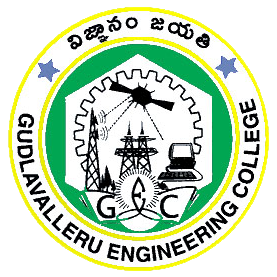
**GUDLAVALLERU ENGINEERING COLLEGE**



**ELECTRONICS AND COMMUNICATION ENGINEERING**

**PROJECT TITLE**

**HAZARDOUS AREA MONITORING SYSTEM FOR INDUSTRIAL PLANTS**

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**1.INTRODUCTION**

**1.1 Overview:**

Today there is a great challenge in the development of industrial hazardous safety monitoring for the application of gas leaks, fire, smoke, radiation etc. In all related fields of investigation, a key matter is the need flexible and practical virtual instruments, a way to easily expose the multi-sensors to the hazardous levels in risk concentration. The implementation of wireless sensor network provides an alternative solution by deploying a larger number of disposable sensor nodes. The Sensor data may consist of industrial environmental parameters like critical temperature, gas leakage, radiation, fire, smoke and the dynamic variations of these physical quantities. This software platform is in the terms of virtual instruments developed under Lab VIEW programming environment and integrated with computer-controlled system.

**1.2 Purpose:**

In some industrial plants, there are some areas which are to be monitored time to time. Sometimes the conditions may become critical which may lead to loss of property and also human loss. To monitor the conditions, we can integrate the smart devices in the areas which are needed to be monitored.

**2.LITERATURE SURVEY**

**2.1 Existing Problem:**

If the temperature gets high, a man must go and check manually. This is a time taken process and uses man labour. Due to this there can be a possibility of getting the temperature high without knowing it. Hence, disasters

