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Efficient Industry Automation with Safety Security and Monitoring the Process Through IOT

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Abstract –

Now a days the technology is increasing rapidly, that leads to an up gradation in industrial security system and also, there is a high demand to conserve the energy. Security has been becoming an important issue everywhere. Automation in security sector makes it more authentic. There are many electrical equipments available in industry which are in necessity of monitoring from a remote area all at a time. In this project a smart industry and security system is proposed along with the IOT monitoring technique. Internet of Things is an emerging domain that promises omni-present connection to the Internet, turning common objects into connected devices. A stand-alone system through Internet of Things as a network of communication is implemented. The temperature sensor LM35 is used to prevent fire accident by detecting the increase in temperature beyond a certain limit thus the system ensures industry safety as well as security. Arduino is used as controlling unit coded in C language. Industrial Automation is not only meant for human efforts but also for energy efficiency and time saving. The status of the sensors can be viewed in the webpage. The cost of the project is also low.

Keywords: Arduino Mega, Door sensor for CNC machine, Temperature sensor, Current sensor, Smoke sensor, LDR, ESP 8266 (IOT), RF Card.

INTRODUCTION

Many manufacturing companies in India are presently focusing on automation as a weapon for competition on a global market. This project focuses on industry's view of automation. The project presents data on advantages and disadvantages of automation, based on one pilot study and implantation.

Automation decreases the human efforts by replacing the human efforts by system which is self-operated. The internet is one method for developing the platform for automation, through which new advancement are made through which on effortlessly monitor to control the system utilizing the Internet.

IOT or internet of things is a technology that deals with bringing control of physical devices over the internet. Here we propose efficient industry automation system that allows user to efficiently control industry appliances/machines over the internet. Here this system proposes an internet-based industry automation system that enables a single industry operator to control industry appliances easily utilizing Arduino processor and IOT. User is permitted to send commands for machines switching over internet utilizing IoT from anyplace in the world over internet.

Our system uses an AVR family microcontroller for processing all user commands. A WIFI modem is used to connect to the internet and receive user commands. On sending commands through the internet they are first received by our WIFI modem. The modem decodes information and passes it to the microcontroller for further processing. The microcontroller then switches loads and operates the motors as per Receivers commands. Also, it displays the system state on

an LCD display. Thus, we automate entire industry using online GUI foreasy industry automation.

Industrial Automation eliminates healthcare costs associated with human operator. The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems and resulting in improved efficiency, accuracy and economic benefit when IoT is augmented with sensors.

I. BLOCK DIAGRAM

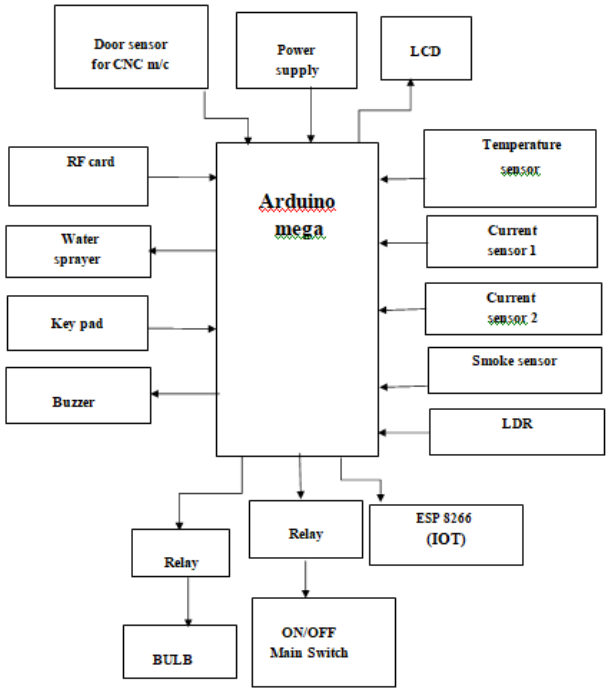

Figure 1: Block Diagram of the Project

II. WORKING

The above block diagram represents the efficient Industry Automation with Safety, Security and Monitoring the process through IoT model, in which Arduino is used to process the data received from various sensors implemented.

It consists of two major blocks namely Arduino and ESP8266. The power supply is given to the Arduino through a transformer, which receives the data from various sensors like temperature sensor, smoke sensor, LDR and so on.

We are using RFID card reader in our project for the data security purpose, which is able to read the RF card that are been given to workers. LCD is being used to display the data like room temperature which is measured through a temperature sensor. Bulb and buzzer system is implemented for the alert purpose, whenever some accidents occur. We have implemented a door sensor especially for the CNC machines so as to monitor the working of employee on it.

After processing the data, the Arduino transfers the processed data to the cloud that is on website in the internet through a Wi-Fi module ESP8266 which provides internet connectivity to our project. We can see the graphs of data that is being received from the sensors from anywhere.

III. MAJOR COMPONENTS

- **Arduino Uno microcontroller :**

Figure 2: Arduino Uno microcontroller

The Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB

cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a fewdollars and start over again.

"Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE).The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

- **ESP8266 WIFI Module**

Fig 3: ESP8266 WIFI Module

The ESP8266 WIFI Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.

Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wi-Fi-ability as a Wi-Fi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost-effective board with a huge, and ever growing, community. This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its

high degree of on- chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area.

- **Smoke Sensor**

Fig 4 : Smoke Sensor

A smoke detector is an electronic fire-protection device that automatically senses the presence of smoke, as a key indication of fire, and sounds a warning to building occupants. Commercial and industrial smoke detectors issue a signal to a fire alarm control panel as part of a building's central fire alarm system.

IV. ADVANTAGES

1. **Efficient:** This system can be said as a Efficient System as it works with no errors or a negligible errors. Also, it saves a time and some manual work will be reduced.
2. **Automatic:** In this automation, the temperature sensor will automatically gets activated whenever they sense an increase in amount of heat in a area. The current sensors will get activated whenever they detect a high voltage or a current.
3. **Secure:** To allow access to a door of a machines like CNC or to drive an electronic device we are going to use RFID. Users will have cards registered to access the system. When approaching the card to the RFID sensor, the serial number of the card is detected, if it is registered serial number the system will release the entry tothe user.
4. **Safety:** Whenever some part of the industry is caught on fire immediately the smoke sensors will turn on and alert the system. So that some preventive actions may be taken to prevent the huge loss and also to save the life of workers.

V. APPLICATIONS

1. System can be used for the data security purpose.
2. IOT data monitoring
3. Fire safety
4. Safety for high current
5. Automatic lighting ON /OFF

CONCLUSION

We have taken up this project as real challenge, as we were not experience in this field & started our work on this project facing new hurdles initially. After the completion of the project work, we tried it working in our college machine shop and we were pleased to note that it does meet the requirements for what it is meant. The maneuverability of the device is quite good and the handling is quite simple. For commercial purpose one can improve the efficiency of the device effectively by increasing the size of the device.

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