

IOT BASED SMART HOME AUTOMATION SYSTEM**¹Mr. Salunkhe K.D, ² Mr. Savali S.R, ³Mr. Loni S. S, ⁴Miss. Ukrande R. N, ⁵Mr. Kote M. A.**

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ABSTRACT

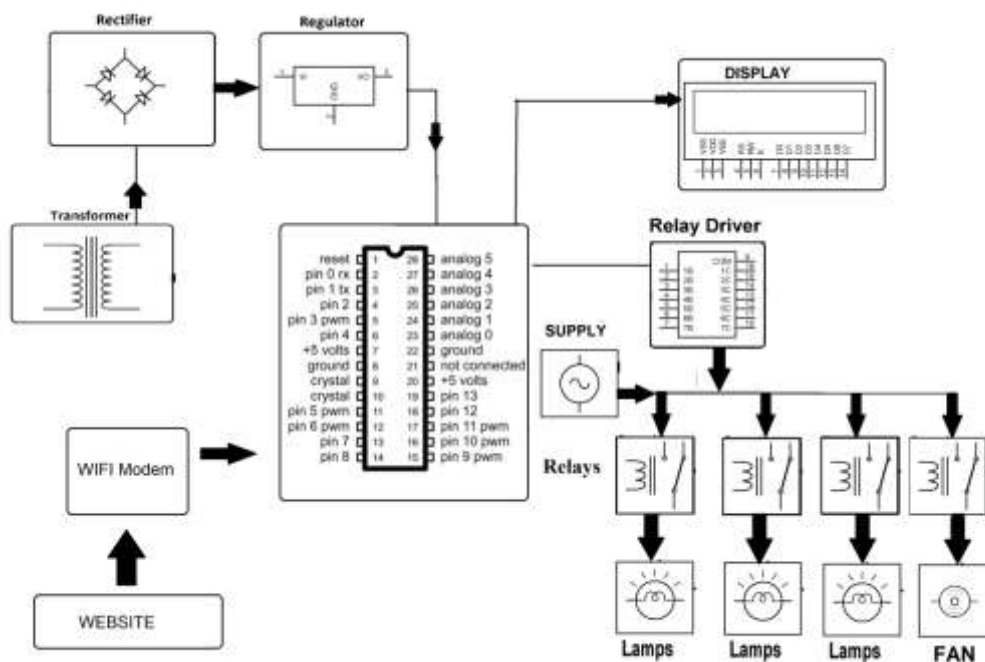
Internet of Things (IoT) conceptualizes the idea of remotely connecting and monitoring real world objects (things) through the Internet. When it comes to our house, this concept can be aptly incorporated to make it smarter, safer and automated. This IoT project focuses on building a smart wireless home security system which sends alerts to the owner by using Internet in case of any trespass and raises an alarm optionally. Besides, the same can also be utilized for home automation by making use of the same set of sensors. The leverage obtained by preferring this system over the similar kinds of existing systems is that the alerts and the status sent by the Wi-Fi connected microcontroller managed system can be received by the user on his phone from any distance irrespective of whether his mobile phone is connected to the internet. The microcontroller used in the current prototype is the TI-CC3200 Launchpad board which comes with an embedded micro-controller and an onboard Wi-Fi shield making use of which all the electrical appliances inside the home can be controlled and managed.

