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Smart Factory Using Industrial Internet of Things

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ABSTRACT: The industrial internet of things (IIoT) describes a network of things or objects for connectivity used mainly for industrial purposes. IIoT refers to the extended branch of IoT that is specifically engaged with the industry [1]. The IIot refers to industrial applications. The principle of IoT and IIoT they both work in the same way. They both connect the devices to the internet and make them smarter. All the technology companies have developed new innovative technologies which are extended. From this process, the basic idea can be given by the name of our project. In this project, we are also handling the same aspects which are related to control panels, developing modules and monitoring on web portal with the help of the industrial internet of things.

KEYWORDS: ESP32 BOARD, CABLES, HTTP SERVER, BULB, HLK-PMO3, PythonAnyWhere

1. INTRODUCTION

In many company there are incoming transformers, they are in a corner of the company. There are some panels in company which is needed for different aspects like controlling panel. Those are in particular area or in different room, that room is called panel room. The distance from the panel room to the control room is around 1500 -2000 feet. Suppose, when the light of MSEB goes out, then the whole system goes into auto mode and system will start again. But always the worker has to go to the panel room and check if the diesel generator is on? Has the light of MSEB really gone? There are some panels in company which is needed for different aspects like controlling panel.

1.1 Need

Mostly in many companies every time employee Need to go to panel room for checking MSEB or DG indicator, and distance between panel room and workshop is approximately 1km-1.5km. For this purpose we are used the industrial Iot hardware having WiFi module to solve this problem. So by using this module there is no long wires in factory and it improves it efficiency. So overall, it increased the visibility, analytics, and the connectedness afforded by IIoT means that this technologies are not just an immediate solution to present challenges. [4]

2. METHODOLOGY

This is flowchart of our system. So firstly, we started the Iot module, once it is started it will check that Wifi is connected or not all department. If it is connected to Wifi then it processes further. But if it is not connected Wifi then it follow the loop again and again still it connected to Wifi. When it is connected to Wifi it will detect the input from the MSEB panel room and check for MSEB light is "ON" or "OFF". Once it get input then that input signal detect on Master Board and then that signal send to Slave

board using Pythonanywhere cloud and also show on Web Monitor Dashboard

2.1 Flowchart

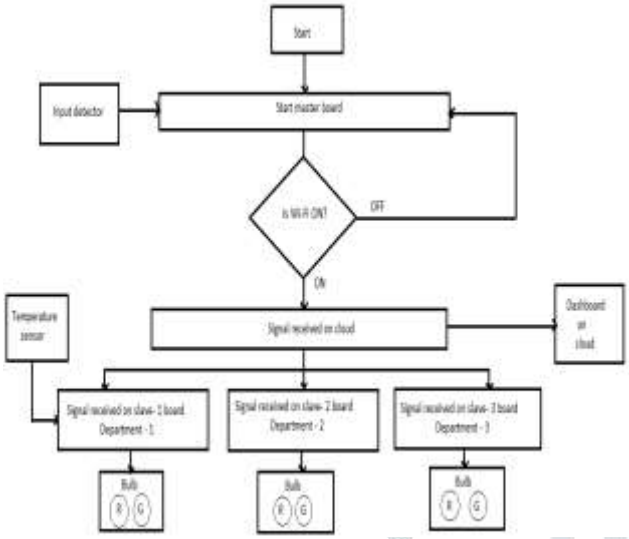

Figure 2.1 Flowchart of system

3. MODELING AND ANALYSIS

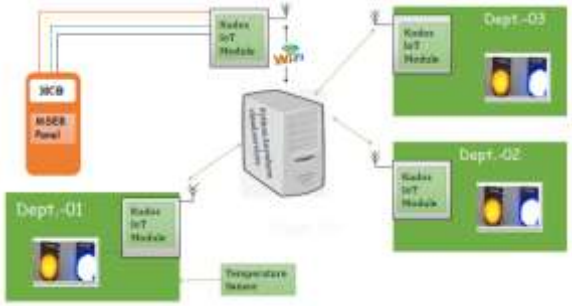

Figure2.2.Block Diagram of Smart Factory Using Industrial IoT

The Existing system need to operate manual, old system not able to identify actual problem in of tripping the switch. Whenever DC switch ON and OFF need to check manual in existing system. We propose to build new approach toward this, Using ESP32 microcontroller, Relay module, HTTP server, Pythonanywhere cloud and bulb as an indicator lamp. In this we will place ESP32 board with relay and indicator in each every department of factory which is known as "Slave Board" and all the Slave are connect with Master board (Which in side of control panel Room) using cloud. Once Input detractor detect input signal in Master board then it will update signal (ON or OFF) on Web portal and flask server and from the flask server the signal will send to all the department. In this we also recoding the Temperature of the departments on web porter Due to this time and cost for industry are increasing. To overcome this we are designing new system which can give alert whenever DC switch is turning ON / OFF or electrical supply form MSCB is available or unavailable and shows in Web Cloud. To reduce wire problem then we are using wireless technology. It will reduce cost and time of company. So in this process we are using some controlling boards.

