

# **Gas Leakage Monitoring and Alerting System**

## **Final Report**

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### **Abstract:**

A wide range of gas is used in Industries for various purposes such as, Heating, Preserving, etc. These gases can also be hazardous in nature. So, monitoring the flow of gas is very important and Leakage is simply unavoidable. As we have already witnessed a couple of calamities it is time to learn from them. This expert system is capable of monitoring the environmental parameters at all times. In case of emergency, using a GSM module it notifies the concerned person to take necessary step to prevent an accident.

### **Objectives:**

- This project helps the industries in monitoring the emission of harmful gases
- In several areas, the gas sensors will be integrated to monitor the gas leakage
- If in any area gas leakage is detected the admins will be notified along with the location
- In the web application, admins can view the sensor parameters.

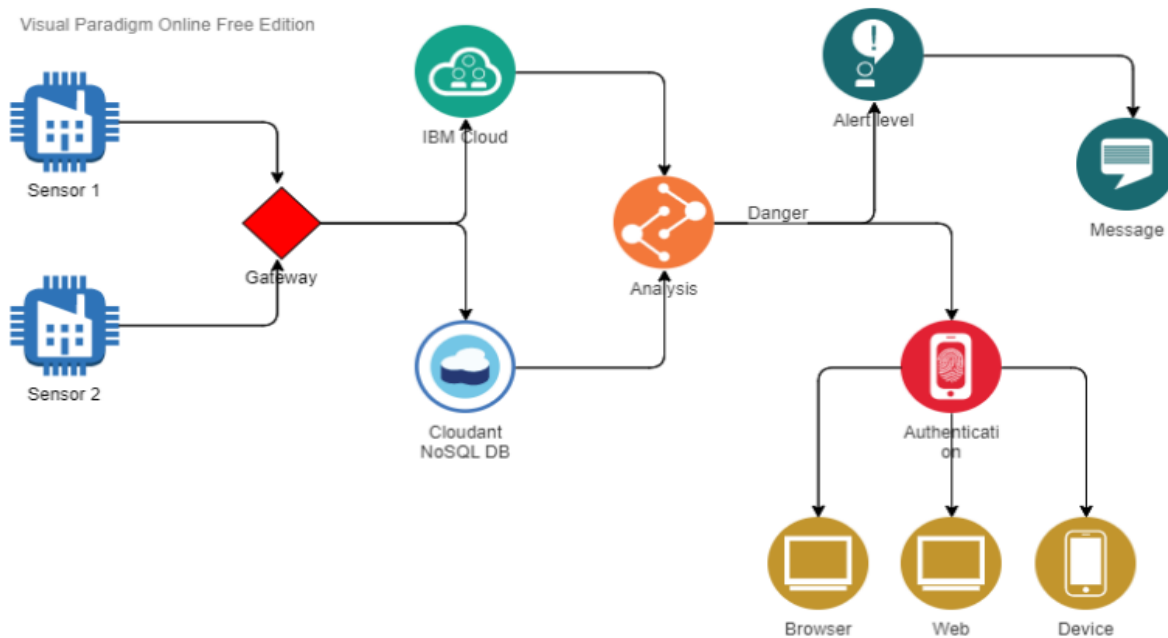
## **Problem Formulation:**

Any gaseous molecule that escapes from a stove, pipeline, cylinder, etc. is considered a gas leak. This may happen on purpose or even accidentally. Given that we are aware that these leaks are harmful to our health, and when it explodes, it poses a serious threat to everyone's safety as well as that of their homes, places of employment, industries, and the environment. We are in need of taking necessary precautions to prevent this calamity.

The Bhopal Disaster and the Vizag Gas Leak are only a couple of the significant disasters that occurred as a result of gas leaks. As far as industrial accidents go, the Bhopal disaster is considered the worst. From this insecticide plant, over 45 tons of methyl isocyanate escaped. Methyl isocyanate is an organic molecule that can be found in insecticides that contain carbamates. The liquid is colorless, lethal, and flammable, and people should stay away from it.

In Vizag the release of styrene from containers that were left unattended for a long time caused a gas leak. This viscous liquid has no color and can spread through fumes. Therefore, a detector needs to be built in a way that it can pick up any type of gas, fume, leak, smoke, etc. The detector may be fitted with particular settings that could help to prevent the problem, however severe and deadly it may be.