INTRODUCTION

The home automation is control of home device from a central control point automation is today's facts where more things are being completed every day automatically. Usually the basic tasks of turning on or off certain device and beyond, either remotely or in close proximity. The concept of the RF-based system is to use the underlying wireless data network such as IEEE 802.11 (Wi-Fi). The popularity of wireless networks at home has increased in recent years, and the advanced computer technology has made the personal digital device to commonly have the capability to communicate through the wireless network. Hence, it is suitable to use RF-based location denervation system to estimate location of the personal digital device in a home environment with high data rate transmission, supporting multimedia application may be feasible in WLAN. One of the possible application is wireless network for home automation. Imagine a private home equipped with motion light temperature and other sensor actuators for opening the door dimming lights with a remote control as complex as setting up a network of items in your home (such as thermostat, security system lighting and appliances) that can be programmed using a main controller. The basic idea of home automation is to employ sensor and control system to monitor dwelling and accordingly adjust the various mechanism that provide heat ventilation lighting and other service. The automated "intelligent" home can provide a safer more comfortable and more economical dwelling. In an intelligent home automation system there are many possible solution for how and form where to control the automation system and single device a user interface can be a computer-based system a mechanical switch a single light a loudspeaker with a microphone or a some kind of personal remote controller using normal PC, laptop or table PC by standalone software or web-based user interface. In the near future all electronic appliances in a home will be networked. The internet of things (IOT) is the network of physical objects or "Things" embedded with electronics, software, sensors and network connectivity, which enable these objects to collect and exchanging data. IOT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunity for more direct integration between the physical world and computer based system, and resulting in improve efficiency, accuracy and economic benefits

LITERATURE SURVEY

Several research articles and existing literature have aimed at enhancing environmental control, energy management, home security, and other aspects of smart home automation systems. Machine learning algorithms have also been applied in the IoT field for classification, prediction, and analysis. This section presents articles in the field of IoT relevant to smart home automation and the use of machine learning in intelligent systems. Govindraj et al. Presented a smart home automation system to replace the conventional home automation system using IoT technologies. The proposed system uses an Android application to control and monitor appliances, temperature, motion, and gases in the home environment, which is carried out via a satellite station and a radio frequency transceiver. Data generated by sensors are stored on the Thing Speak cloud platform. A base station provides the necessary commands for home control. Also, a mobile application was designed to communicate with the satellite station, base station, and the cloud server for the overall control of the home, with a graphical display of sensor readings. A voice-controlled home automation system was proposed by Rani et al. , which was based on artificial intelligence and natural language processing (NLP) techniques. To control home appliances, voice commands are issued over a mobile phone and interpreted using the predefined natural language processing medium. The system was only used to control home appliances and not extended to other aspects of home automation such as control, monitoring, and detection of environmental conditions, intruders, motion, etc. Gladence et al. Proposed a client-server-based mechanism for smart home automation. The proposed system uses machine learning algorithms and NLP concepts to establish interaction between the systems and humans. The user issues command to carry out specific tasks such as controlling home appliances and doors and monitoring voice bed movement. The authors also designed a module to assist persons with disabilities through NLP and artificial intelligence techniques. Mehmood et al. developed an object detection mechanism for the control of smart home appliances, in which the automation system was based on an object detection algorithm, model view controller architecture, and cloud of things. The IoT devices communicated with home appliances through the message queuing telemetry transport (MQTT) mode. This work showed that object detection algorithms combined with deep learning algorithms enhance object detection in a smart home environment. An intelligent smart home automation system that carries out tasks based on the user's emotions was presented by Jaihar et al. To control lights, sound systems, and other home devices. Several machine learning algorithms were combined and used to analyze the user's needs and the surrounding conditions to predict actions and minimize user interaction. The home appliances are switched ON or OFF according to the emotion detected by the machine learning model. Their approach enhanced energy efficiency in the home. An approach to controlling home appliances based on intelligent decision-making and analytics was presented by Majeed et al., which used the support vector machine for its intelligent decision-making and block chain technology for the security of IoT devices. An Android application was developed for the remote control of home appliances. The authors applied a linear kernel for decision-making about home appliances and their statuses. A real-time algorithm for monitoring and control of the home, its environmental conditions, motion sensors, and electrical appliances was proposed by Khan et al. Lights were switched ON or OFF according to the algorithm generated inferences from the motion sensors. The proposed algorithm was also used to monitor the power consumption of various appliances in the home through the Wi-Fi module and was also applied to create an alarm based on the gas level in the home

