



# IOT - BASED HOME AUTOMATION SYSTEM FOR MANY LOADS

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**Abstract**— The term "Internet of Things" (IOT) refers to the idea of remotely interacting with and keeping track of physical items (things) over the Internet. This idea can be effectively applied to our home to make it smarter, safer, and more automated. This Internet of Things project is focused on creating a smart wireless home security system that leverages the Internet to transmit notifications to the owner. Integration of Internet-connected sensing systems is expected to optimise overall energy usage. In order to efficiently balance energy generation and utilisation, it is anticipated that IOT devices will be integrated into all types of energy-consuming equipment and be able to interact with utility supply companies.

**Keywords**— Zig Bee, Internet of things, wireless, smart house.

## I. INTRODUCTION

As time goes on, technology develops and becomes more essential to human life. Water, food, and shelter are essentials, but some other resources like power, oil, gas, and others are also gradually becoming necessary for us.

It would appear impossible to do our everyday chores without these resources. Their deficiency serves as an example of the severe level of this. For instance, if a nation has a power shortage, life will continue as usual since electricity is required for everything from little led lights to large machineries.

If it is not delivered adequately, a lot of problems might occur and the nation could experience severe difficulties. As a result, given how depending we are on these resources, we should propose and put into practice alternatives that might help conserve them.

The idea of a "smart house" is quite popular since it improves the occupants' quality of life by integrating many different disciplines, such as lighting, security, and much more. A few of the many issues relating to data loss due to interference and effective energy management must be addressed as the size and complexity of smart home networks continue to expand.

By reducing needless energy demands, smart energy control systems improve the energy consumption of household appliances. They integrate sunshine with light sources.

## IOT



Figure 1: Representation of IoT

The Internet of Things (IOT) is a network of objects, including cars and household appliances, that include connectivity, electronics, software, actuators, and connectivity to enable connections, communication, and data sharing. The Internet of Things (IOT) refers to the expansion of Internet connectivity to a variety of conventionally non-internet capable physical things and gadgets outside of regular devices including desktops, laptops, smartphones, and tablets. These gadgets have technology built into them, so they can interact and communicate online and be watched and controlled from a distance.

### HOW IOT WORKS

An IOT (Internet of Things) ecosystem is made up of web enabled smart devices that employ embedded computers, sensors, and communication gear to gather, communicate, and act on environmental data. By connecting to an IoT gateway or other edge device, which either sends data to the cloud for analysis or analyses it locally, IOT devices exchange the sensor data they gather. These gadgets converse with other similar devices on occasion, acting on the data they exchange. Although individuals may engage with the gadgets, for example, by giving them instructions or gaining access to the data, the devices conduct the majority of the job without their help. These web enabled devices' connection, networking, and communication protocols are heavily influenced by the particular IOT applications that have been implemented.

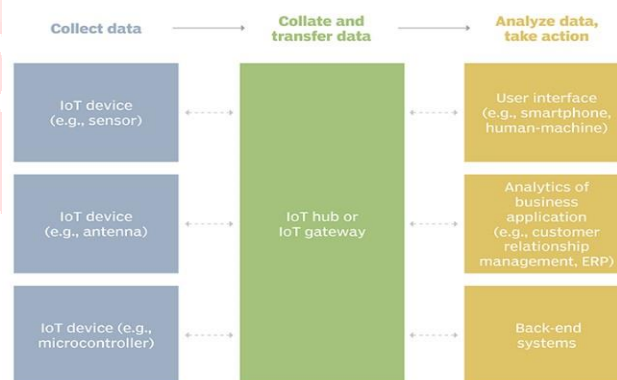


Figure 2: Example of an IOT system

### IOT APPLICATION AREAS

IOT is being deployed increasingly using the following technologies: NFC (Near Field Communication), RFID (Radio frequency Identification), M2M (Machine to Machine Communication), and V2V (Vehicle to Vehicle Communication). More than 50 billion IoT devices are anticipated to be connected online. The way people live, work, play, and enjoy themselves will all alter as a result. IoT has a wide range of application areas, and the domains for these applications are expanding daily.

