Gas leakage monitoring & alerting system for industries

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**Introduction**

**Overview**

The project that we are designing will help us to detect any leakage of gas wherever there is a usage of gas cylinders. We are designing this detector in order to understand the basic functioning of sensors & also detailed working of concepts in IOT(Internet of Things).

The goal of this project is to reduce accidents caused by the leakage of gas from the cylinders in order to reduce the adverse effects caused by the accident & also to increase the safety at places where there is a usage of cylinders. This device is not limited to usage at large scale industries & petrol bunks, but also can be implemented for the cylinders used in the household. With the implementation of this device, we can decrease the number of accidents. Cost of production is also less, so that it can be purchased by any average individual. These are designed in such a way that they are ready to be installed.

**Purpose**

This device is mainly designed to monitor the gas leakage & alert through a text SMS in order to reduce the accidents. The device can be used in industries, petrol bunks as well as for household purpose.

**Literature Survey:**

**Existing Problem**

The existing problem is that if there is a gas leakage, we are not able to know about the leakage immediately. In some of the cases, the leak is detected early, if done so the damage may be less. But in some of the cases, we are getting know about the leakage very lately, by the time we know about the leak the damage is already happening in an adverse condition causing a huge loss.

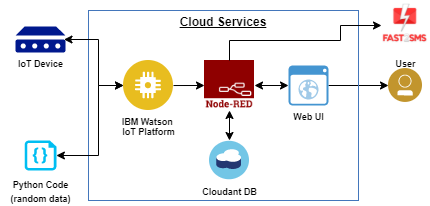
If the industry is closer to the households, there may be leak of some poisonous gases which may affect the human respiratory system completely or partially. In some cases, the affect may be as long as the human is alive.

**Proposed Solution**

The designed device consists of a sensor with the latest technology which detects the gas leak & sends an alert SMS to the desired device.

**Theoretical Analysis**

**Block Diagram**

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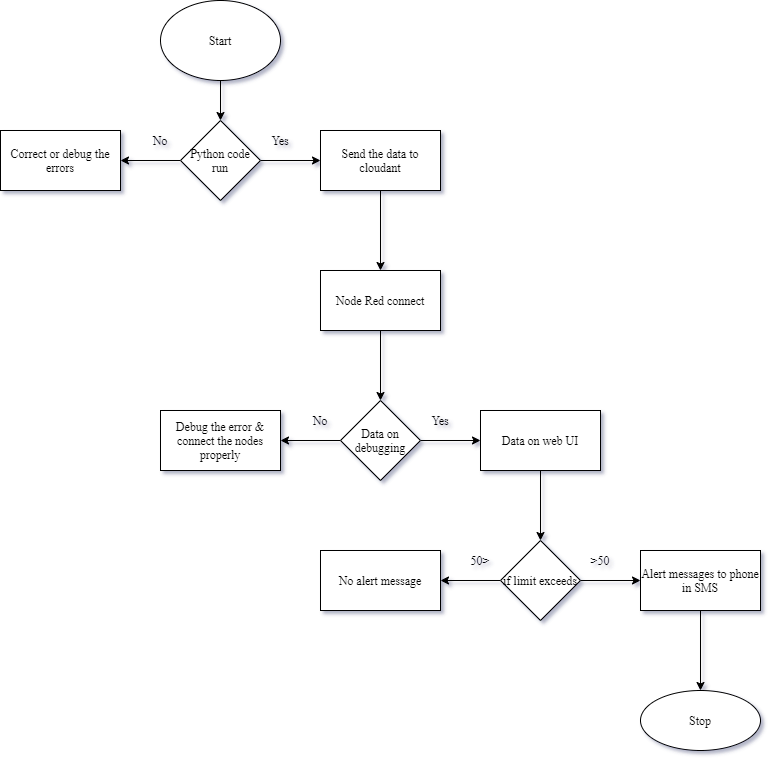
**Hardware/Software Design :**

We follow a step-by-step procedure to set up all the interfaces required for our project & developed the project in Python to detect the leak of gas & send an alert SMS to the desired device.