IMPLEMENTATION**BLOCK DIAGRAM: -****METHODOLOGY**

We will utilize the sensors like DHT11 Humidity Temperature Sensor, MQ-135 Gas Sensor, and Passive Infrared Sensor to monitor the Indoor Air Quality Parameters. Similarly, a simple 5V buzzer can work as an alarming system. An automatic exhaust Fan is connected to a relay which activates automatically when the gas level exceeds the threshold value. Since we are using 4 channel relay, the remaining 3 relays can be connected to kitchen appliances like Mixer, Refrigerator, Oven, Water Heater, Induction, etc. A simple 0.96" I2C OLED can Display room temperature, humidity, and gas value live. The heart and brain of this project are Wemos D1 Mini Board or NodeMCU ESP8266 Board. You can use any of the ESP8266-12E based boards. The ESP8266 chip connects to the WiFi Network and establishes a connection with Blynk Application. Use the following schematic as a reference and assemble the circuit on a breadboard. Connect the OLED Display SDA & SCL pins to Wemos D2 & D1 Pin. Similarly, connect the DHT11, MQ-135 & PIR Sensor output pin to the D4, A0 & D3 pin of Wemos. For the alarm system, you can connect the 5V active Buzzer to the D0 Pin of Wemos. For controlling the Home Appliances, we can use 4 channel Relay Module. So using the jumper wires, connect the 4 channel relay input pin to the D5, D6, D7 & D8 of Wemos. Now we need to setup the Blynk Application so that we can receive the data from ESP8266. The Blynk Application used here is for IoT Based Smart Kitchen using NodeMCU ESP8266. Blynk is an application that runs over Android and IOS devices to monitor any IoT based application using Smartphones. It allows you to create your Graphical user interface for IoT application. Here we will display the room temperature, humidity & Air Quality data & control kitchen appliances. 1. So download and install the Blynk Application from Google Play Store. IOS users can download from the App Store. Once the installation is completed, open the app & sign-up using your Email id and Password. 2. From the dashboard create a new project and select NodeMCU Board & Wifi Connection. 3. Then drag & drop or add 3 buttons, 2 style buttons, and 3 gauge from the widget list. 4. Assign the 3 variables and name them like temperature, humidity & Air Quality

Index Value as per code. 5. Similarly, assign the 3 variables for the button and 2 variables for the styled button. 6. You will get the authentication code in the mail. Copy this authentication code. This will be used in your code. After adding all these libraries, the code will compile easily. But for establishing Wifi connection and connecting Blynk with Wemos ESP8266 Board, change the Wifi SSID, Password & Blynk Authentication Token. Here is a complete code for the project. Paste this code on the Arduino IDE. Then select the Wemos D1 board from the Board manager & also select the port and upload the code

FUTURE SCOPE & CONCLUSION:

In this paper, we have introduced the event of a home management using NODE MCU and internet of things technology. The system is suitable for remotely controlling the home appliances. A smart home system integrates various electrical appliances in a home with each other using information devices automatically according to the users' need. For the web application the part is provided inside the program thus it doesn't require any other application to be developed for different gadgets. The automated mode makes life easier for users by complete automation of necessary appliances without any human effort

REFERENCES: -

Books:-

1. Wikipedia. (2012, 12th December). Home automation. Available: http://en.wikipedia.org/wiki/Home_automation
2. <http://www.smartcomputing.com/editorial/article.asp?article=articles%2F1995%2Fmar95%2Fpcn0323%2Fpcn0323.asp> retrieved 2010 09 02

Websites:-

1. <https://www.researchgate.net/publication>
2. <https://create.arduino.cc/projecthub/make-esp8266-we>.
3. <https://how2electronics.com/iot-based-smart-kitchen-automation-monitoring-withesp8266/#:~:text=Basically%2C%20the%20IoT%20Smart%20Kitchen,Level%20on%200.96%E2%80%B3%20OLED%20Display>