These are some examples of IoT applications:

Smart Cities

Environmental monitoring

Home and building automation

The automotive industry

Smart retail

Smart agriculture

Smart industry and

Energy management

## II. LITERATURE SURVEY

This paper [1] suggests an Internet of Things-based smart home system and provides the system architecture in accordance with the Internet of Things' layered design. The system's gateway is also meticulously planned, from the hardware to the software. The interface circuits for the 3G, video, and ZigBee modules are presented with reference to the S3C2440A CPU, however it is quite expensive.

According to paper [2], the system gives consumers the tools they need to safely and dependably manage and control their electronic gadgets, keep an eye on their power use, and pay their electricity bills. The provider can efficiently monitor, respond to, and maintain the problems as well, but it will need additional power.

In paper [3] the 433 MHz wireless sensor and actuator network is used as the bottom layer in the IOT based smart home management system that is suggested in this study, making reconfiguration and reorganisation relatively simple. High cost implementation and complex design are the downsides.

This paper [4] discusses an embedded data collecting system, energy management system, and GPRS, SMS, and email alert based Interactive Industries Home network system. The device system may automatically gather data, deliver it by SMS and email, and display the results in real time on a HyperTerminal window. It was created using the IEEE 1451 protocol in conjunction with an ARM controller and the use of wireless communication; nevertheless, its drawbacks include being difficult to install and requiring additional processes.

paper [5] The project's proposed outcome aims to save users money on their home's electricity bills, keep them informed about home security, give them the option to switch between devices with their voice or a simple toggle on their smartphone, and, most importantly, track usage to minimise electrical energy consumption and protect the earth's limited natural resources. However, there are some drawbacks. Poor Efficiency and Lower Reliability.

## EXISTING SYSTEM

Zig bee-based home automation is already incorporated in the system. It is only utilised for a limited number of applications. There is a power outage, Covers brief distance

## III. PROPOSED SYSTEM

IOT (Internet of Things) is used in this system to allow the owner to monitor the fan and light remotely using their smartphone. The fan and light will turn on automatically if someone is home. Fan and light will turn off if no one is home thanks to AI technology and a camera.

Depending on the input provided by the user, the Arduino controller will regulate the load. Using a temperature sensor, the fan turns on when the temperature is high. With the use of an IOT website, the whole home load, including the fan and light, will be regulated. The IOT website provides the system with the command. The LCD Display will show all of the information.

## BLOCK DIAGRAM

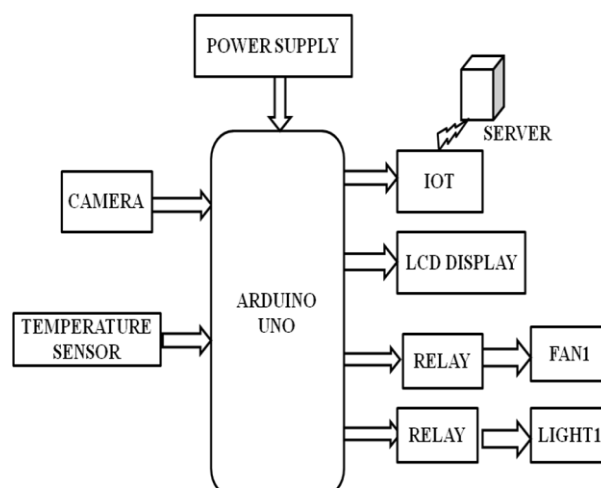


Figure 3: Proposed system block diagram

## SOFTWARE AND HARDWARE REQUIREMENTS

Embedded C is the programming language in use.

### ARDUINO IDE

The compiler is Arduino Ide 1.8.3 is shown in Fig 4.

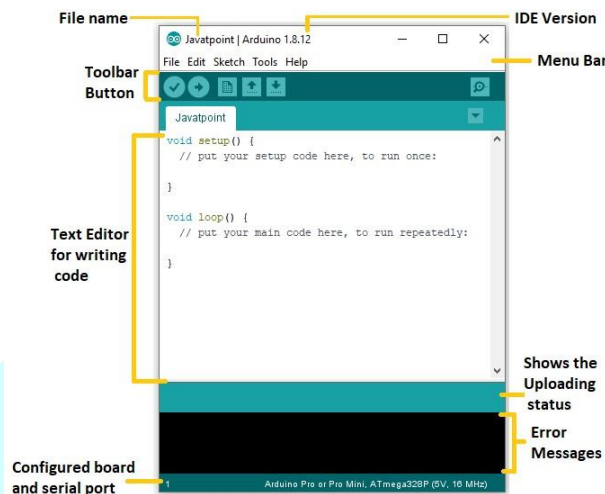


Figure 4: IDLE of Arduino

Java was used to create the cross-platform Arduino IDE (integrated development environment), which is available on Windows, macOS, and Linux. It is used to programme and upload code to an Arduino board.

