SCADA SYSTEMS FOR INDUSTRY MONITORING AND CONTROLLING

Ambati Swarna Bindu,

M.tech In Embedded Systems

Sri Venketeswara college of Engineering (SVCE), Tirupati.
ambatibindu@gmail.com

Abstract:

Industrial controlling system becomes most common and important these days which has so many advantages. This can be achieved by using some cloud server network. In this project we are controlling and monitoring the industrial loads. The controller used in this project are Raspberry Pi and Adafruit IO Software. In this project we are integrating Raspberry Pi with Cloud server. Raspberry pi is Microcontroller and microprocessor which is used in this project to monitor and control the industrial devices. Here we have used Gas Sensor and Fire Sensor. In this project we are monitoring gas values if any harmful gases are in and around the industry. Fire sensor is to detect Fire. If anything happens Message alerts will be sent through GSM.

I. Introduction

As the world is getting more technologically forward looking, we find new technology coming deeper into to our personal and professional lives. Industrial process monitoring systems make use of PC-based servers. Appliances in case of process monitoring system are connected to these servers and therefore it becomes necessary to keep the server on all the time which ultimately increases the cost of the system. The remedy to this problem is to use embedded web server instead of pc-based server. Embedded web server is basically an only chip implementation of Ethernet networking standards which we can achieve by using Raspberry Pi board. By embedding Ethernet onto the device, it has the competence to interconnect via Ethernet without using a PC. The server allows web access to the automation and monitoring system and provides a mountable networking solution that is enhanced for instrumentation, and industrial as well as home automation. The user can surf the home page of the system using local web browser and can control the industrial appliances and enquire about their operational status from remote place. This project develops such a low-cost electronic prototype which is designed for monitoring and controlling industrial appliances via web browser from remote place. At the same time user can monitor security situation at industry in real time through different sensors installed at industry.

II. Existing Method

The work of sensors (i.e.) PIR sensor and IR sensor which were used in existing system can be done by using the switch sensor. It is highly sensitive and can detect even small pressure that is applied on the floor. The temperature is not constrain since switch sensors mainly focus on the pressure. The corner regions may not be an issue in case of the switch sensors because the overall pressure on the tile is measured.

III. Proposed Method

In this proposed system we are controlling industrial Loads like fan and light using Adafruit. IO Cloud server and also implemented safety parameters to monitor the fire and gas in the industries. If any sensor is activated then message will be sent though GSM.
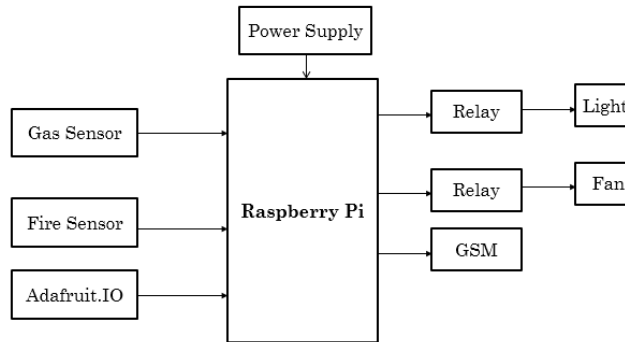
Block Diagram

Fig1: Block Diagram

IV. Hardware Requirements

A) Raspberry Pi:

Raspberry pi is a powerful microcontroller that exists in credit card size. It serves as micro controller, also it serves as a minicomputer by connecting essential cables like HDMI cables, audio cable. Simply we can say Raspberry Pi is a credit card sized computer which also serves as microcontroller. It is fast as compared to other controllers.

Fig2: Raspberry Pi

B) Power Supply:
Transformer:

Fig3: Transformer

Transformer is a device which reduces A.C current into required D.C current.
Bridge Rectifier:
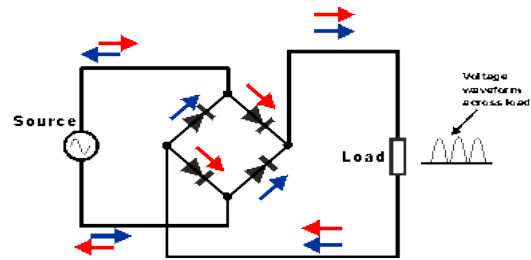

Fig4: Bridge rectifier

Fig5: Bridge rectifier circuit

A diode bridge is a technique of four diodes in a bridge circuit arrangement that provides equal polarity of output for mutually polarity of input. While used in its maximum shared application, for transformation of an alternating-current input into a direct-current output, it is called as a bridge rectifier.
Capacitor:

Fig6: Capacitor

A capacitor could be a passive two terminal eletrical component that stores current in a electric field. The result of this can be termed as capacitance.
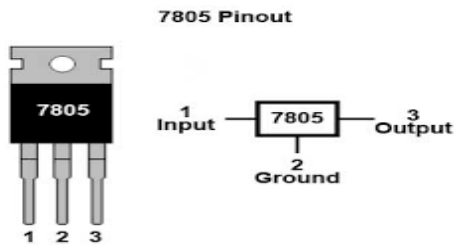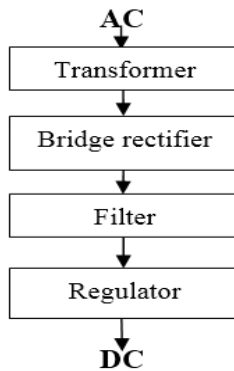**Regulator:**

7805 Pinout

Fig7: Regulator

A voltage regulator IC keeps the output voltage at a continuous value. 7805 IC is one of the IC of 78xx family. It maintains fixed linear regulators which is used to maintain fluctuations.

