

Smart Light Management Using IoT

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Abstract In present days we are living in the technical era, life is getting easier and comfortable as the manual systems are being replaced by the automatic one. The internet users are increasing day by day lets us to share new technology in world-wide, IoT is the emerging and latest internet technology. One can control the machine by using IoT from anywhere. Internet of Things is responsible for completing tasks while one is involving in other activities. IoT based Smart Light Management (SLM) is a automatic light system that uses internet connected device to control the functionality and features automatically from anywhere in the corner of the world. The main aim of this technology to save electric power, time and human energy. The IoT based light system is totally different from other wireless automation system since, it can be operating from anywhere around the world with the help of internet.

Keywords— IoT [Internet of thing], SLM [Smart Light-Management]

Introduction

Smart light can be referred as to monitor the conditions and performing the required actions on the home devices connected to IoT to control it smartly. In home automation household devices like light bulbs, etc. are assigned a unique id as an address and are connected through common home gateway. This can be controlled, managed and accessed from any smart phone, PC, Laptop, tablet. This system can control lights, fans, television, AC and other appliances. By using this we reduce the energy wastage and improve the living conditions and enhance the indoor security.

Present days real world electronic devices are equipped with intelligence and sense of computing to take decision accordingly. Sensors are being used to the IoT connected devices along with low cost and power wireless connection to facilities to monitor and control the devices remotely. All this form an integral component of IoT (Internet of Things) network. The network of devices that are wirelessly connected to communicate and manage themselves based on the predefined rules developed by the developer is considered as Internet of Things (IoT). The data is transmitted over the wirelessly connected devices with the help of light weight protocols like MQTT, CoAP etc. GSM, 3G, WiFi, Bluetooth, Zigbee etc. are the common radio modules that are used in IoT based devices. To monitor and control the IOT devices,

WiFi hotspots having sufficient range is used. The mode of communication in the prototype is performed through WiFi through MQTT protocol that is implemented through ESP8266 to control and manage the IoT devices.

MESSAGE QUEUING TELEMETRY TRANSPORT

Message Queuing Telemetry Transport (MQTT) is a transport protocol of light weight that efficiently uses the network bandwidth with a fixed header of 2 byte [3]. MQTT works on Transport Control Protocol (TCP) that is responsible for the delivery of message from node to server with assurance. MQTT is a messageoriented information exchange protocol nature is ideally suited for the IoT devices that having limited capabilities and resources. MQTT is considered as a publish /subscribe based protocol. In MQTT connection involves two type agents: MQTT server or MQTT public broker and MQTT clients. When data is being transmitted by MQTT is known as application message. Any program or a device which is connected to the network and involves in exchanging through MQTT protocol is known as MQTT client. The MQTT client may be either subscriber or a publisher. A publisher publishes application messages and the subscriber requests for the application messages. MQTT server may be a device or a program that interconnects the MQTT clients. MQTT server accepts and transport the application messages among multiple clients connected to it. Sensors, mobiles etc. devices are considered as MQTT client. When certain information needs to broadcast by the MQTT client, it publishes the information to the MQTT server. by the MQTT clients is also forwarded to other MQTT clients that subscribe to it. By concentrating all the complexities at the broker end, MQTT design is simplified in the implementation on the client.

A. Connection establishment

It waits for the connection to be established with the server and creates a link between the nodes and the server and creates a link between the nodes. Then the transmission of message takes place between the nodes and server.

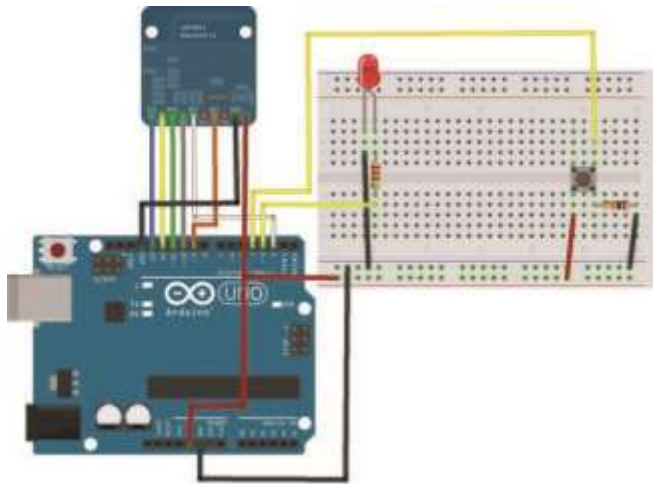


Figure: Circuit Diagram

B. Terminating the Connection

In order to terminate the connection between the client and server, MQTT client sends a DISCONNECT packet to the MQTT server and the server does not acknowledge this packet. But all the application messages that are related to the client will be flushed off and the client will be disconnected from the server.

Related Work

A prototype is designed to perform home automation through SMS. In this GSM network and the devices are bridged with the help of microcontroller. The security aspects in the networking is also focused in this prototype and they proposed a secure, reliable and much adaptable home automation system. MQTT is far better than HTTP for the nodes with the constrained resources in the research work done in [5]. Through MQTT the data transmission consumes only about 0.05% of battery per hour when we use 3G for network connectivity.



Figure: Bluetooth Technology

Conclusion

MQTT is light weight protocol which occupies low bandwidth and consumes less power when transfer the data over the internet. And the IoT based Smart Home Automation system lets us allow to control various electric home appliance (that can operate on 230v also) from any device like smart phone, tablet or PC from anywhere in the world via an internet connection. By using such technology, we can reduce

the energy wastage and improve the living conditions and enhance the indoor security. Because we are going to control the home appliances through the internet, as we can access it all over the world where internet is available.

The primary objective of our project is to provide a simple yet functional solution for home automation and security. This system provides a central command to control all the electrical appliance present in the home. This system is very useful and handy for elderly and physical disabled person to control the appliance without going from one room to another.

This project also enable user to control the appliance, remotely. Which means, user can control or view status of the appliance from anywhere in the world.

It also enables them with many unique features like, timer control, slider control, switch control. These features can be very useful, time to time.

All the components used in the project is easily available and the software is open source which can be used by any person for free. This is a prototype project which can be used by any person who is looking to make his/her simple home into smart home

Future Work

By using the Smart Home management System framework can be further expanded to include various options in the automation which may include hoe security features like capturing the photo of a person moving around the house using the latest technology of Artificial

Intelligence that stores it in the cloud storage. By using this we can reduce the data storage continuously from the CCTV cameras all the time. This type of system can be further expanded to energy monitoring, or weather stations etc. this kind of systems with some respective changes can be implemented in the hospital for disable people or in industries where human invasion may be danger and impossible, and it can also be implemented in environmental monitoring. In today's market there are many smart speakers available.

There is amazon's alexa, Google's assistance, Microsoft's cortana, Apple's siri. These speakers have artificial intelligence, which can process human commands very well.

So, the future enhancement of this project is to integrate the current system with those smart speakers, so that there is no need to any device and can be controlled over voice. This will allow user to control all the electrical appliances of the house seamlessly.

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