# IOT based Real Time Data Monitoring for Industry

Varun A[1], Yashvant[2], Vetrivel k[3], Sujith R[4]

***Abstract*: Our objective is to design an Industrial machine control and monitoring system using IOT. Surveillance is most important security systems in home, industrial, office and public places. In this security system is based on the embedded system along with Microcontroller and sensor networks. The human movement is detected using the PIR sensors. In this time, the system triggers an alarm detecting the presence of person in a specific interval of time and simultaneously sends the how many persons are intruder. When the security system is activated, the PIR Sensor is activated. This highly reactive approach has low computational requirement. Therefore, it is well suited for Industrial surveillance system. This surveillance security system implemented using Microcontroller and sensors. Industrial security systems have grown in popularity in recent years, a Industrial owner's look for ways to protect their personal space and enhance their Industrial values. It is necessary for every Industrial owner to considering adding a industrial security and monitoring system, as burglaries, thefts and murders have become routine in big cities. This paper demonstrates a Industrial machine control system that allows the user to control it with a wireless device such as a Wi-Fi or Bluetooth or Internet enabled mobile phone. A desktop PC is used to run the server software. The system allows the user to control each of the lights and fans individually. It can automatically turn off the main motors and turn on a motors at a specified time.**

## I. INTRODUCTION

Modern industries have been introduced to a broad range of manufacturing processes to ease reconfigurability and enhance flexibility while retaining the high throughput of the quality of products. Such systems provide real time data acquisition, enabling the monitoring of the actual condition of the manufacturing process. IOT facilitates real time monitoring and optimization of the fabricating systems, reduces the time for maintenance by instantaneously taking necessary corrective measures. IOT technology can generate an added value to logistics. The embedded software architecture offers a reliable solution to eliminate communication latency and provides real-time response to acquired information.

Real-time (data) monitoring is the delivery of continuously updated information streaming at zero or low latency. Monitoring involves collecting data periodically throughout an organization's environment from on-premises hardware and virtualized environments to networking and security levels, into the application stack including those in the cloud and out to software UIs. From this data, we can analyze system performance and resolve issues. Real- time monitoring ups the ante by providing a continuous low- latency stream of relevant and current data from which administrators can immediately identify serious problems. Alerts can be more quickly routed to appropriate staff or even to automated systems. By tracking real- time monitoring data over time, organizations can reveal and predict trends and performance. Data can be useful in multiple scenarios – to avoid industrial hazards in high profile plants, track yield in powerplants, ensure safety in high paced industries, nuclear safety levels etc. Fast paced delivery of this data can save time. Real time monitoring techniques implementing physical models for reliable damage and fault detection are essential for the safe use of ageing systems.

**Aim:**

The project aims in monitoring the gases, temperature, humidity, noise, barometric pressure, etc. and report the information on your smartphone. And also tells about the harmful conditions for the workers.

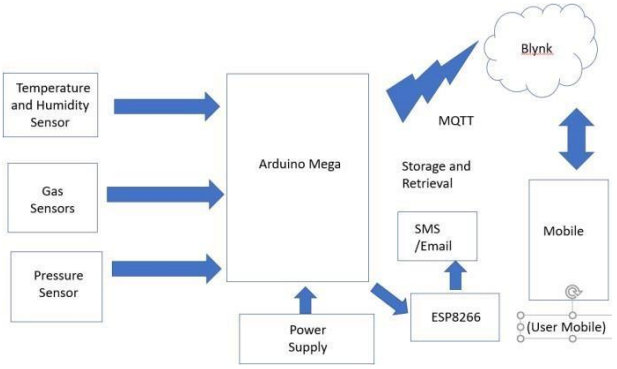
**Objectives:**

- To monitor any manufacturing plant remotely for temperature, motion, humidity and carbon dioxide etc by using Arduino Mega and ESP8266 and various sensors.
- With the use of IoT, real time monitored data will be sent remotely to E-mail /SMS about the current weather and concentration of gases in the plant.
-

## II. PROPOSED WORK:

This project is to monitor any manufacturing plant remotely for temperature, motion, humidity and carbon dioxide etc. The project has uses Arduino Mega and ESP8266 and various sensors.