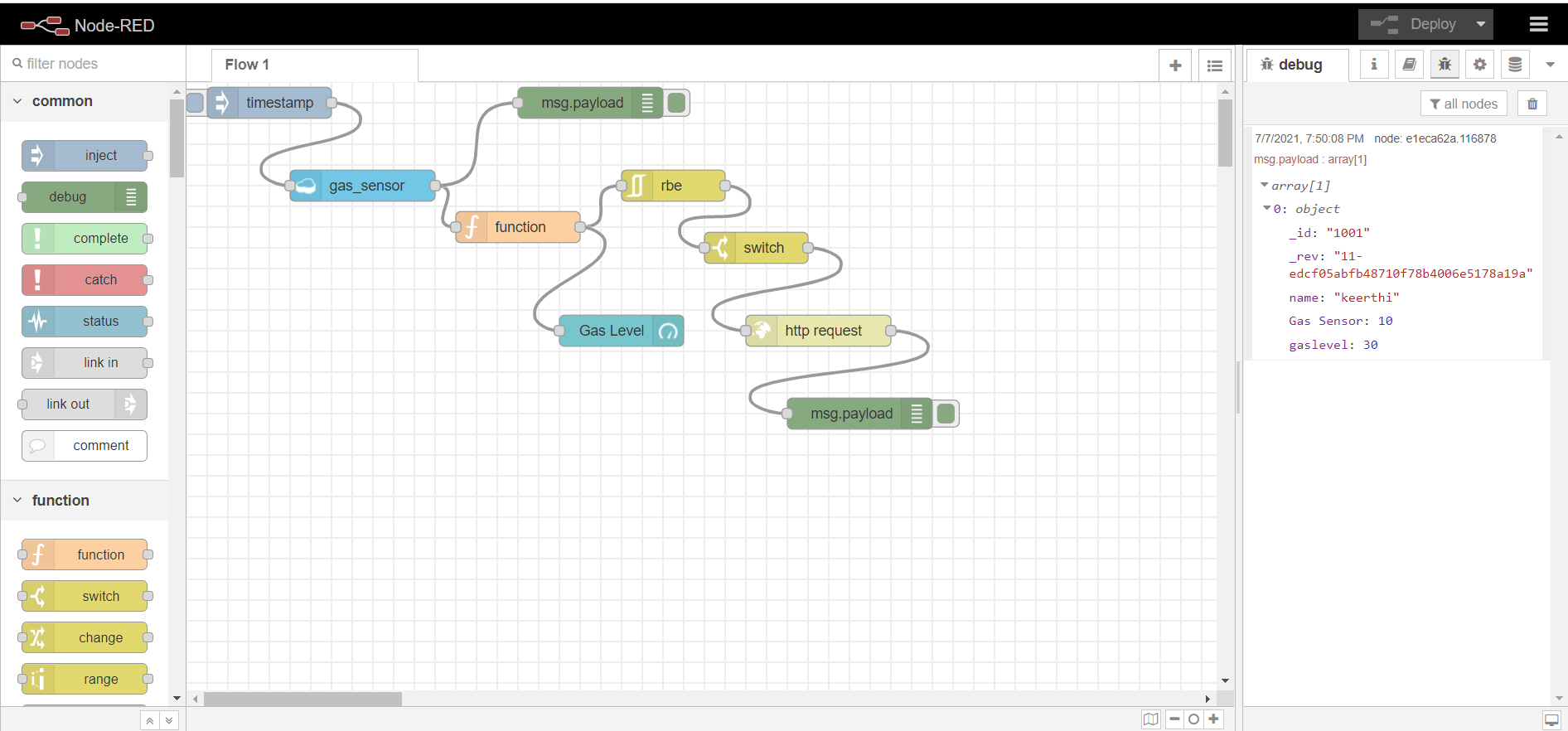
Software requirement

* Python Idle (with specified packages installed)
* IBM Cloud
* Node Red service

**FLOW CHART:**

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**Results**

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**Advantages & Disadvantages**

**Advantages**

* Low cost
* Low power consumption
* High accuracy
* The sensor has excellent sensitivity combined with a quick response time

**Disadvantages**

* No prevention of fires possible with kit
* Applicable only as an indicator/alarming device
* Its sensitivity depends on humidity & temperature
* It is a little sensitive to smoke

**Applications**

* **Home Security** can be used in homes (especially kitchen) to prevent accidents due to gas leak.
* **Industrial Security** can be used in sensitive areas to prevent any accidents
* **Enhancement** can be enhanced to measure specific gas levels to use in industrial applications

