

Smart Monitoring System for Industrial Automation (IoT based)

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Abstract - IOT or internet of things is a technology that makes use of control systems such as computer to control the physical devices over the internet. Here we propose efficient industry automation system that allows user to efficiently control industry appliances/machines over the internet. The microcontroller 89C51 is used by our system for processing all user commands. For the connection to the internet and to receive the user commands a Wi-Fi modem is used. WIFI modem receives the commands which are sent through the internet. The received information is decoded by the Wi-Fi modem and passed to the microcontroller. IR sensors are also used to count the number of products manufactured. System is divided into two parts software part and hardware part.

1. Introduction

Industrial relations is the term that describes how the management and the employees of a company interact with each other. We are going to implement this project in industries with the aim to monitor the work of labours. It can be used to monitor safety and productivity of employees, but it also may help business financially. From dishonest unethical employee process is monitoring employee action, it allows for growth of financial profile from small investment. Not only does employee monitoring prevent theft of money and resources but it also prevent theft of time and to make sure people are doing what they are supposed to be doing in the workplace. Employees will spend their time using their work time for personal uses and employee monitoring helps regulate this. In this project we are going to have an RFID for technicians, which will interface by the microcontroller 89C51. The production data will be upload on the Web Server through Wi-Fi module (IOT).

2. Objective

The main objective of the project on smart employee monitoring system is to manage the details of the employee, ON-OFF time of machine, salary, leaves, attendance, and registration. It manages all the information about employee, skills, registration, and employee. The project is totally built at administrative end and thus only the administrator is guaranteed the access. The purpose of the project is to build and application program to reduce the manual work for managing the employee, salary, skills, leaves. Another objective of the project is to count number of products manufactured by each machine.

3. Literature Review

IOT Based Industrial Automation

Prof. Niranjan M, Madhukar N, Ashwini A, Muddsar J, Saish M (Department of Electronics and Communication, Jain College of Engineering Belagavi, India)

In this paper, we shall design a system which will automatically control and monitor the industrial applications and also allow the user to control the application from anywhere in the world. Having control over the applications over the internet is one of the best ways to deal with the industrial applications. **Keywords:** Artificial intelligence, Industry 4.0, M2M communication.

RFID Based Security and Access Control System

Umar Farooq, Mahmood ul Hasan, Muhammad Amar, Athar Hanif

And Muhammad Usman Asad

This paper describes the design of RFID based security and access control system for use in hostels inside the Punjab University premises. The system combines RFID technology and biometrics to accomplish the required task.

International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 5 Issue 2, February 2016.

Industrial Automation using Internet of Things (IOT) Ashwini Deshpande Department of computer engineering Savitribai Phule Pune University G.H.Raisoni College of Engineering and Management, Chas, Ahmednagar, Evolution of this starts from RFID technology, which allows microchips to transmit the identification information to a reader through wireless communication. By using RFID readers, people can identify, track, and monitor any objects attached with RFID tags automatically.