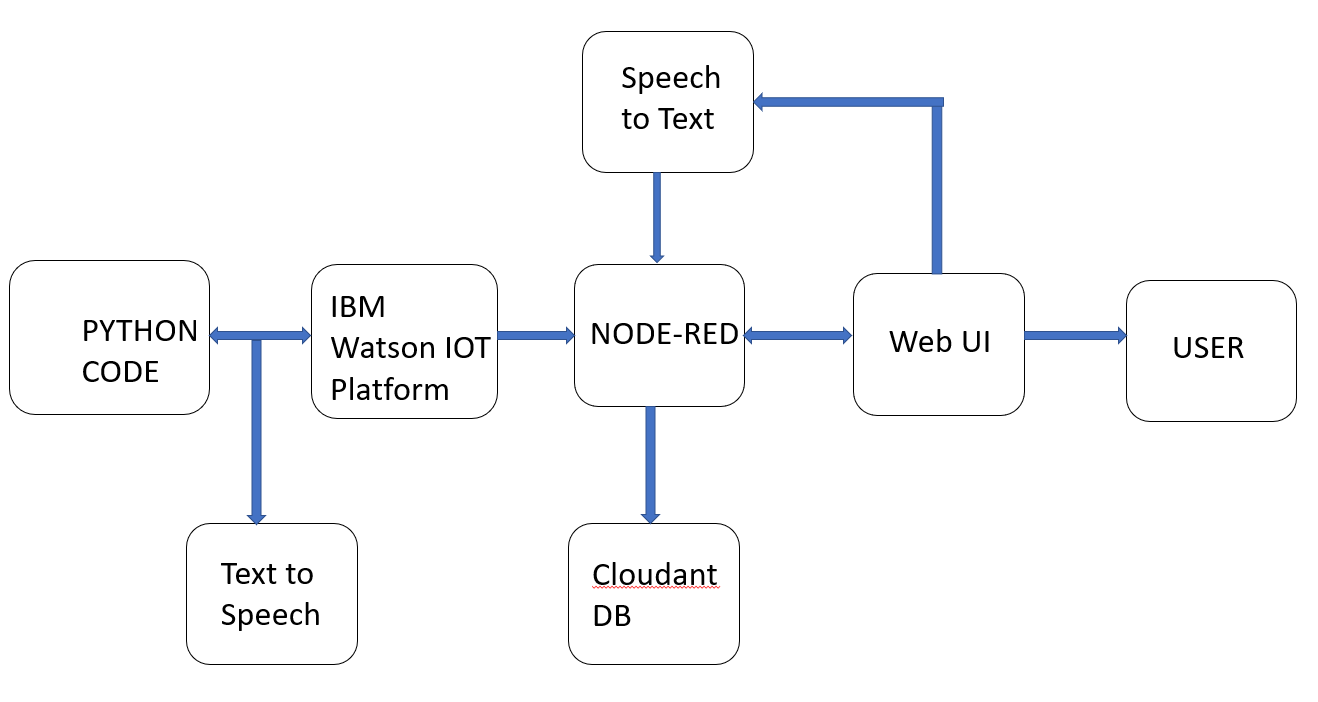
**2.2 Solution:**

In industrial plants and installations, control systems are used to monitor and control processes. Control Systems, whether a conventional Control Desk or a Computer/PLCs System with SCADA or a, provides a human-machine-interface to monitor and control the plant equipment and processes.

An alarm system consists of both hardware and software including: field signal sensors, transmitters, alarm generators and handlers, alarm processors, alarm displays, annunciator window panels, alarm recorders and printers. Alarm systems indicate the abnormal conditions and problems of the plant and equipment to the operators, enabling them to take corrective action and bring the plant/equipment back to normal conditions.

**3.THEORETICAL ANALYSIS**

**3.1 Block Diagram:**



**3.2 Software Designing:**

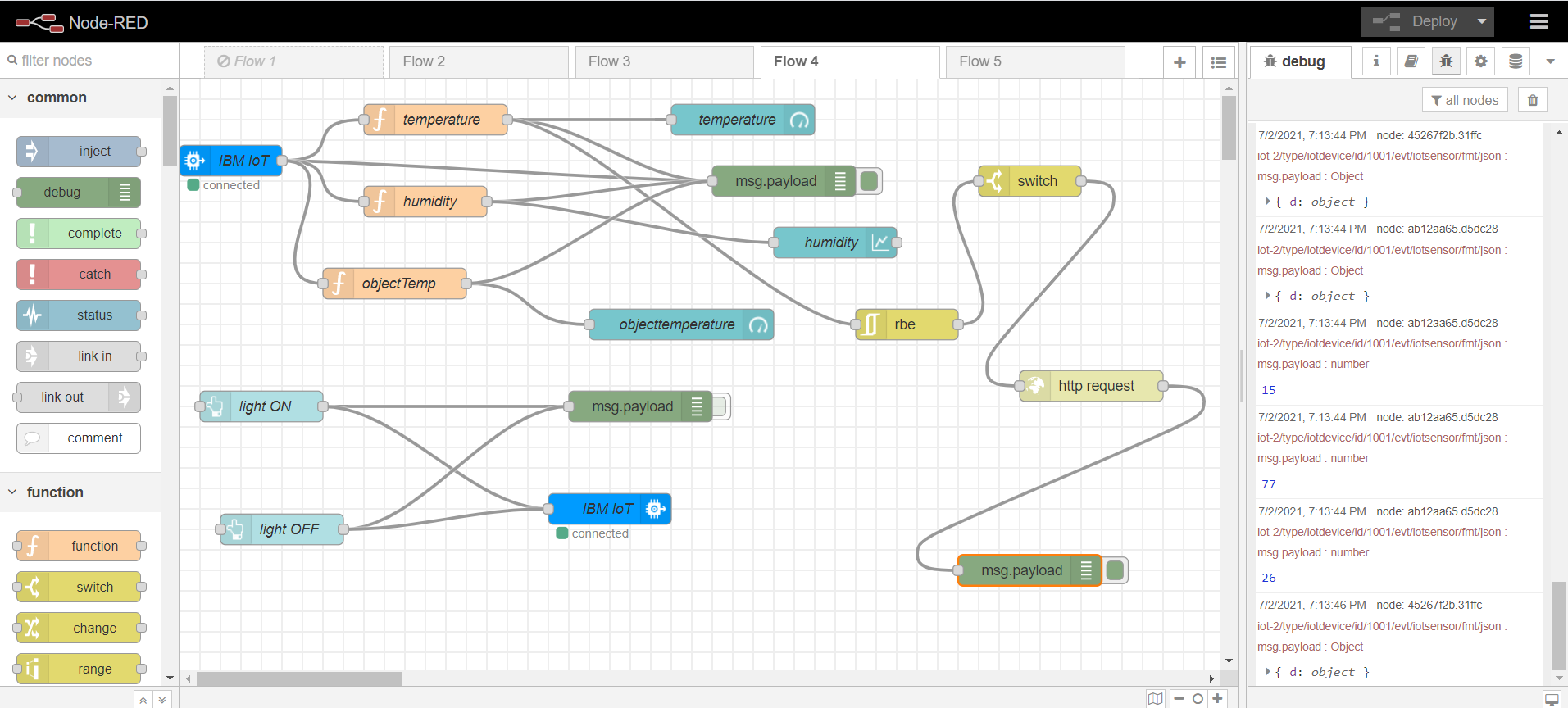
* Code for Text to Speech
* Code for IBM Watson Assistant

