R.M.D ENGINEERING COLLEGE

DEPARTMENTOFELECTRONICS ANDCOMMUNICATIONENGINEERING

PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY ANDENTREPRENEURSHIP

HAZARDOUSAREAMONITORINGFORINDUSTRIALPOWERPLANTBYIoT

NALAIYA THIRANPROJECTREPORT2022

Submittedby

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CHAPTER1

1. INTRODUCTION

ProjectOverview

Since technological growth is a continuous process, we must beprepared and aware of any new advances. Because of these technologicaladvancements, daily life has become more convenient. The necessity forautomation has become essential. All systems and data are now accessible overthe internet, and web technology is constantly developing. Using a web-basedembedded system, a network interface provides remote management andcontrolofembeddeddevices.Webcontrolisused tomanageInternetofThings(IoT) devices. The most popular technique of web development in the worlduses a software stack called a web controller. For data monitoring,administration, and handling, distributed network control systems made with webtechnologies are used instead of massive server systems.The industrialmonitoring system connects itself with the open-sourceSMS for admin. IBMIot platform connected to the Node Red for develop the web application .ThenIBM Watson platform connected to the Python software.We have sent therandom values for input as temperature.In software to check the temperaturethatperson, SMS senttoadminusingAPIKEYwhenthetemperaturevaluehigh compared to the threshold temperature value. API KEY also provides bytheIBMWatson.SMSsentbyFast toSMSthatisconnectedtotheNodeRed.Sometimesyouaredevelopedtheappwithhelpof MITappinverter.

Purpose

The parallel-connectedheat can also be included in this SMSsystem.The microcontroller serves as the brain of this SMS system,managing allactivities.

The monitoring system used by the SMS system allows it to locate andidentify the area that is on fire. It is capable of showing the results from everysensor inthemonitoringsystem.

In order to keep the temperature level as well as employees health, andSMSsystemsinsafe,dependable,andeffectiveoperatingcondition,thesystems mustundergoinspection,testing,andmaintenance.

With the use of temperature sensors, each employees health issues thathappensin theindustrycanbedetected.Toprotectpeopleforanyhealthissues . To use a SMS alarm to warn people if an diseases occurs and to use IOT to doso.

CHAPTER2

2. LITERATURESURVEY

TITLE : IoT based temperature and humidity monitoring framework

AUTHOR:RafizahAbRahman,UmmiRaba'ahHashim,SabrinaAhmad.

YEAR :2019

Inordertounderstandtherelationshipandvariationbetweentemperatureandhumiditywithrespecttothevariouslocationsofmeasurements, this study investigated the use of Internet of Things (IoT) inmonitoring the temperature and humidity of a data centre in real-time usinga basic monitoring system. Utilizing the suggested architecture, a system formonitoring temperature and humidity was developed and put into use at thePoliteknikMuadzam Shah data centre. There, readings were recorded andforwarded to an AT&T M2X IoT platform where they were stored. Theinformationwasthendownloadedandanalysed,revealingthatthetemperature and humidity recorded at various places varied significantly. XExtreme temperature and humidity variations were successfully detected bythemonitoringsystem.

TITLE :SmartWeatherMonitoringAndRealTimeAlertSystemUsingIoT

AUTHOR:YashaswiRahut,Rimshaafreen,DivyaKamini

YEAR :2018

The proposed system employsIoT to make its real-timedata freelyaccessible over a very broad range and is an advanced solution for weathermonitoring. The system uses a number of sensors to monitor many aspectsof the weather and climate, including temperature, humidity, wind speed,wetness, light intensity, UV radiation, and even airborne carbon monoxidelevels. The data from these sensors is transmitted to the website, where it isshown as graphical statistics. Anywhere in the world can readily access thedata that has been uploaded to the website. These web pages' data collectioncan also be utilised as a future reference. The concept even includes an appthat sends alerts as a reliable alarm system to inform users of sudden andunexpected.

TITLE :AIRPOLLUTIONMONITPORINGSYSTEMWITHIOT

AUTHOR :VivekanandPrakashRachure,Dr.Vasudev,B.Virulkar

YEAR :2019

- We are developing an IOT-based air pollution monitoring system inwhich we will monitor the air quality via a web page using a WI-Fi moduleand the internet. The system will sound an alarm when the air quality dropsbelow a certain point, i.e., when enough dangerous gases, such as CO2, CO,smoke, CH4, and benzene, are present in the air. It will display the airquality in PPM and in the percentage on the LCD and as well as on thewebpage in PPM so that we can easily monitor it and make a graphicalpresentationonthewebpage.