4. Block Diagram

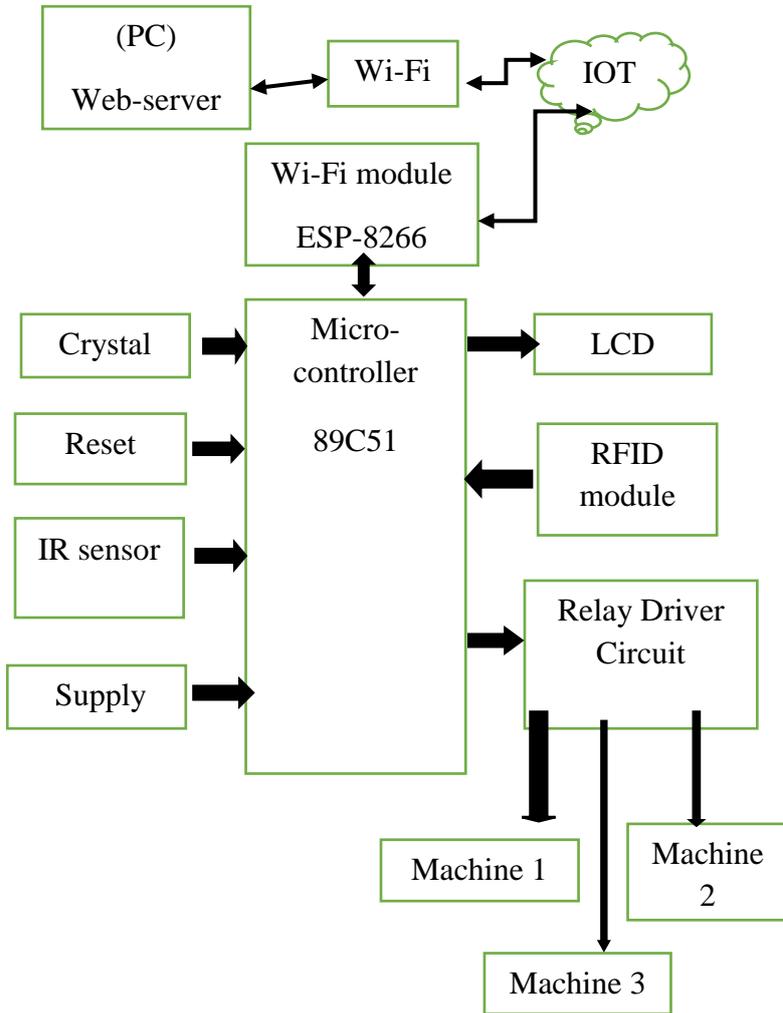


Figure: Smart Monitoring System for Industrial Automation (IOT based).

5. Hardware Details

1) Power Supply:-

In this project circuits and motor are used which require +12V & +5V (DC) supply, to fulfil this requirement we have used following circuit of power supply which provides regulated +12V & +5V. (DC)

2) Wi-Fi Module

This is reliable and ultra-low cost module that is based on ESP8266 chipset and easy to use. It is used along with a microcontroller that configures and communicates through AT commands.

The embedded Wi-Fi solutions were a bit pricey to implement for hobbyist. This Wi-Fi module has wide working range and many applications. The amazing

community support provides all the information for ESP8266.



Fig. Wi-Fi Module

Note: The ESP8266 Module is not capable of 5-3V logic shifting and will require an external Logic Level Converter. Please do not power it directly from your 5V dev. board.

3) Relay

A relay is an electrically operated switch. Electromagnet to operate a switching mechanism mechanically or other operating principles are also used by the relays. Relays are used where a circuit is to be controlled by a low-power signal (with complete electrical isolation between control and controlled circuits).

Applications of Relay

- ☑ In some types of modems or audio amplifiers relays are used to control high voltage circuit.
- ☑ To Control a high-current circuit with a low-current signal, as in the starter solenoid of an automobile.
- ☑ Opening and closing circuit breakers detect and isolate faults on transmission and distribution lines.

4) LCD Display

There are various display devices such as seven segment display, LCD display, etc. that can be interfaced with microcontroller to read the output directly. In our project we use a two line LCD display with 16 characters each.



Fig. LCD Display

Features:

- 16X2 dots with cursor
- Built-in controller (KS 0066 or Equivalent)
- + 5V power supply
- 1/16 duty cycle
- B/L to be driven by pin 1, pin 2 or pin 15, pin 16 or A.K (LED)
- RS232 compatible serial interface (2400 & 9600 baud selectable)
- Externally selectable serial polarities (Inverted & Non-Inverted)
- Serially controllable contrast and backlight levels
- 8 user programmable custom characters
- 16 Byte serial receive buffer

5) RFID Reader and tags

Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically-stored information. Passive tags collect energy from a nearby RFID reader's interrogating. Unlike a barcode, the tag need not be within the line of sight of the reader, so it may be embedded in the tracked object. RFID is one method of (AIDC). A passive tag is cheaper and smaller because it has no battery; instead, the tag uses the radio energy transmitted by the reader. However, to operate a passive tag, it must be illuminated with a power level roughly a thousand times stronger than for signal transmission.