Arduino is a simple open-source electronics platform with simple hardware and software. An Arduino board may receive inputs such as light on a sensor, a finger on a button, or a tweet and then activate a motor, turn on an LED, or post anything online. You may direct the activities of your board by programming its microcontroller.

### PROTEUS

Simulation tool used is Proteus before being implemented into a real-time application.

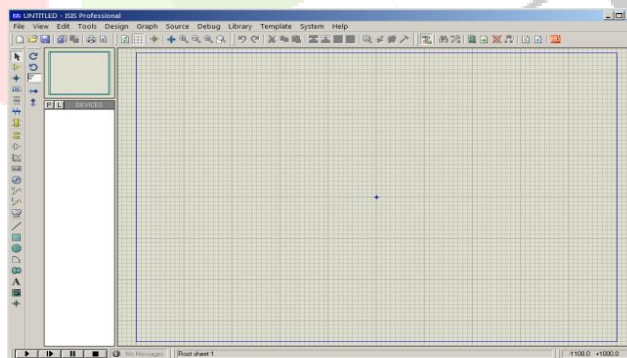


Figure 5: Proteus Application

Proteus is a simulation and design tool for electrical and electronic circuit design developed by Labcenter Electronics. The simulation feature of Proteus. Many Proteus components can be realistically recreated. There are two methods for simulating: Run the simulator or analyse each frame individually.

With the "Run simulator" option, the circuit is replicated at normal speed. Before going on to the next frame, the "Advance frame by frame" option waits until you click this button again. This is beneficial for troubleshooting digital circuits. Figure 5 shows a resting proteus.

### ARDUINO UNO

Arduino is a free and open-source hardware and software prototyping platform. An Arduino board may receive inputs such as light on a sensor, a finger on a button, or a tweet and then activate a motor, turn on an LED, or post anything online. By delivering a series of commands to your board's microcontroller, you will direct it on what to do. This is accomplished through the use of the Processing-based Arduino Software (IDE) and the Wiring-based Arduino Programming Language.

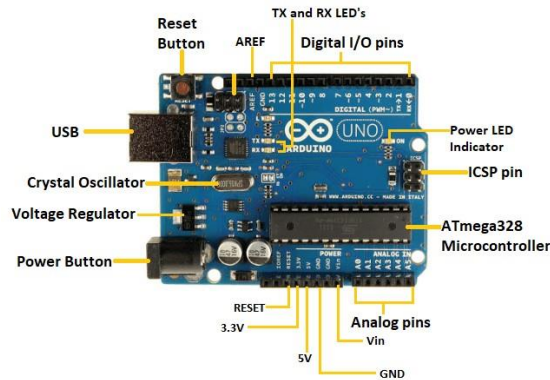


Figure 6: Arduino UNO board

### CIRCUIT DIAGRAM

The circuit diagram and proteus simulation is as shown in figure 7(a) and figure 7(b).

