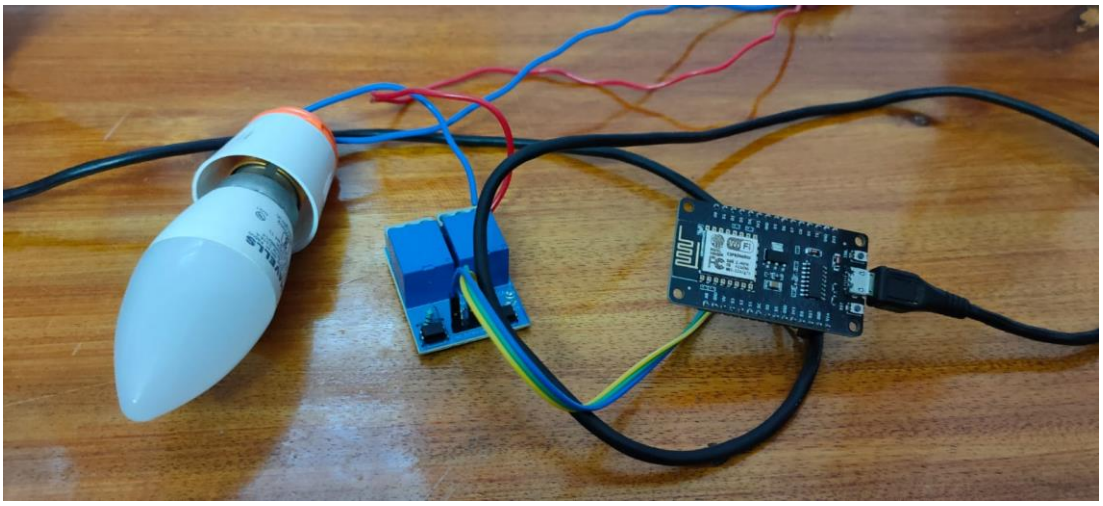

Figure 5. Led Bulb in Turned OFF condition

VI. DISCUSSION

The proposed model targets immobilized people and physically challenged people to control their home appliances with just one command line. The discussed paper combines three broad technologies namely IoT, Home automation and Chatbot which enables to control the home appliances remotely. In this, we have implemented the concept of IoT in home automation where the chatbot works as an IoT interface. The command is given in a telegram chatbot which is then sent as a signal to controlling board which then controls the things referred in "IoT". Combining these techniques paves the way for unlimited remote access of your home devices, the Telegram chatbot used here is better than the conventional chatbots which allows faster and efficient communication with interconnected home devices. Finally, this proposed paper helps physically challenged and immobilized people to have control over their home devices.

VII.CONCLUSION

The main objective of our proposed model is to provide remote access of home devices through chatbot. Thus, this is mainly focusses on immobilized people to have access to their home devices. The highlight of using telegram chatbot is that it doesn't necessarily need technical knowledge to use it, a simple command line is enough to pass commands to interconnected devices. As, we conclude that our proposed work can/will be useful for those facing challenges to have access to their home devices. Our future works includes regional languages to break the linguistic problems. Furthermore, email services will be added to ensure safe and secure connection.

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