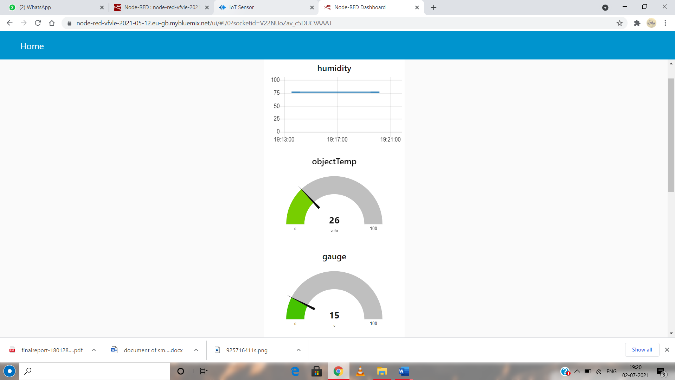
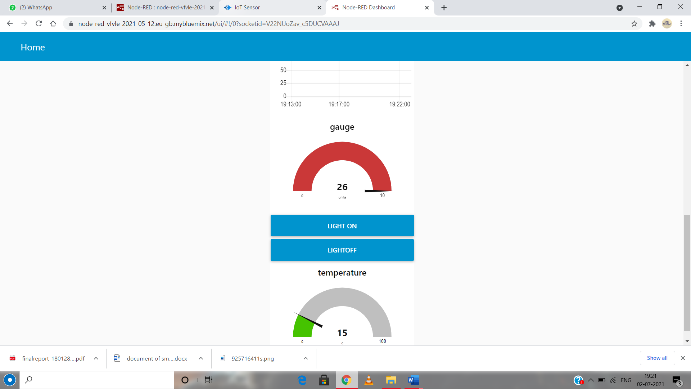
**Tools used:**