Fig 1: Block Diagram



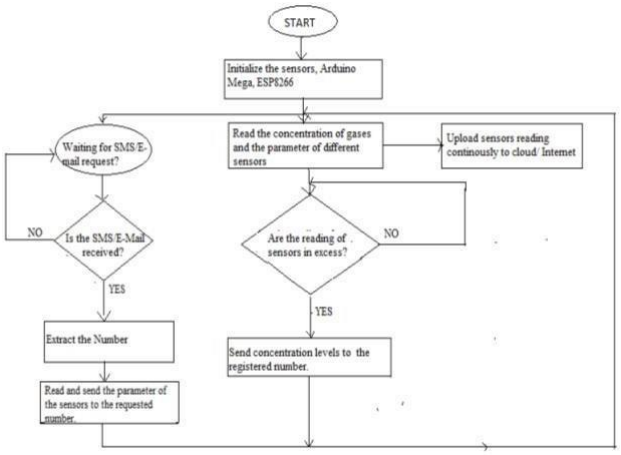

With the use of IoT, this project will send you the data remotely to your E-mail /SMS about the current weather and concentration of gases in the plant. The program has also set the parameters and if the results are not within the parameters

it will notify the results with warning so that immediate action will be taken to prevent the fire. It can also take pictures while sending notification. With the use of motion sensor, it will help to monitor unauthorized entry after the office hours as set in parameters. This project uses Blynk as server and app to view your data. I planned to use Arduino Cloud but it is not available for ESP8266. This project will also be expanded for monitoring the Health of each employees working in the plant by measuring their BP and heart rate with a future wearable device in the safety jacket.

The project is split to two different modules server side and user side. The server side of the project is managed by Blynk, a free application/host. The sending and receiving of data is being handled by POST, PUT, GET, etc.
; on the phone and esp8266.

The Arduino Mega is connected to ESP8266 board to connect to Wi-Fi. The ESP8266 will be used to connect to Wi-Fi and the server and communicate with it through MQTT Protocol. The ESP8266 is connected via serial interface. The system will monitor the temperature and pressure and the humidity. The DHT211 and BMP180 shall be used for the same. Since the modern factories/industries use fossil fuel or other gases; The system also monitors gases like carbon monoxide (silent killer), LPG and smoke using MQ3 gas sensor. It also has a PIR motion sensor to detect humans and motion activity. Most of the work of analyzing the data the data will be done on the server side. The server is hosting the web page and managing the entry of data and its analysis which has to be done. It uses and event- or widget to give notifications and other stuff based on the information sent by the device.

**Flowchart:**




## III. SYSTEM REQUIREMENT:

### A. Hardware Requirement:

- **Arduino Mega :**

The Arduino MEGA 2560 is designed for projects that require more I/O lines, more sketch memory and more RAM. With 54 digital I/O pins, 16 analog inputs and a larger space for your sketch it is the recommended board for 3D printers and robotics projects. This gives your projects plenty of room and opportunities maintaining the simplicity and effectiveness of the Arduino platform. This document explains how to connect your Mega2560 board to the computer and upload your first sketch. The Arduino Mega 2560 is programmed using the Arduino Software (IDE), our Integrated Development Environment common to all our boards and running both online and offline. For more information on how to get started with the Arduino Software visit the Getting Started page.

Fig 2: Arduino Mega

- **Wi-Fi Module (ESP8266):**

ESP8266 offers a complete and self-contained Wi-Fi networking solution, allowing it to either host the application or to offload all Wi-Fi networking functions from another application processor. When ESP8266 hosts the application, and when it is the only application processor in the device, it is able to boot up directly from an external flash. It has integrated cache to improve the performance of the system in such applications, and to minimize the memory requirements.

Fig 3: Wi-Fi Module (ESP8266)

- **DHT11 Temperature & Humidity:**

This DHT11 Temperature & Humidity Sensor features a temperature & humidity sensor complex with a calibrated digital signal output. By using the exclusive digital-signal-acquisition technique and temperature & humidity sensing technology, it ensures high reliability and excellent long-term stability. This sensor includes a resistive-type humidity measurement component and an NTC
temperature measurement component, and connects to a high performance 8-bit microcontroller, offering excellent quality, fastresponse, anti-interference ability and cost- effectiveness.

