

## IOT Based Industrial Parameter Monitoring System

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### Abstract

*The operations of various industrial equipments are affected by the change in temperature and a physical characteristic of the surrounds monitoring the changes in temperature is very crucial. The computer consists of an embedded microcontroller chip for different parameters the real-time data collection is monitored by a system. The values from different parameters are collected and displayed on LCD. The Arduino has a collection on all the code burned into it. Each code represents its own parameter i.e. air, temp, pressure, humidity. The power system intelligent industrial remote monitoring, intelligent furniture monitoring, intelligent warehouse monitoring etc can be implemented with the systems platform. This gives the assured to the user for the system reliability and stability. It has good social aspects and is most effective and most economical means of equipment safety monitor. Integration of IOT with voice module and monitoring system is done. It senses changes in temperature, senses smoke, flame etc and sends it to control station by android app. In the prototype, installations of sensors in three distinct locations to identify the exact location of fire hazards that have taken place.*

**Keywords:** temperature sensor, pressure sensor, humidity monitoring, Arduino, IOT.

### 1. Introduction

In the list of most threatening causes that led to global warming are fire hazards. Hazards can be resolved by the adaption of new and growing technologies which also help in better living. Applications in monitoring and control are performed by the wireless multisensory network are characterized by small, low power and cheap devices which are integrated with limited computation, sensing, and remote communication. It impacts enormously on fire emergency. Temperature sensors are installed in fire endangered areas which allow a person to manually provide temperature information on fire extinguishing website email or landline number. The process of accessing information from the website may be time-consuming and it may cause some amount of delay in the response to the fire extinguisher. IOT is a wireless technology. Use of IOT is in combination with fire fighting for hazard source monitoring, fire fighting rescue, fire early warning, preventing and early disposal. It is effectively used for the enhancement of fire brigade fire fighting and emergency rescue capabilities.

#### 1.1 Need

Fire monitoring is the goal of the project which is done with a wireless sensor network. There is an increase in productivity of automation and a decrease in data rate failure by using technologies in wireless sensor network Arduino and wireless communication is used in the project for industrial process monitoring. Wireless multisensory networks have met their applications in medical, military, industrial,

agricultural and environmental monitoring; current voltage, temperature and water level are the traceable parameters. Harmful gases like carbon mono-oxide, methane, etc can be detected by the Smoke sensors which may be harmful for the workers that can cause various lung diseases like asthma, pneumonia etc. Humidity is the amount of water vapors in the air, the sensor monitors the amount of humidity in the surroundings inside a plant and then alerts the workers regarding the changes in humidity which can lead to high pressure in the atmosphere and hence can cause hazards by radioactive chemicals present in power plants.

### 1.2 Problem Statement

The objectives of the research are:

- To monitoring industrial parameter monitoring and power consumption control.
- To the Data availability and easy remote configuration.
- To the accomplishment of requirements of industrial sensors.
- To design strategies in achieving robust nodes, security in communication.
- Implementation of a real WSN is done to measure industrial parameters and to perform experimental validations.

### 1.3 Social and Environmental Impacts

WSN would revolutionize the world of technology if advanced changes would be made in its hardware and software. It would make lives easier and would, therefore, be a great boon to the society. It would be a whole innovative network using IOT. No use of fuel consuming machinery makes it environmentally friendly. It reduces the hazards to workers and adjoining population. It also leads to careful planning and emergency procedure.

## 2. Review of Literature

In today's world, the use of wireless technology is becoming beneficial for the leisure and safety of people. Many wireless technologies like IOT, AR, AI, etc are in good demand for adaption of a new lifestyle. Keeping these inventions in the mark, we desired to create a sensor network for prevention and detection of hazards and using the same wireless sensors and then elimination of the cause which led to the hazard. The sensors encapsulated in the prototype are for fire, gas, temperature, humidity. Now the most crucial

The parameter for hazard is fire. Temperature, gas, and humidity are the parameters that can be monitored at a prior notice for the preventing the occurrence of a huge fire. If these parameters are under control, it might prevent fire and vice versa. For the elimination and extinguishing the fire, we have used water as the extinguishing element. The prototype also contains a voice module. This is a device which records audio notes and then plays them for an audio alert of the parameter detected. For example, if there is the presence of any harmful gas like carbon mono-oxide in the surrounding, the gas is detected by the sensor and the voice module plays the audio output "gas detected". It is necessary to record the appropriate voice audio note for each parameter respectively. Thus, this prototype can be very beneficial for workers in industries, power plants, etc for the prevention of a hazard that might destroy machinery as well as can risk the life of the workers.

### 3. Proposed Methodology

No.	Devices	Picture	Main function
1	Arduino		All the sensors are interfaced through the Arduino(required)
2	Fire detector		It detects the fire and is interfaced through Arduino(required)
3	Gas Sensor		It detects the smoke and is interfaced through Arduino (required)
4	LDR		It detects if the light is present
5	Voice Module		It gives us the output of the different sensors
6	GSM		It sends the message to the user regarding fire, smoke alert.

