

# IOT based Industry Automation using Arm7

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**Abstract:** The importance of industrial safety is very much important now days because of the fact that every year industrial accidents occur which consequences in loss of production time. Industrial safety is important as it protects human life, especially in high risk areas such as nuclear, petroleum industries, chemical, oil and gases, and mining industries, where a lethal mistake can be disastrous. We are developing a system which will semi Automatically control and monitor the industrial parameters like temperature, humidity, movement of various industrial tools using IOT concept to provide the industrial safety and avoid the accident. In this paper, we are developing a system which will automatically monitor the industrial parameters and generate Alert or take intelligent decisions using concept of IOT. IOT has given us an auspicious way to form powerful industrial systems and applications by using wireless devices and sensors.

**Keywords:** IOT, Automatic, Industrial safety

## I. INTRODUCTION

It is natural that the economic setting for several producing and process businesses involves a spread of important safety points. this is often because of production systems that utilize significant machinery, chemicals and different sensitive materials and processes. Typical industrial hazards will embrace chemical exposure to the body, engineering science hazards because of frequent and/or intense physical strain, moreover as different physical dangers, like heat or significant moving elements. giant ranges of business IOT application area unit developed among previous couple of years. it had been initiated from RFID technology, wherever microchips transmit the identification info to a reader through wireless communication. Internet of Things (IOT) may be a conception that considers universal presence within the surroundings of a spread of things that through wireless and wired connections and different addressing systems area unit able to move with and work with other things/objects to form new applications, services and reach common goals. This project involves the detail style associated construction of an Industrial automation system exploitation ARM7 and net association. The automation could also be semi controlled and monitors the utility grid connected sensors. This project may be a demonstration of the way to style associated build a useful remotely controlled system which will switch any industrial acuter by accessing an Arm seven, that is programmed to regulate the systems within industrial surroundings, once the person is far away from work station and modify an individual to urge the connected info on phone. The system can offer feedback indicating this state of the system stopped or functioning.

## II. MOTIVATION

The new age of technology has redefined communication most of the people today have access to mobile phones and therefore the world so has become a world village. At any given moment, any specific individual may be contacted with the movable. However the applying of movable cannot simply be restricted to causing SMS or beginning conversations. New innovations and concepts may be generated from it which will additional enhance its capabilities. Technologies like Infra-red, Bluetooth, etc that has developed in recent years goes to indicate the actual fact that enhancements area unit really doable and therefore these enhancements have mitigated our life and the manner we tend to live. Remote management of many home and workplace appliances may be a subject of growing interest and in recent years we've got seen several systems providing such controls.

## III. LITERATURE REVIEW

The literature associated with the research topic has been reviewed for last twenty years so as to search out out work dispensed by various researchers. There area unit many systems for remote observation and control designed as business product or experimental analysis platforms. it's detected that almost all of the analysis distributed belongs to the subsequent categories: □ internet based mostly observance using Servers, GPRS modems, etc. with completely different approaches. □ GSM-SMS protocols exploitation GSM module individually or together with internet technologies □ observance exploitation Wireless detector Networks. □ Wireless monitoring exploitation Bluetooth, Wi-Fi, Zigbee and RF (radio frequency). □ Applications have varied wide like Home Automation, Security Systems, Bio-medical applications, Agriculture, surroundings, Reservoir, Bridge health observation, etc.