Fig. RFID Reader And Tags

6) IR Sensor

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes that can be detected by an infrared sensor. The emitter is simply an IR LED and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED.



Fig. IR Sensor

7) Microcontroller

AT89C51 is an 8-bit microcontroller and belongs to Atmel's 8051 family. **ATMEL 89C51** has 4KB of Flash programmable and erasable read only memory (PEROM) and 128 bytes of RAM. It can be erased and program to a maximum of 1000 times.

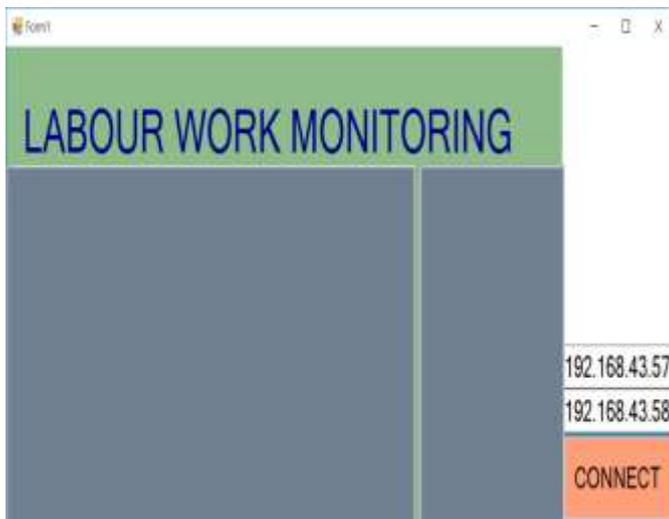
Features:

- The 89c51 is compatible with MCS 51 family.
- It has 8 bit data bus and 8 bit (arithmetic logic unit).
- It has 4k bytes of on chip reprogrammable flash memory.
- It supported three level program memory lock.
- It has 16 bit of address bus and 64 kb of RAM (random access memory) and ROM (read only memory).
- It has on chip RAM 128 bytes data memory.
- It has four 8 bit bidirectional input or output ports that is 32 programmable input or output lines.

- It can execute 1 million one cycle instructions per second with a clock frequency of 12MHz.
- It has one UART programmable serial ports.
- It has six interrupts source.
- It has two multimode 16 bit timers.
- It has two level interrupts priority.

6. Procedure for Execution

- Initialize ESP8266 Wi-Fi module.
- Press 'Connect' button available on the software application on PC and wait for few seconds.
- Swap respective RFID tag on RFID Reader to turn ON respective machine and wait for few seconds to update the data on software application. The data is updated on software application through web server (IOT).
- With the help of IR sensor the count of number of product manufactured is also updated on software application through web server (IOT).



7. Problem Definition

The problem definition for designing the system is to maintain the data of employees, to make easy controlling employees, to divide jobs and access control of employees, to use technology for accurate and timely processing by fully privacy and full authority access. Since today is the generation of smart phones, people prefer smart work. Same goes with the industries. The term automation has led to a great change in the world of industries. Some industries are fully automated while other are partially automated. In short automation has become an important term, whether at home or the industries. Our project focuses on the industrial

automation. The machines can be controlled manually from long distance as well.

8. Conclusion and Future Scope

In this paper, we proposed a method for monitoring the attendance and work done by employee automatically with the help of IOT. The sensed data of employee will be displayed to the user in LCD as well as application. It has several advantages such as data can be viewed any time. The count of product manufactured can be calculated. In future we can calculate power consumption of each machine with the help of power meter. Updated data will be save in file and we can check it anytime.

9. References

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