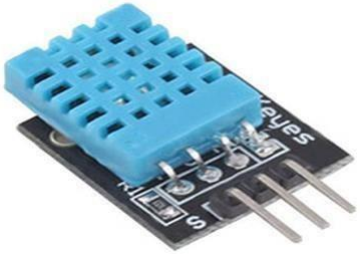


Fig 4: DHT11 Temperature & Humidity

- **PIR Sensor**

Proximity Infrared sensor is used as the sensing unit in this proposed system. It can sense up to the range of 3 meters. It will operate at the voltage of 4.8 V – 20 V with the current of
<50µA, and Dimension of 32 x 24 mm with Lens diameter 23 mm.

Fig 5: PIR Sensors

- **Bmp180 – Pressure sensor:**

BMP180 is one of sensor of BMP XXX series. They are all designed to measure Barometric Pressure or Atmospheric pressure. BMP180 is a high precision sensor designed for consumer applications. Barometric Pressure is nothing but weight of air applied on everything. The air has weight and wherever there is air its pressure is felt. BMP180 sensor senses that pressure and provides that information in digital output. Also the temperature affects the pressure and so we need temperature compensated pressure reading. To compensate, the BM180 also has good temperature sensor.


Fig 6: BMP180 Pressure Sensors

- **MQ3 – Gas sensor:**

MQ3 is one of the most commonly used sensors in the MQ sensor series. It is a Metal Oxide Semiconductor (MOS) type of sensor. Metal oxide sensors are also known as Chemiresistors, because sensing is based on the change of resistance of the sensing material when exposed to alcohol. So by placing it in a simple voltage divider network, alcohol concentrations can be detected. MQ3 alcohol sensor works on 5V DC and draws around 800mW. It can detect Alcohol concentrations anywhere from 25 to 500 ppm.


Fig 7: MQ3- Gas Sensors

## B. Software Requirements

- **Arduino IDE:**

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuine hardware to upload programs and communicate with them.

- **Blynk:**

responsible for all the communications between the smartphone and hardware. You can use our Blynk Cloud or run your private Blynk server locally. It's open-source, could easily handle thousands of devices and can even be launched on a Raspberry Pi.

## IV. RESULT:

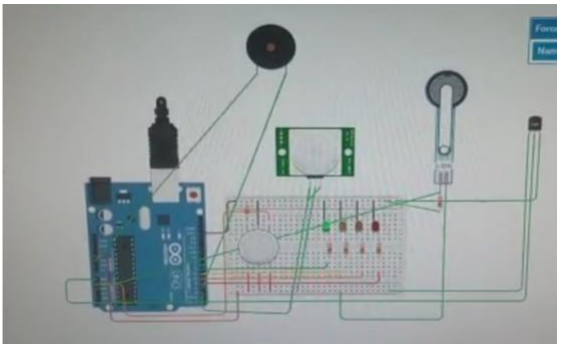


Fig 8: simulation

## V. FUTURE SCOPE:

This paper based on IoT can be further expanded by providing additional facility to the industry person with the help of Android app for achieving better control and monitoring of industry. Further, smoke and gas sensors can be interfaced with the system to ensure security of industry workers and goods in case of fire or toxic gas leakage

## VI. CONCLUSION:

IoT enabled industrial monitoring system has been a wide requirement in various industries as they raise the safety standards exponentially whilst providing a real time monitoring of critical parameters like temperature, humidity, pressure etc. and notified regularly to concerned officials/ workers. The Implementation is not only in the view of safety but also could be used as a yield booster for theindustry.

## VII. REFRENCE:

[1] "**Internet of Things-based Hydrocarbon Sensing for Real-time Environmental Monitoring**", Ali Yavari, Dimitrios

Georgakopoulos, Paul R. Stoddart, Mahnaz Shafiei, Faculty of Science, Engineering and Technology, Swinburne University of Technology, Melbourne, Australia - 2019 IEEE 5th World Forum on Internet of Things (WF- IoT)

[2] **"Low Cost IoT Sensor System for Real- time Remote Monitoring"**, Matteo D'Aloia, Annalisa Longo, Gianluca Guadagno, Mariano Pulpito, Paolo Fornarelli, Pietro Nicola Laera, Dario Manni.

[3] "**Design of an Industrial IoT-Based Monitoring System for Power Substations",** Long Zhao Igor Matsuo Yuhao Zhou* Wei-JenLee, University of Texas at Arlington.

[4] "**Industry 4.0 LabVIEW Based Industrial Condition Monitoring System for Industrial IoT system",** 2019 Developments in eSystems Engineering (DeSE).