3.1 HardwareRequirement

1. ESP32 Development Board with WiFi
2. HLK-PM0
3. . 5W bulb
4. Arduino Uno
5. Relay board
6. DHT11 Temperature Sensor

3.2 Software Requirement

1. HTTP
2. Python
3. Flask
4. PythonAnywhere Cloud

[1] ESP32 Development Board with Wi-Fi

ESP 32 Development board is based on the ESP WROOM 32 WIFI+BLE Module. ESP 32 also supports the Wi-Fi Direct. Wi-Fi-Direct is good option for peer-to-peer connection without the need of an access point. The Wi-Fi- Direct is easier to set up and the data transfer speeds are much better than Bluetooth.

Figure 3.2: ESP32 Development Board with WiFi

[2] HLK-PM03

HLK-PM03 Hi-Link 3.3V AC to DC Power Supply Module is plastic closed PCB mounted isolated switching down power supply module. This makes it perfect for small projects that needs a 3.3volt supply from mains. There are many advantages for these modules, such as low temperature rise, low power, high efficiency, high reliability, high-security isolationist.

Figure 3.3: HLK-PM03

[3] HTTP

Hypertext Transfer Protocol (HTTP) is an application-layer protocol for transmitting hypermedia documents, such as HTML. It was designed for communication between web browsers and web servers, but it can also be used for other purposes.

[4] Flask

Flask is **a web framework written in Python**. It is classified as a framework because it does not require particular tools or libraries. It has no datastore abstraction layer, form validation, or any other components where pre-existing thirdparty libraries provide common functions.

[5] Pythonanywhere cloud

PythonAnywhere is an online integrated development environment (IDE) and web hosting service (Platform as a service) based on the Python programming language Founded by Giles Thomas and Robert Smithson in 2012, it provides in-browser access to server-based Python and Bash command-line interfaces, along with a code editor with syntax highlighting. Program files can be transferred to and from the service using the user's browser. Web applications hosted by the service can be written using any WSGI-based application framework.

PythonAnywhere was created by Resolver Systems, who also produced Resolver One, a Python-based Spreadsheet program. On 16 October 2012 the product was acquired by a new company, PythonAnywhere LLP, who will develop and maintain the product in the future, and have taken on the existing development team.

The development team uses PythonAnywhere to develop PythonAnywhere, and say that its collaboration features help because they use the extreme programming methodology.

4. Circuit Analysis

   Basically the circuit diagram for both slave and master board are identical to each other.

   In the following diagram the PIN 30,29 and 28 are connected with input detector for master board and PIN 23, 22 and 21 are connected with relay for slave board

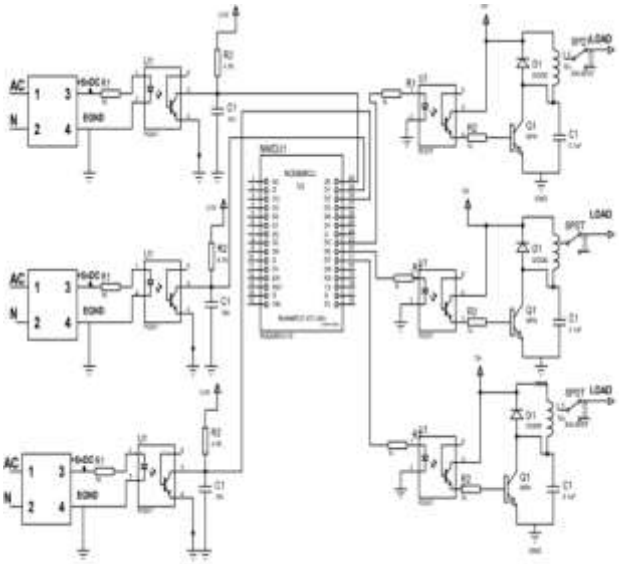

Figure 4.1: Circuit Implementation

5. RESULT AND DISCUSSION

In study we have implemented c programming while coding for Arduino, and Python in the smart factory using industrial (IOT).The use of Arduino provides automation to it. In this project we use wireless communication. It reduce the wire cost and improve the efficiency

Figure 4.1 System result (Electricity is present)

Figure 4.2 System result (Electricity is absent)

Figure 4.2 Web Dashboard

6. CONCLUSION

In study we have implemented c programming while coding for Arduino and python, in the smart factory using industrial (IOT).The use of Arduino provides automation to it. In this project we use wireless communication. It reduce the wire cost and improve the efficiency

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