TITLE:AirandSoundPollutionMonitoringSystemUsingIOTAUTHOR:M s.Aarthi,etal.

YEAR:2018

One of the significant problems today is the rising air and sound pollution.As pollution worsens, more diseases are emerging as a result. Controllingpollution is now necessary in order to ensure healthy living and a brighterfuture. Everyone who is interested in the pollution level can access the Airand Sound Pollution Monitoring gadget. A mobile application that displaysthe pollution level can be used to install the device. This device has theabilitytodetectfiresinthesurroundingareaandreportthemtotheappropriateau thoritiesso thatthey cantaketheappropriateactionandcontainthefireto minimisedamage.Thissystem employsanIOT,orInternetofThings,technique.

TITLE:IoTbasedEnvironmentalMonitoringandControlSystem
AUTHOR:GhulamRubabMirza,Etal

YEAR:2019

Due to climatic changes that increased the importance of environmentalmonitoring, IoT plays a significant role in gathering data from the sensingunitaroundoursurroundings.UsingtheNodeMCU,DHT11sensor,ACS 712 current sensor, Thing Speak (Open IoT analytics service), andBlynkapplication,thispaperdescribesthebuildingofareal-timeenvironmentalmonitoringandcontrolsystem.ThingSpeak'sprimaryresponsibility istocontinuously monitorparameters(suchashumidity,temperature, and power consumption) using real-time sensors. Thing Speakhas an API (applicationprogramming interface)thatcollects sensed dataand allows users to view the monitored data in graphs at intervals of every15 seconds.This technology is also intended to allow users to control homeappliancesfromanywhereintheworld.

TITLE:StudyandDevelopmentofTemperature&HumiditymonitoringsystemthroughWirelessSensorNetwork(WSN)usingZigbeemodule.

AUTHOR:HemalataTomer,KapilMangla.YEAR:201

5.

Giventhattheyarenowfrequently utilisedasthemainmonitoringsystem in a variety of applications, wireless sensor networks have become acrucial component of every developing nation. The risks associated withwiringsystemsareeliminatedby wirelesssensornetworks,whichalsosignificantlysimplifyandreducethecostofdatamonitoringandmeasurement. Wireless networks are best suited for various process plants,industries,andremote&ruralcommunicationduetoitsdecentralisedarchitectureandflexibilityofdeployment.Inthisstudy,wirelesssensor

networkapplicationsaremadeforonlinemeasurementandmonitoringofreactionchambers, furnaces,and otherindustrialmeasurementtargets.

TITLE:WeatherMonitoringStation:AReviewAUTHOR:
Mr.DipakV.Sose,Dr.Ajij,D.Sayyad,

YEAR:2018

Since weather monitoring is crucial to human life, it is important toresearch the weather system.There are now two different types of weathermonitoring stations: wired and wireless. The popularity of wireless systemsnowadays is due to their benefits over wired ones. In weather monitoring,thecharacteristicstypically include temperature,humidity,airpressure,light intensity, rainfall, etc. There are numerous ways that have been usedwith various processors, including PIC, AVR, and ARM. The analogueoutput of the sensors is fetched using an analogue to digital channel. TheGSM, FM channel, Zigbee, RF, and other wireless technologies used inweather monitoringhavetheirownprotocols.

TITLE:IOTBASEDINDUSTRIALMONITORINGSYSTEM

AUTHOR:HemlataYadav,Etal,

YEAR:2022

A new industry called the Internet of Things (IoT) seeks to connect"things,""people,"and"machines"totheinternet.IoT-basedindustrialmonitoring solutions are at the forefront of the global modernization andautomation that is taking place. To ensure that the products are safe andeffective,itiscriticaltoevaluatethestateofthesector.AnIoT-based industrialmonitoringsystemwithintelligentsensorsiswhatthisstudyaims

tobuild.BigdataintegrationallowstheBlynkapptobeutilisedfromanywhere on the earth to check on status. IoT monitoring is now simplerthankstostreamlineddataanalysis.Themanufacturingindustrymightbe nefitfromtheproposedtechnology.Anyindustrialindustrythatincorporatestech nologywill guaranteeworkers'securityandwelfare.

TITLE: Real-timemonitoring system forweatherand airpollutantmeasurement withHTML-basedUIapplication.