**Conclusions**

The design of a sensor-based automatic gas leakage detector with an alert and control system has been proposed and discussed in this paper. This is a low-cost, low power, lightweight, portable, safe, user friendly, efficient, multi featured and simple system device for detecting gas. Gas leakage detection will not only provide us with significance in the health department but it will also lead to raise our economy, because when gas leaks it not only contaminates the atmosphere but also wastage of gases will hurt our economy. The proposed system is easily affordable even for poor people. In the open literatures it is noticed that much work has not been done for a smart gas detection system. In future, more advanced features will be integrated with this system which will provide users with more safety and relaxation. The proliferation of handheld devices has led to developments in the field of smart gas sensors, which has considerably widened their scope of application. The need for ensuring safety in workplaces is expected to be the key driving force for the market over the coming years.

**Appendixes**

**Source Code**

from cloudant.client import Cloudant

from cloudant.error import CloudantException

from cloudant.result import Result

from cloudant.result import Result, ResultByKey

# IBM Cloudant Legacy authentication

client = Cloudant("apikey-v2-26nfu4gqvyxcmu556d5ny604qqnb18zdxg7nk1s6d8gu", "5f55403d7e64e3f62356312c03a4a8f0",

url="https://apikey-v2-26nfu4gqvyxcmu556d5ny604qqnb18zdxg7nk1s6d8gu:5f55403d7e64e3f62356312c03a4a8f0@af1bea6a-629e-4a60-a77e-96164b416359-bluemix.cloudantnosqldb.appdomain.cloud")

client.connect()

database\_name = "gas\_sensor"

my\_database = client.create\_database(database\_name)

if my\_database.exists():

print(f"'{database\_name}' successfully created.")

json\_document = {

"\_id": "1001",

"name":"keerthi"

}

new\_document = my\_database.create\_document(json\_document)

if new\_document.exists():

print("Document '{new\_document}' successfully created.")

result\_collection = Result(my\_database.all\_docs, include\_docs=True)

# Get the result for matching a key

result = result\_collection['1001'] #search by id, if id=1001

print("---------------")

print("the data with id =1001 is")

print (result)

print("---------------")

# Iterate over the result collection

for result in result\_collection:

print(result)# it will print all the records

# First retrieve the document

for document in my\_database:

my\_document = my\_database['1001']

# Update the document content

# This can be done as you would any other dictionary

my\_document['gaslevel'] = 55

# You must save the document in order to update it on the database

my\_document.save()

result\_collection = Result(my\_database.all\_docs, include\_docs=True)

# Get the result for matching a key

result = result\_collection['1001']

# Iterate over the result collection

print (result)

**CODE OUTPUT:**

'gas\_sensor' successfully created.

Document '{new\_document}' successfully created.

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the data with id =1001 is

[{'id': '1001', 'key': '1001', 'value': {'rev': '10-dfd18a7da101d9d7b64306e125554394'}, 'doc': {'\_id': '1001', '\_rev': '10-dfd18a7da101d9d7b64306e125554394', 'name': 'keerthi', 'Gas Sensor': 10, 'gaslevel': 30}}]

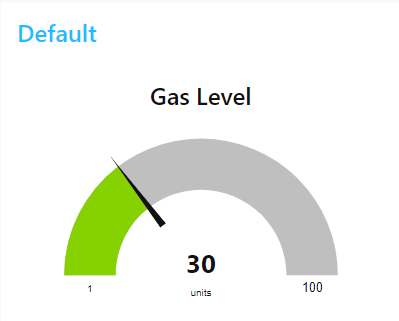
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{'id': '1001', 'key': '1001', 'value': {'rev': '10-dfd18a7da101d9d7b64306e125554394'}, 'doc': {'\_id': '1001', '\_rev': '10-dfd18a7da101d9d7b64306e125554394', 'name': 'keerthi', 'Gas Sensor': 10, 'gaslevel': 30}}

[{'id': '1001', 'key': '1001', 'value': {'rev': '11-edcf05abfb48710f78b4006e5178a19a'}, 'doc': {'\_id': '1001', '\_rev': '11-edcf05abfb48710f78b4006e5178a19a', 'name': 'keerthi', 'Gas Sensor': 10, 'gaslevel': 30}}]

>>>

**UI output :**

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**Mobile Output :**

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