* NODE-RED
* IBM Watson
* Cloudant DB
* Python IDLE

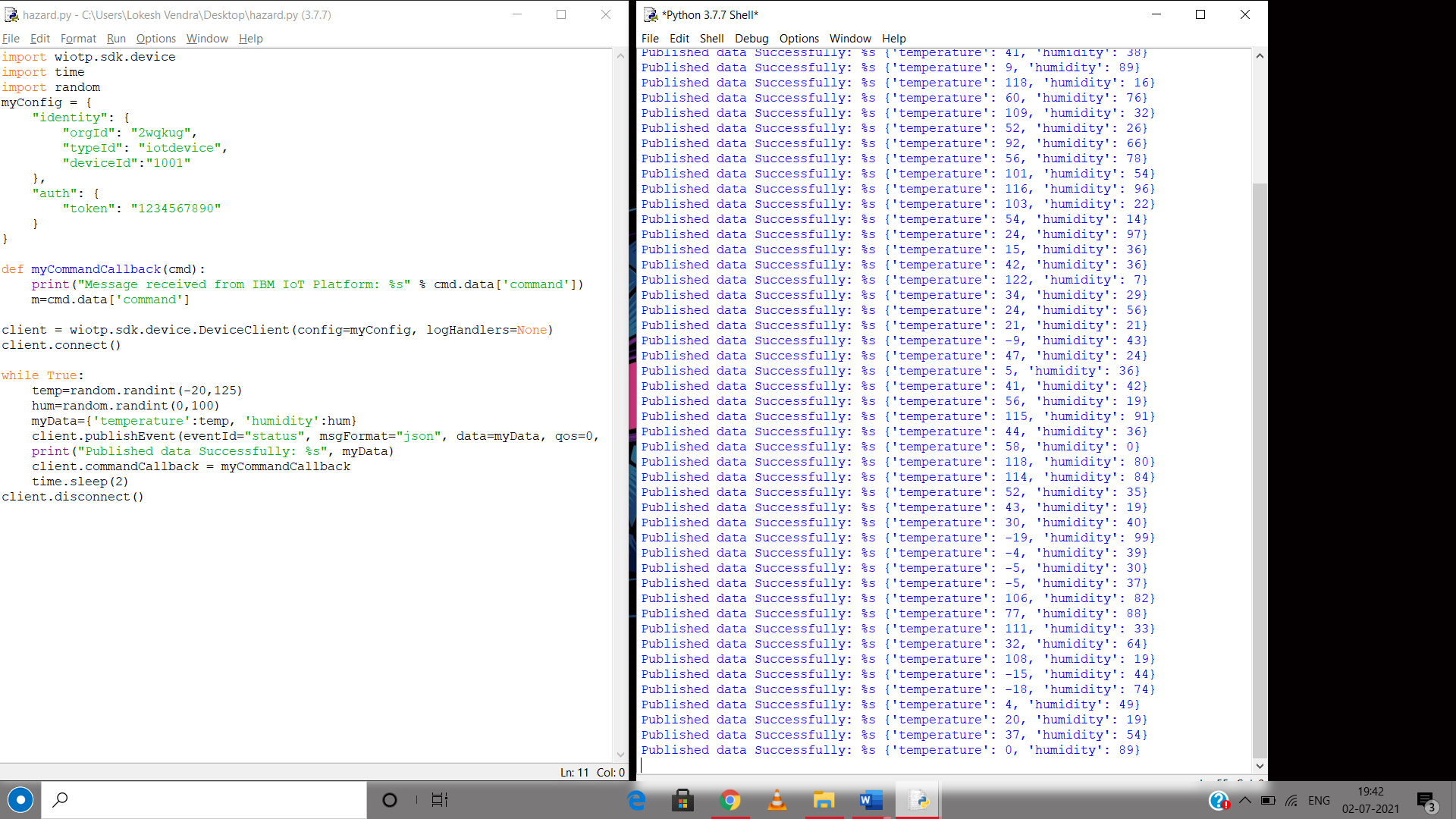
**4. EXPERIMENTAL INVESTIGATIONS**

Firstly, we create ibm cloud, then we create Watson platform. While creating Watson platform we will get device id, device type, organization id, authentication token. From google we would take iot Watson simulator, then we have to fill the required credentials in the simulator. After giving the credentials, we must create a node-red. After creating, for authentication we’ll get an API key. We’ll again go to node-red and connect the iot simulator to it. We take function nodes, ibm input, ibm output, gauge, switch, http request, rbe, buttons and debug node. We have form connection between these nodes. We’ll open a website called ‘fast2sms’, the website will provide an API key and a URL. We’ll enter these two in http request. It will indicate if the temperature is high in SMS format to the given mobile number.