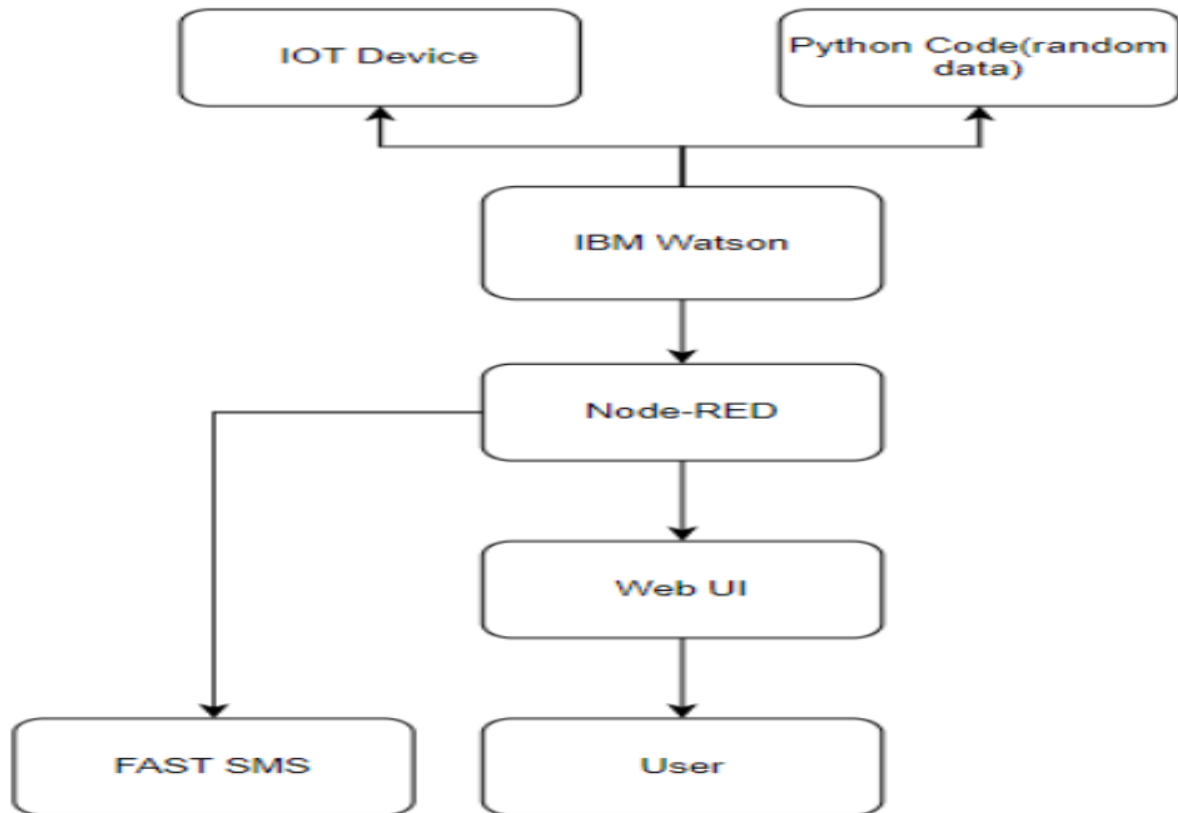
## Solution Architecture:



1. Data is gathered from sensor.
2. Data is uploaded to Cloud.
3. Data is displayed in Web.
4. After authentication, Data is displayed in Mobile.
5. In case of emergency Mobile application notifies the user.

Integrity and data confidentiality are the 2 key security features to be taken care of. Tampering the data may lead to serious accidents. User can easily keep an eye on their industry though they stay at home. This system is just like a surveillance system. Instead of theft, here we are surveilling the Gas to prevent accidents.

## Proposed Solution:



### 1. IoT Device:

Our entire work depends on this module. Data gathered by the sensor must be accurate and should be available without any latency. Here we use gas sensor to detect the presence of various gaseous substances like Carbon Mono Oxide, Carbon Di Oxide, Methane, etc. According to the need sensor can be changed to detect other kinds of gas. As each industry deals with different kinds of gases.

## **2. IBM Watson:**

This is where we connect our independent IoT device with internet and to gather the sensed environmental parameters. This here is responsible for collecting the data, so each IoT device is connected with this platform using various meta details of the controller.

## **3. Node-RED:**

Node-RED gathers the data from IBM Watson using nodes. This module acts as a backbone to publish data. Node-RED plays a vital role in creating a dashboard where the user/admin can view the sensed data. At the same time the data is also published in a temporary website, from which our mobile application gathers the data.

## **4. MIT App:**

This is the mobile application where the user must login with their credentials to monitor the environmental parameters. This here is made up of several screen for various purposes such as to log in, to raise alarm, to display the data, etc. An industry might have multiple security personals who might be in need of access to monitor the data, so each individual person has their own unique ID and secret password.

## **5. Alarm:**

When the percentage of gas in the environment is above 45% an alarm is raised in the user mobile with the help of the application. This alerts the concerned person to make the necessary decisions to avoid a calamity and to save those souls working in the industry.

## **Conclusion:**

True prevention is not waiting for bad things to happen, it's preventing things from happening in the first place. Installing the proposed system will be one of the best ways to prevent accident. An industry that values employee's life will always grow faster. This system can detect even a slightest leak in the entire system so not only you can prevent disasters but also you can efficiently track whether the gas is being used or being wasted due to leakage.