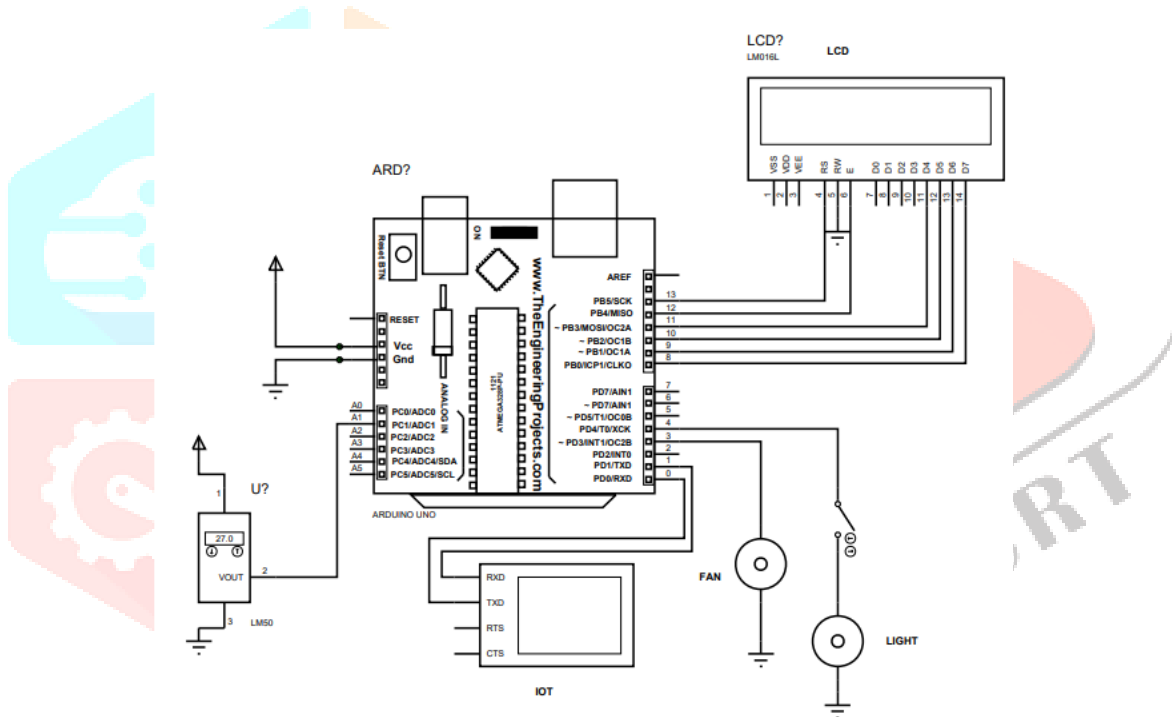


Figure 7(a): Circuit diagram

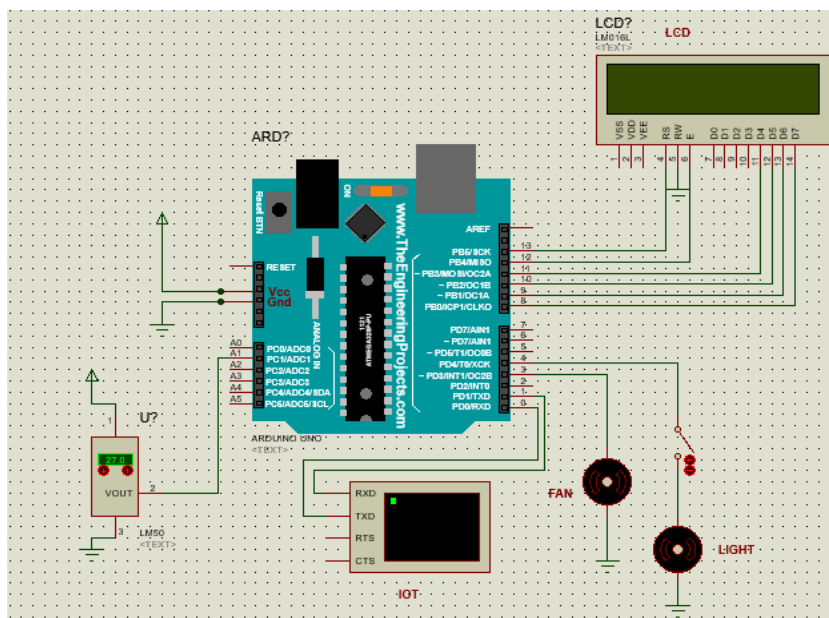


Figure 7(b): Proteus Simulation

IV. RESULTS

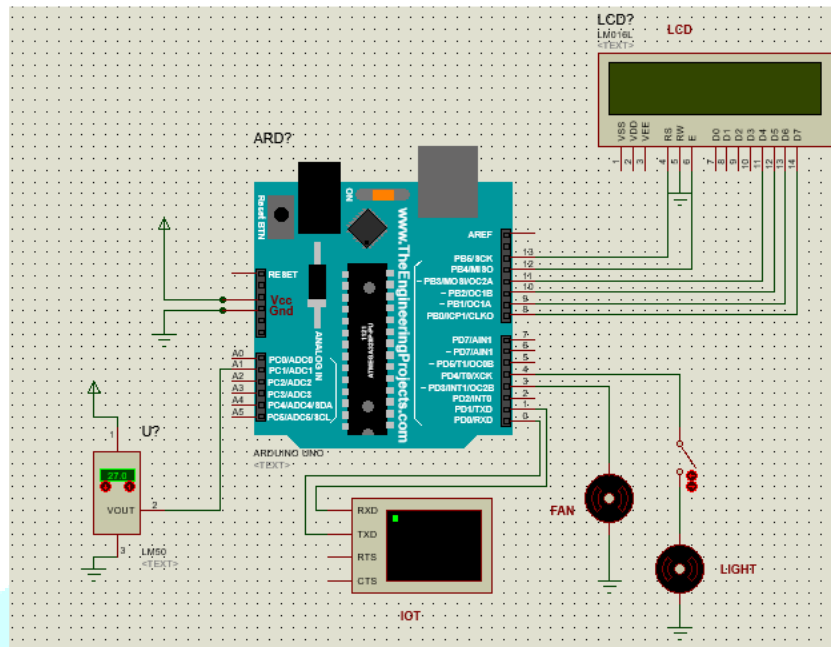


Figure 8(a): Off State

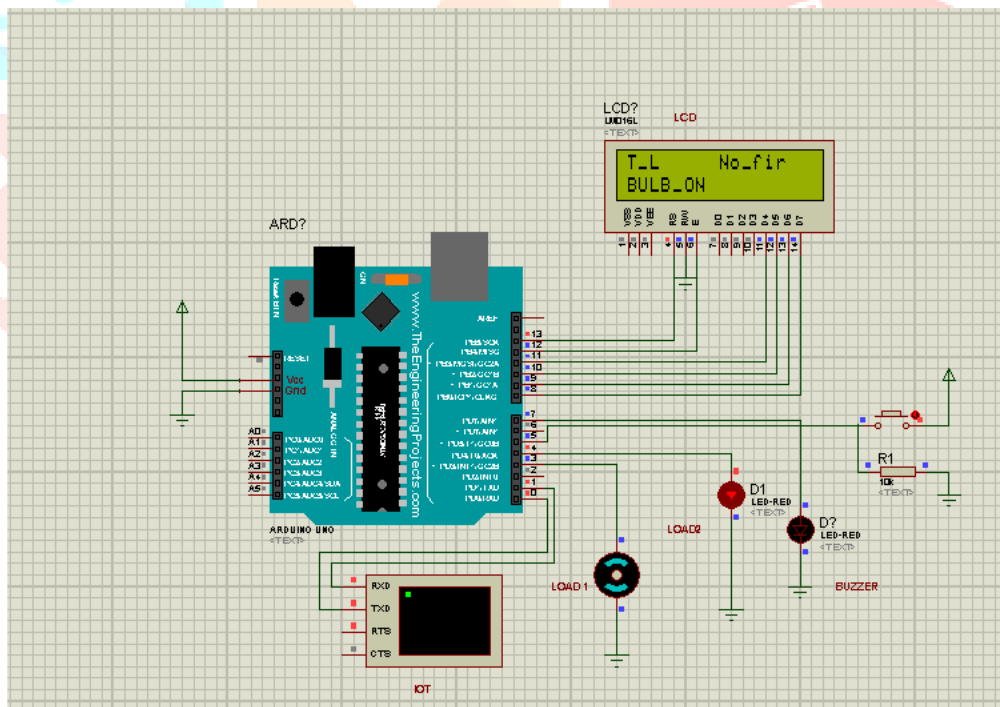


Figure 8(b): On State

V. CONCLUSION

IOT is used in this study to develop home automation. A smart house automates and combines different electrical equipment with little to no user input. The smart home maintains track of the many environmental factors that are present and directs the appliances to operate in accordance with user demands. In this case, IOT commands are used to operate electrical appliances. Energy is consumed from. We utilised Internet of Things technology to construct the Smart House. The experiment revealed that we are capable of creating smart homes that are affordable, adaptable, and energy efficient for a better and more environmentally friendly future.



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