Flow chart of power supply:

All the above components are used to convert AC voltage to DC voltage.

C) GSM Module:

GSM speaks to Global System for Mobile Communications. It is a standard set made by the European Telecommunications Standards Institute (ETSI) to depict traditions for second time (2G) automated cell frameworks used by PDAs.

A Modem is a gadget which modulates and demodulates signals as per communication requirements. It converts an analogue carrier signal to digital signal and also converts such a carrier signal to required information.

Fig8: GSM

D) Relay:

Relay is electromagnetic switch that open or close the switches electrically or electromechanically. Relay is mostly used to switch smaller circuits.

Fig9: Relay

E) Gas Sensor:

MQ2 gas sensor can be used to detect the presence of LPG, Propane and Hydrogen, also could be used to detect Methane and other combustible steam, it is with low cost and suitable for different application. Sensor is sensitive to flammable gas and smoke.

Fig10: Gas Sensor

F) Fire Sensor:

A sensor which is most sensitive to a normal light is known as a flame sensor. That's why this sensor module is used in flame alarms. This

sensor detects flame otherwise wavelength within the range of 760 nm – 1100 nm from the light source.
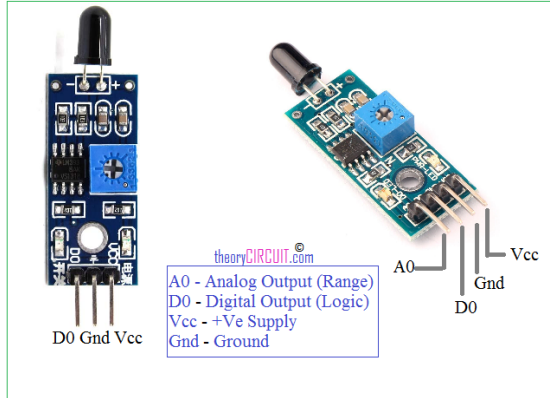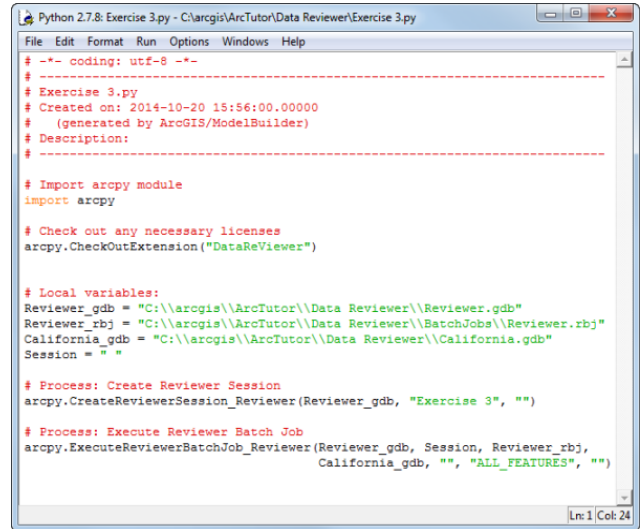

Fig11: Fire Sensor

Fig14: Python Script

VI. Software Requirements
A) Python:

Python is an interpreter, high level, interactive and general-purpose programming language. It was developed by Guido van Rossum during 1985 – 1990. The source code is available under general public License. Python is named after a TV Show 'Monty Python's Flying Circus' and not after Python-the snake. It supports Object Oriented programming approach for developing applications.

Fig13: Python Shell

VII. Advantages
- Automatic Message alerts will be given
- Controlling loads Using Cloud Server
- Can monitor continuously

VIII. Applications
- In industries
- In houses
- In any offices
- In bus systems
- In train Systems.

IX. Conclusion

The industrial automation using web of Things has been by experimentation established to figure satisfactorily by connecting easy appliances there to and also the appliances were with success controlled remotely through web. The designed system not solely monitors the sensing element information, like fire sensor, gas however additionally actuates a method per the need, as an example shift on the sunshine once it gets dark. It additionally stores the sensing element parameters within the cloud (Gmail) in a very timely manner. This may facilitate the user to investigate the condition of assorted parameters within the industry anytime anyplace. Using this technique as framework, the system are often dilated embody to incorporate varied alternative
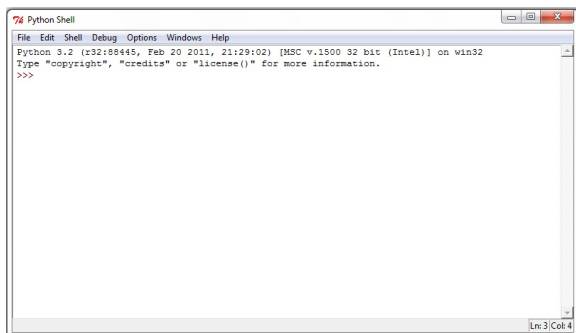
choices. The system is often dilated for energy observance, or weather stations. This type of a system with various changes is often enforced within the hospitals for disable folks or in industries wherever human invasion is not possible or dangerous, and it may also be enforced for environmental observance.

X. Future Scope

This system can be proved as a future of artificial intelligence and a powerful and a dependable system through which the goal of energy saving and efficient use of the energy resources can be achieved soon. Raspberry Pi being an intelligent platform using which multiple appliances can be connected to each other and can be controlled from a longer range of distance because the connection which is to be used would be through the internet. Due to which appliances, can be accessible easily.

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