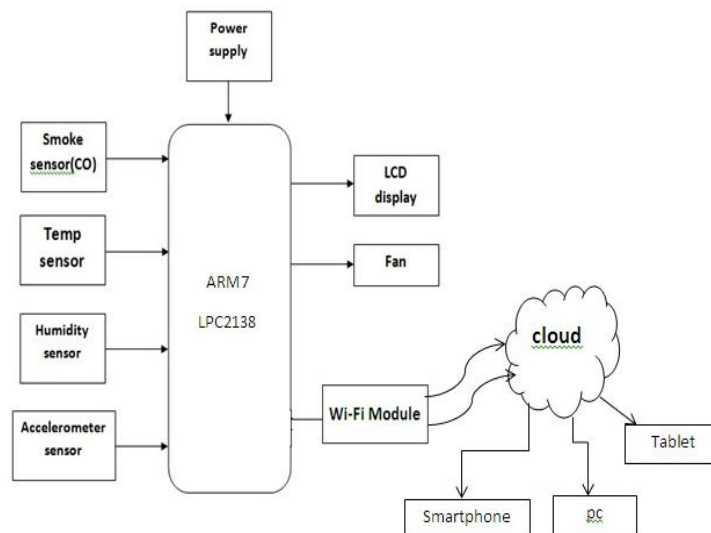
#### IV. PROBLEM STATEMENT

It is very important to provide industrial safety to prevent accidents in the plant by reducing the hazard to minimum so that loss of life, permanent disability and loss of income of worker can be diminished. To create a small industrial system, where sensor can be monitor and controlled only based on the data received from the industrial site sensors. Therefore there arises to do so in a systematic manner which we have tried to implement with our system. The system we have proposed is an extended approach to automating a control system.

#### V. OBJECTIVES

1. To make Smart Industrial environment which enables the user to monitor and control industrial parameter on real time basis using Mobile device.
2. To prevent accidents in the plant by reducing the hazard to minimum.
3. To prevent loss of life, permanent disability and the loss of income of worker by eliminating causes of accidents.

#### VI. BLOCK DIAGRAM AND WORKING



The block diagram of the system is shown in fig. which shows how we have implemented project and various components involved in it. Power supply block gives the required voltage of 5V to ARM7 processor. ARM 7 controller act as the computing system. The sensors used here are Smoke, Temperature, Humidity and Accelerometer sensor which is used to detect various parameters in industry and control accordingly. Data collected from sensors can be capture by Processor and appropriate action can be taken. Now processed data from ARM7 is send over internet using Wi-Fi module. Smart Industrial environment which enables the user to monitor and control industrial parameter on real time basis using Mobile device.

#### VII. HARDWARE DESCRIPTION

##### 1. ARM7 LPC2138 microcontroller

The NXP (founded by Philips) LPC2138 is an ARM7TDMI-S based high-performance 32-bit RISC Microcontroller with Thumb extensions 512KB on-chip Flash ROM with In-System Programming (ISP) and In-Application Programming (IAP), Two 8-ch 10bit ADC 32KB RAM, Vectored Interrupt Controller, Two UARTs, one with full modem interface. Two I2C serial interfaces, Two SPI serial interfaces Three 32-bit timers, Watchdog Timer, Real Time Clock with optional battery backup, Brown out detect circuit General purpose I/O pins. CPU clock up to 60MHz, On-chip crystal oscillator and On-chip PLL. The main reason behind selection of ARM7 is its support for uC/OS-II RTOS for real-time execution of tasks. Programming of is done using embedded C-Language with the help of Keil UV4 software tool.

##### 2. ESP8266EX (WI-FI-MODULE)

ESP8266EX is a system-on-chip which integrates a 32-bit Ten silica microcontroller, standard digital peripheral interfaces, antenna switches, RF balun, power amplifier, low noise receive amplifier, filters and power management

modules into a small package. It provides capabilities for 2.4 GHz Wi-Fi, general-purpose input/output (16 GPIO), Inter-Integrated Circuit (I<sup>2</sup>C), analog-to-digital conversion (10-bit ADC), Serial Peripheral Interface (SPI), I<sup>2</sup>S interfaces with DMA (sharing pins with GPIO), UART (on dedicated pins, plus a transmit-only UART can be enabled on GPIO2), and pulse-width modulation (PWM). External flash memory can be accessed through SPI.

### 3. Accelerometer

An Accelerometer (ADXL335) is an electronic device that is used to measure the acceleration of movement. The accelerometer measures the vibration or movement of industrial tool like cutting blades.

