Implementation of IoT based Smart Laboratory

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Authors:

M. Poongothai, A. L. Karupaiya, R. Priyadharshini

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Abstract

Internet of Things is a promising technology that has wasted no time spreading across the world and connecting the huge number of individuals with the devices around them. The proposed work aims to develop a smart laboratory system in CIT campus based on IoT and mobile application technologies that operates in an intelligent manner. This provides a platform that allows devices to be connected, sensed and controlled remotely across a network infrastructure. The IoT lab is implemented by embedding the electrical appliances such as lights, air-conditioners, fans and projectors in the laboratory with sensors and network connectivity. These software enabled physical objects collect and exchange the real time data. Devices in the laboratory are connected to IoT smart hardware kit and communicate through an MQTT protocol which is a messaging protocol for machine-to-machine communication. IoT smart hardware kits are designed using ESP8266, Arduino UNO, relays and current transformers. All ESP8266s act as MQTT clients and an online server acts as an MQTT broker. The proposed work mainly intents to provide an easy accessibility of the electrical appliances through an Android application and a user interactive dashboard developed in Node-RED.
Along with the status and energy consumption of individual devices, temperature & humidity status of the laboratory can also be monitored using sensors and viewed in dashboard and mobile application. From the results of implementation, it is observed that the appliances in our lab are remotely monitored and controlled, thereby reducing their energy consumption considerably.

References

Index Terms

Computer Science  
Information Systems

Keywords

Environmental monitoring, IoT kit, Mobile application, MQTT, Node-RED, User-interactive dashboard