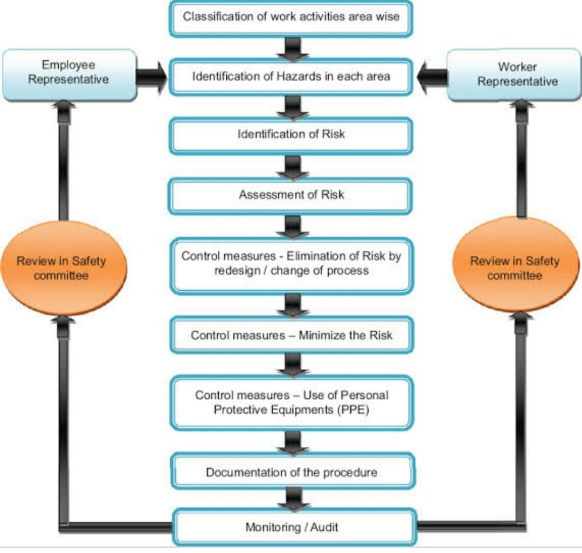
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Python Code :

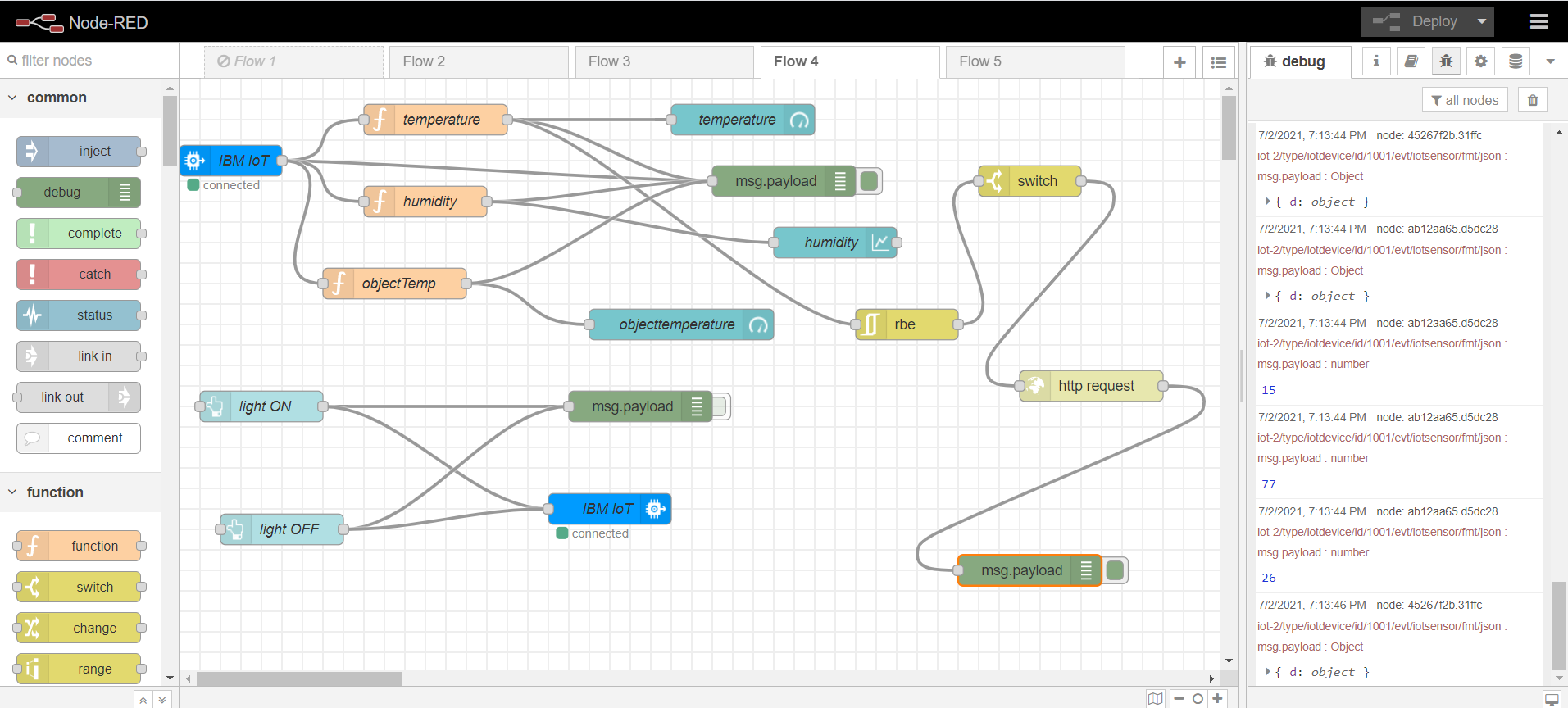


**5.FLOW CHART**

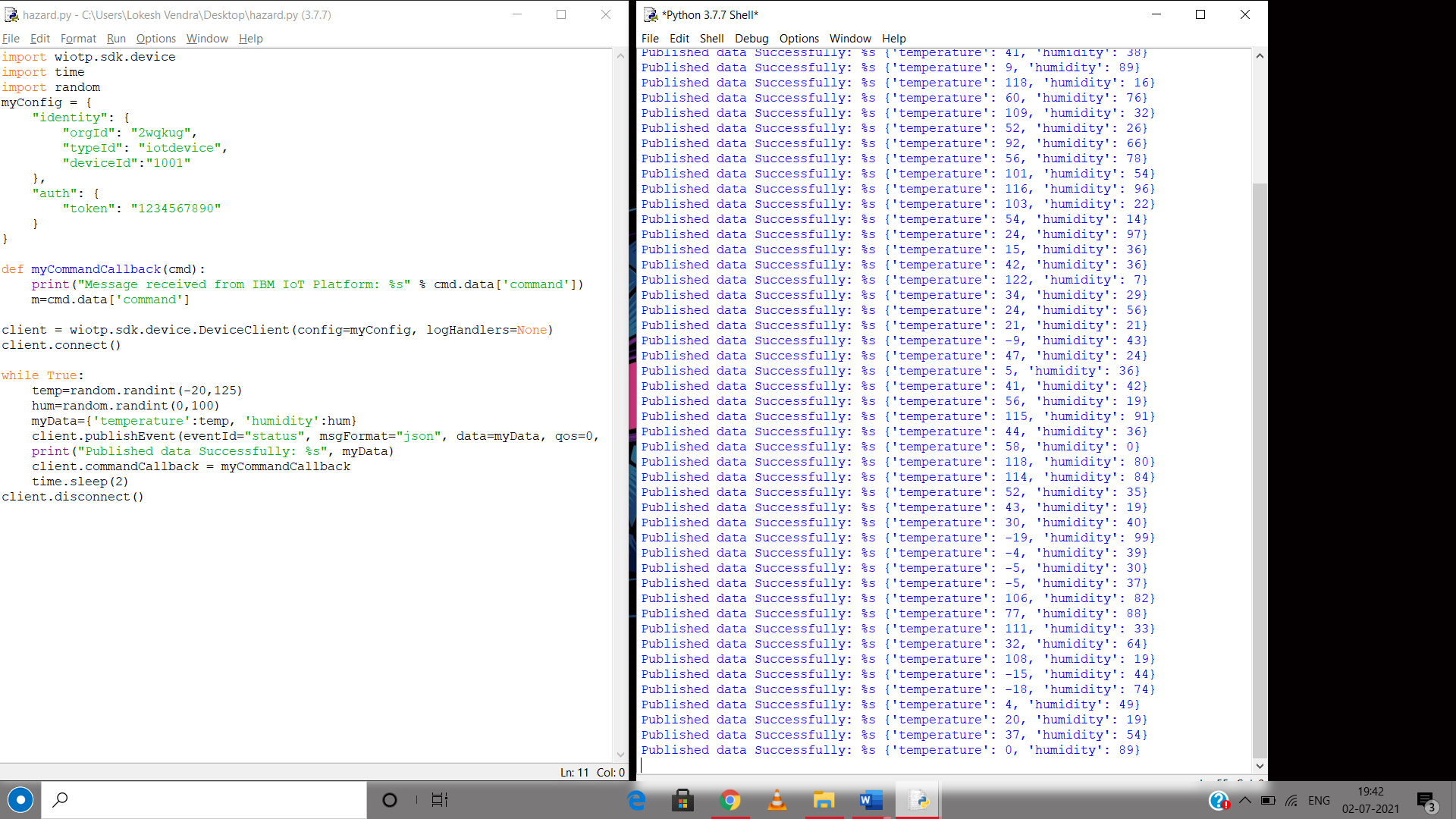


**6.RESULT**

The Result for hazardous area monitoring system can be obtained by connecting NODE-RED with python idle through IBM Watson. The Web app of node-red is used to give commands to python shell. The python shell takes the commands from node-red and display the temperature and SMS is obtained.

****

Python Code:



**7.ADVANTAGES &DISADVANTAGES**

**ADVANTAGES:**

* Greater energy efficiency.
* Reduced costs.
* Better quality products.
* Improved decision-making potential.
* Less equipment downtime.

**DISADVANTAGES:**

* Device hijacking.
* Data siphoning.
* Denial of service attacks.
* Data breaches.
* Device theft.
* Man-in-the-Middle or Device “spoofing”

**8.APPLICATIONS**

Industrial IoT can connect machines, tools, and sensors on the shop floor to give process engineers and managers much-needed visibility into production. For example, organizations can automatically track parts as they move through assemblies using sensors such as RFID and break beams.