Table 1. Components Used

### 4. Working And Implementation

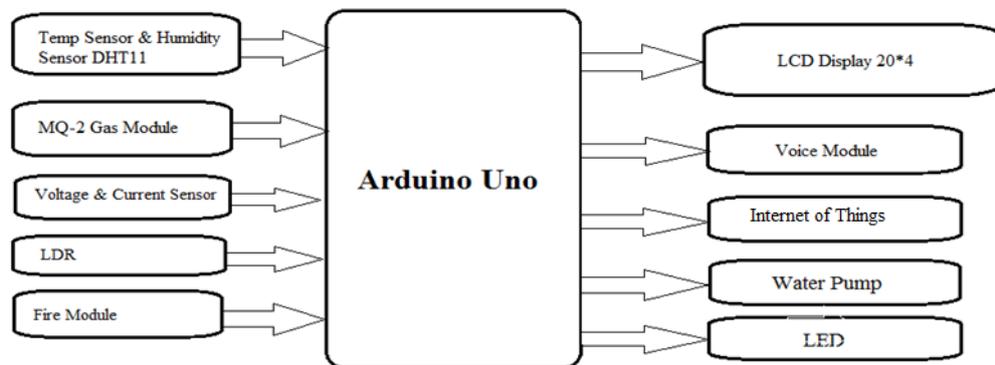


Figure 1. Block Diagram

Arduino module is fully equipped with inbuilt peripherals and bridging devices for

communicating with sensors or another platform. This module operates with solar energy and using of battery charger circuit it is operating night time also. The figure shows the interfacing of physical parameters like Temperature, Light intensity, Water level identifier, voltage and current in this module. Data acquired from each parameter is collected in the Arduino module is displayed in (16x2 LCD) which is used as our output module. The in-built analog to digital (ADC) converter is used to measure the voltage and current. The water pump releases when there is fire. The voice module gives voice output of various requirements. The LED glows when there is some gas leak or some problem.

In this section receiver, a personal computer can be used. Receiver collects the data from the transmitter and sends to the personal computer through a serial cable. If any fluctuations in the parameters then it will be shown on LCD for example if the fire will be detected then work pump will ON or voice module will give emergency alerts like don't use lift etc. Voice module has 8 voices. If the fire is present then the voice sound is "Fire is present". While using IOT it sends the message to the server room if any sensor limit is raised. IOT has two parts that are a sender and receiver.

### 5. Experimental Setup

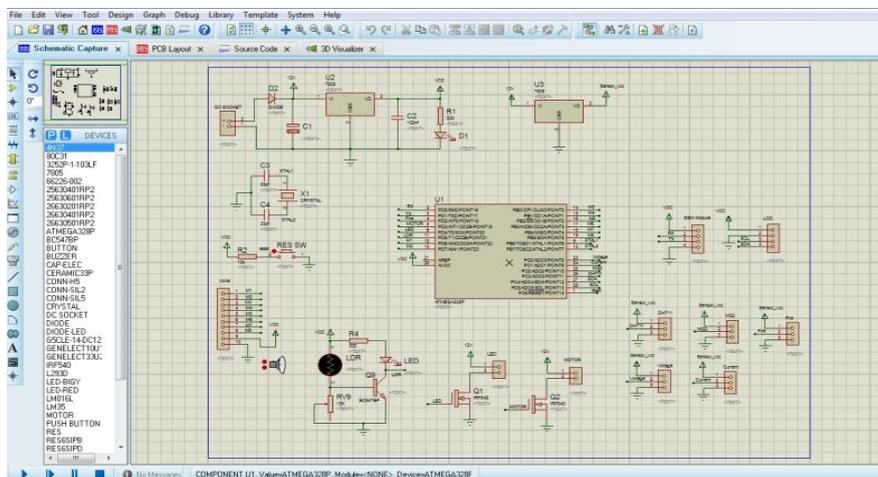


Figure 2. System Layout

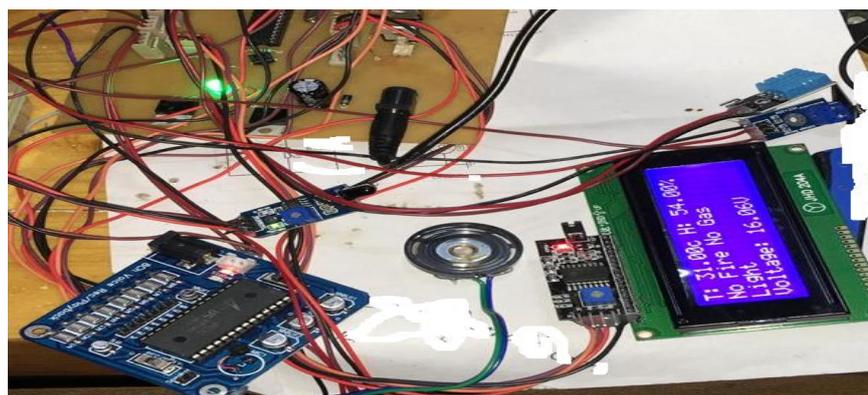


Figure 3. Expected Outcome

### 6. Advantages

This system helps in the following ways:

- To detect the exact direction of the fire source.
- The capability of sensing accurately with increased flexibility.

- Reduce human effort.
- Reliable and economical.
- If any of the sensor output will be high, Voice module will produce the sound for intimating the condition to others.
- To detect fire in the disaster-prone area.
- Also extinguishes the fire on detection.
- Reduces the level of destruction.
- Simple and low cost technology.
- Measures flammability of gases.
- It has robust and simple construction.
- Automation of sensors leads to better monitoring of devices.

## 7. Conclusion

WSN is possible today due to technological advancement in various domains. Envisioned to be an essential part of our lives design constraints need to be satisfied for a realization of sensor networks. In this system, various sensors like fire, gas, LDR sense the fire and other parameters, the fire get extinguished with the help of water pump attached in the system. Similarly other actions will to be taken by the system. If the voltage and current go above the threshold value and leakage of gas are detected by gas sensors and the voice module plays an audio note which gives an alert message to the factory workers for the gas and fire detected. IOT and the Android app help us for remote monitoring. The entire mechanism is controlled by Arduino.

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