### 4. LCD

Liquid crystal display a type of display used in digital watches and many portable computers. LCD displays utilize two sheets of polarizing material with a liquid crystal solution between them. An electric current passed through the liquid crystal causes the crystal to align so that light cannot pass through them. Each crystal, therefore, is like a shutter, either allowing light to pass through or blocking the light. They are usually controlled by microcontroller. They make complicated equipment easier to operate. It runs off a 5V DC supply and only needs about 1mA of current. The display contrast can be varied by changing the voltage into pin 3 of the display usually with a trim pin.

#### Hardware Used

1. Microcontroller (ARM7)
2. 16x2 LCD display
3. Smoke sensor
4. Temperature sensor
5. Humidity sensor
6. Fan
7. Accelerometer sensor

#### Software Used

1. Python
2. PHP
3. MySQL

## VIII. ADVANTAGES

- 1) As it is IOT based, industrial parameters can be controlled and monitored from anywhere at any time.
- 2) It is cost effective so that anyone can use it.
- 3) It can be used in home security, offices and industries.
- 4) Data can be stored for future analysis.

## IX. RESULTS

Figure 1. shows the hardware implementation of proposed system. It contains all the mentioned sensors integrated on single system with microcontroller and display device to show the real time data.

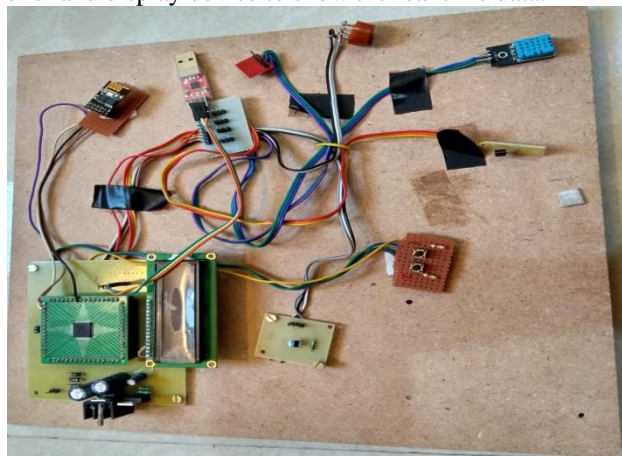
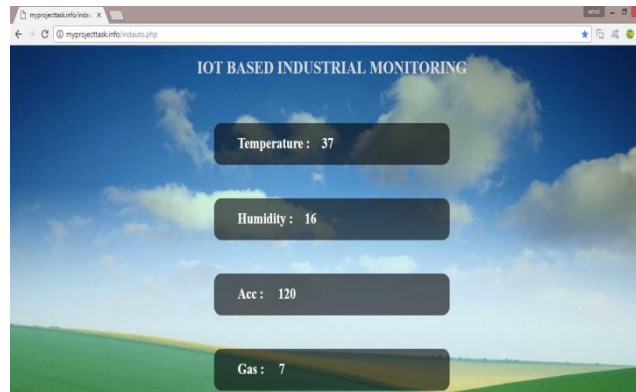


Fig 1. Hardware Implementation of proposed Device



Above figure shows the webpage display on the pc or smart phone by accessing the mentioned URL(<http://myprojecttask.info/indauto.php>). System successfully displays the real time data obtained by sensors on pc or smart phone and it is possible to monitor and control the system away from the workplace.

## X. CONCLUSION

Nowadays we need everything computerized. Earlier we can only monitor the situations with the help of cameras. In industries to reduce manual overhead we have implemented Internet of Things (IoT) in Industry to monitor as well as to inform the responsible person to take appropriate measures, but this will partially fulfill our requirement. As sometimes it will be late in this process and it will harm to property as well as life. For this purpose we are developing a system for Industrial Automation using IoT with the help of Integrated sensors to make system semi or fully automated which will take intelligent decisions and Avoid the hazardous effects to provide safety workplace.

## XI. FUTURE ASPECTS

The future implications of the project are very nice considering the quantity of your time and resources it saves. The project itself are often changed to achieve an entire home automation system which is able to then produce a platform for user to interface between himself and his home. In future the hardware are self-contained and can't be liable to electrical failure. Data may be keep in computer for data analysis.

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