**9.CONCLUSION**

Currently, IoT is present and gaining more traction in a lot of fields, and one of the most important field is industrial applications. There are a huge number of ways in which industries can make use of IoT to improve working conditions, efficiency, cutting costs and improving the overall growth of the sector. However, hazard monitoring and mitigation is often overlooked in industrial areas. Therefore, this project specifically aims to make use of IoT to actively monitor and analyse various factors in a typical heavy industrial zone like temperature and levels of gases in the environment. If the above parameters exceed the recommended safe values, the system can track the same and issue alerts. Also, the data generated in real time can provide important information about how smoothly the work is going on in different zones. This system can be deployed in many industrial areas like mining, underground factories, metal refineries, automatic welding factories and even heavy parts production lines. It will help to provide a safe and efficient working environment in such areas, while also opening new paths to improve the safety parameters of these places.

**10.FUTURE SCOPE**

It can be used in big industries and factories. Nuclear plants can also be monitored through this device. This will prevent the upcoming hazards occurring in industries. It is used to monitor the temperature.

**11.BIBLIOGRAPHY**

<https://www.researchgate.net/publication/275772095_A_Study_On_Computer_Based_Monitoring_SystemFor_Hazardous_Area_Safety_Measurement_UsingVirtual_Instrumentation>

<https://www.researchgate.net/publication/322737281_Toxic_gas_detection_and_monitoring_utilizing_internet_of_things>

<https://www.prescouter.com/2019/10/smart-sensors-and-the-future-of-intelligent-systems/>

**12.APPENDIX**

import wiotp.sdk.device

import time

import random

myConfig = {

"identity": {

"orgId": "2wqkug",

"typeId": "iotdevice",

"deviceId":"1001"

},

"auth": {

"token": "1234567890"

}

}

def myCommandCallback(cmd):

print("Message received from IBM IoT Platform: %s" % cmd.data['command'])

m=cmd.data['command']

client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)

client.connect()

while True:

temp=random.randint(-20,125)

hum=random.randint(0,100)

myData={'temperature':temp, 'humidity':hum}

client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0, onPublish=None)

print("Published data Successfully: %s", myData)

client.commandCallback = myCommandCallback

time.sleep(2)

client.disconnect()

**12.2 UI Output Screenshot:**

In the below picture we can observe the web ui and python shell. The python shell get the commands like notice through microphone of web ui and quotations from buttons of web ui and that commands are displayed on python shell whenever both the web ui and python shell connected to ibm Watson.

