Internet Of Things (Iot) Light Control System Using a Mobile-Based Raspberry Pi

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Abstract

Internet of thing (IoT) is a concept that aims to expand the benefits of internet connectivity that is connected continuously. Internet of things (IoT) can be used in buildings to control electronic equipment such as room lights that can be operated remotely via a computer network. This study aims to build a remote control device by utilizing internet technology to carry out the mobile-based light control process. The research was conducted by building a prototype and mobile-based application using the python programming language. In this study, there is a control feature, namely one light control which is used to turn on one lamp and two controls used to turn on the lamp simultaneously.

Keywords: Internet of things (IoT), Raspberry Pi, Mobile.

1. Introduction

Internet of thing (IoT) is a concept that aims to expand the benefits of internet connectivity that is connected continuously [1]. Internet of things (IoT) can be used in buildings to control electronic equipment such as room lights that can be operated remotely via a computer network, it cannot be denied that such rapid technological advances must be utilized, studied and applied in everyday life. An example is the development of technology that can be utilized from the existence of this internet connection, which can access electronic equipment such as room lights which can be operated online via mobile. So, it can make it easier for users to monitor or control lights anytime and anywhere provided that the location where remote control technology will be applied has an adequate internet network. Remote control system, makes it easier for users to control the lights of buildings that are quite far away. Meanwhile, in another study [2] "Prototype Internet Of Things (IoT) Building Light Control" This control system technology is done from a single computer in which there is systems or software features that have been built and designed to carry out the task of controlling the room lights. In developing and correcting the above problems, in this study the researchers used the Raspberry Pi 3.

Raspberry Pi is one of the components of the Internet of Things (IoT) which can be applied as a remote control with an internet network that can be applied to electronic equipment such as lights. The device can be accessed with internet services via an Android smartphone with Internet Protocol so that the level of energy efficiency and staff working hours and in terms of saving electrical energy used. This technology is appropriate to apply because it makes it easier for officers to do the job. Based on the description above, the researcher intends to conduct research to design prototypes and create mobile and python application programs using the Raspberry Pi 3 as a remote light controller with an internet network that can be applied to electronic equipment such as lamps, so that the level of energy efficiency and working hours of officers and in terms of saving electrical energy used.

2.THEORETICAL BASIS

2.1. Internet Of Things (IOT)

According to [3] Internet of Things or also known as IoT, is a concept that aims to expand the benefits of continuously connected internet connectivity that allows us to connect machines, equipment and other physical objects with network sensors and actuators for obtain data and manage its own performance, thus enabling machines to collaborate and even act on new information obtained independently. Internet Of Things or often called IoT is an idea where all objects in the real world can communicate with each other as part of a single unit integrated system using internet network as a link. for example, CCTV installed along the road is connected to an internet connection and put together in a control room that may be tens of kilometers away. or a smart home that can be managed via a smartphone with the help of an internet connection. basically the IoT device consists of sensors as a data collection medium, an internet connection as a communication medium and a server as a collector of information received by sensors and for analysis. The initial idea of the Internet of Things was first raised by Kevin Ashton in 1999 in one of his presentations. Now many large companies are starting to explore the Internet of Things. Call it Intel, Microsoft, Oracle, and many others. Many predict that the influence of the Internet of Things is "the next big thing" in the world of information technology, this is because IoT offers a lot of potential that can be. excavated. Simple examples of benefits and implementations of the Internet of Things For example, a refrigerator

can notify its owner via SMS or email about what food and drinks have run out and must be stocked again.

2.1.1. How the Internet of Things Works

The concept of IoT is actually quite simple by referring to the 3 main elements of the IoT architecture, namely: Physical Items equipped with IoT modules, Connection Devices to the Internet such as Modems and Speedy Wireless Routers such as at home and Cloud Data Center, a place to store applications and data. base.

Figure 2.1. IOT concept

The basic working principle of IoT devices is that objects in the real world are given a unique identity and can be multiplied in a computer system and can be represented in the form of data on a computer system. In the early days of implementing the idea of IoT, the identifiers used so that objects could be identified and read by a computer were by using barcode, QR Code (QR Code) and Radio Frequency Identification (RFID). In its development, an object can be given an identifier in the form of an IP address and use the internet network to be able to communicate with other objects that have an IP address identifier. How the Internet of Things works is by utilizing a programming argument where each command of the argument produces an interaction between people. machines that are connected automatically without human intervention and at any distance. The internet is the link between the two machine interactions, while humans only function as regulators and supervisors of the work of these tools directly.

2.2. Mobile Application Application

Mobile is software that runs on mobile devices such as smartphones or tablet PCs [4]. Mobile applications are also known as applications that can be downloaded and have certain functions, thereby adding to the functionality of the mobile device itself. To get the desired mobile application, users can download it through certain sites according to their operating system. Google Play and iTunes are some examples of sites that provide various applications for Android and iOS users to download the desired application. So a mobile application can be interpreted as an application program that can be run or used even though the user moves from one place to another and has a small size. These mobile applications can be accessed via wireless devices, fences, PDAs, cell phones, smartphones, and similar devices.

3. RESEARCH METHODOLOGY

The framework in this study consists of 4 stages which are described as follows:
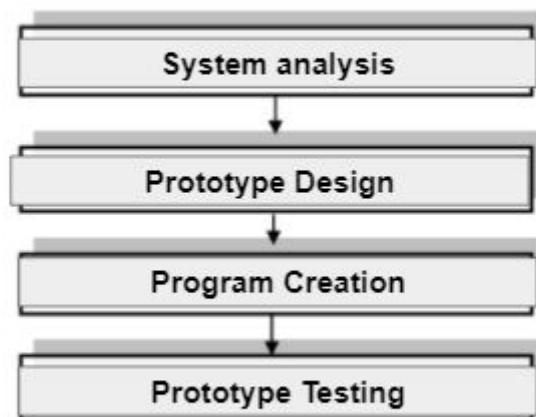

Figure 3.1. Research methodology

This system requirements analysis is intended to describe the requirements that must be provided by the system in order to meet user needs and in accordance with the research objectives, namely designing a Mobile-Based Light Control System. This system design describes interface requirements, input data requirements and output data that shows the system specifications that can be accessed.

4. RESEARCH RESULT

4.1. Prototype Design

Designing a Mobile-Based Light Control Prototype begins using the DT Relay as shown below:
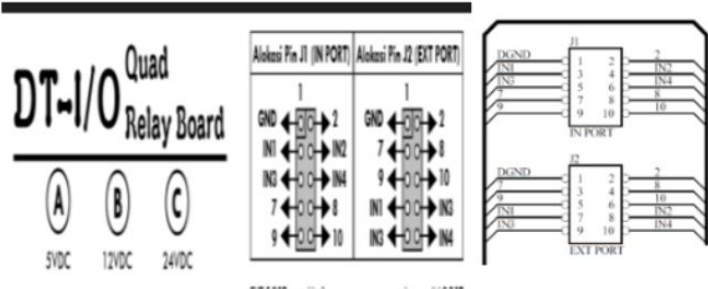

Figure 4.1 DT-Relay Connection

After the DT-Relay, proceed to adjust the Raspberry Pi 3 Data Sheet with a display as shown below
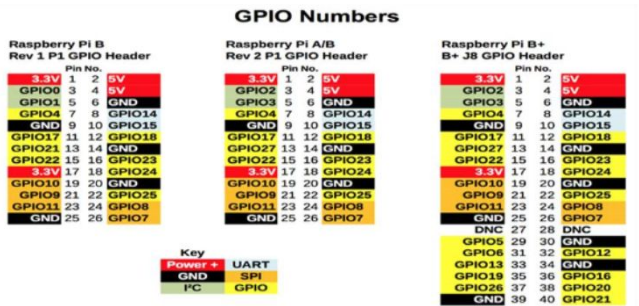

Figure 4.2 Raspberry Pi 3

4.3 Implementation

In this system, it is built to be able to display light control information which will be directly carried out by officers using mobile-based applications. The following is a display of the light control application:

4.3.1 Display of Mobile based light control system 1.Display the mobile device with all the lights off.

Figure 4.8. Mobile display of all position lights off

2.Display of mobile devices

Position 1 light bulb lights up IOT Light Control System Using Raspberry Pi 3 Mobile-based Light Bulb 1 Light Bulb 2

Figure 4.9. The mobile display position 1 light bulb is on

5. Conclusion

The design of this lamp control prototype is only used to turn on, turn off, and monitor the lights. This light control is only supported by mobile devices using Android Internet of Things (IoT) has been applied to the learning process for mobile computing and microprocessor courses.

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