AUTHOR:PrismaMegantoro,BrahmantyAjiPramudita,VigneshwaranPandi

YEAR:2021

Inthispost,itisdiscussedhowtocreateanHTMLweb-basedapplicationandanIoTsystemtotrackmeteorologicalvariablesandairborne gas pollution. The following weather variables are measured: winddirection and speed, precipitation, air temperature and humidity, barometricpressure, and UV index. On the other hand, ammonia, hydrogen, methane,ozone, carbon monoxide, and carbon dioxide were all measured. In thisarticle, a method for sending full parameter data is introduced. Each sensor'sreadparameters are all convertedto strings, then all of the strings from allof the sensors are combined into a string dataset, which is periodically sentto the server. The dataset that was obtained from the server is parsed forprocessing on the UI side before being presented. Google Firebase serves asthereal-timedatabaseserver forthissystem.

Existing Problem

Two curation systemsmake up the suggested system.Thefirstiscurationthatisbasedonmachines,andthesecondiscurationthatisbasedonusers.Thesecurativesystemsaresetuptoofferanintelligent anduncontrollablefeedback to theexisting environment.Thelatterrequirestheusertoactivelymanagethereactionthatthehardware provides,whereas the former ismore of apredictivesystemdesignedonhardware.Thecurationdonebythedeviceisreferredtoas"DirectMachineBasedCuration"andisbasedonthesensordataitgetsfrom itsendpoints(sensoryhardwareunits).

Additionally, the gadget and cloud server offer a hybrid machine-based curation service that uses Weather Forecast data along withsensordatafromit.

Reference

1. ZhaoHongzhuang,LiWeidong,ZhouPinggen,etal.Forgeologicaldisaster monitoring and early warning of intelligent multimedia sensornetwork,ScienceandTechnologyConsultingHerald,2012(2):29~30.

2. Lin Liangjun, Fang Cheng, Li Xiaojie, et al. Preliminary analysis of theWenchuanearthquakedisasterareageologicaldisaster,Hydrogeologyand EngineeringGeology,2008,35(4):129~132.

3. WANG Xin, LIU Xiaoying, QI Shi, LAN Jingtao, LIU Dan. Monitoringand Prediction of Landslide and Debris Flow in Japan, Journal of AnhuiAgriSci,2009,37(14):6503-6505.

4. CUIZhongxin.DevelopmentofaFieldAutomaticMeasuringSystemFor Landslide—An Brief Introduction on a Field Automatic MeasuringSystem For Landslides Had Created by Hisashi TSUCHIYA and others,BulletionofSoilandWaterConservation,1994,14(5):1-7.

5. U.S. Geological Survey. Landslide Hazards Program 5-Year Plan 2006-2010,2005.http://landslides.usgs.gov

6. ZHELun.LandslideHazardsProgramoftheU.S.GeologicalSurvey,Resources andlivingenvironment,2009,(17)·42-46.

7. WANG Zhuoni. Enlightenment and progress of the USGS landslideresearchandservice,AdvancesinMeteorologicalScienceandTechnology,2013,3(suppl):62-69.

8. Liu Chuanzheng, Yang Bing. A new thought of surveying, evaluating,monitoringandforecastingforthegeologichazardsinthethreegorgesonchangjiangriver,JournalofEngineeringGeology,2001,9(2)121~126

9. AtzoriL,IeraA,MorabitoG.TheInternetofThings:Asurvey,Computer Networks,2010(15):2787-2805.

10. Domingo MC. An overview of the Internet of Things for people withdisabilities, Journal of Network and Computer Applications, 2012(2): 584-596.

11. KortuemG,KawsarF,FittonDetal.SmartobjectsasbuildingblocksfortheInternetofThings,InternetComputing,IEEE2010(1):44~51.

12. Hong-hui Wang, Xian-guoTuo, Gui-yu Zhang, Feng-ling Peng.Panzhihuaairportlandslide(Oct.3rd2009)andan emergencymonitoring

and warningsystembasedontheinternetofthings, JournalofMountainScience,2013,10(05):873~884.

13. SunEnji,ZhangXingkai,LiZhongxue.The InternetofThings(IoT)and cloud computing (CC) based tailings dam monitoring and prealarmsysteminmines,SafetyScience,2012(4):811~815.

14. Zhu Yonghui, Bai Zhengdong, Guo Jingjun, et al. A new wirelesssystemforgeologicaldisastersmonitoringbasedonBeidou,BulletinofSurveyingandMapping,2010(2):5~7.

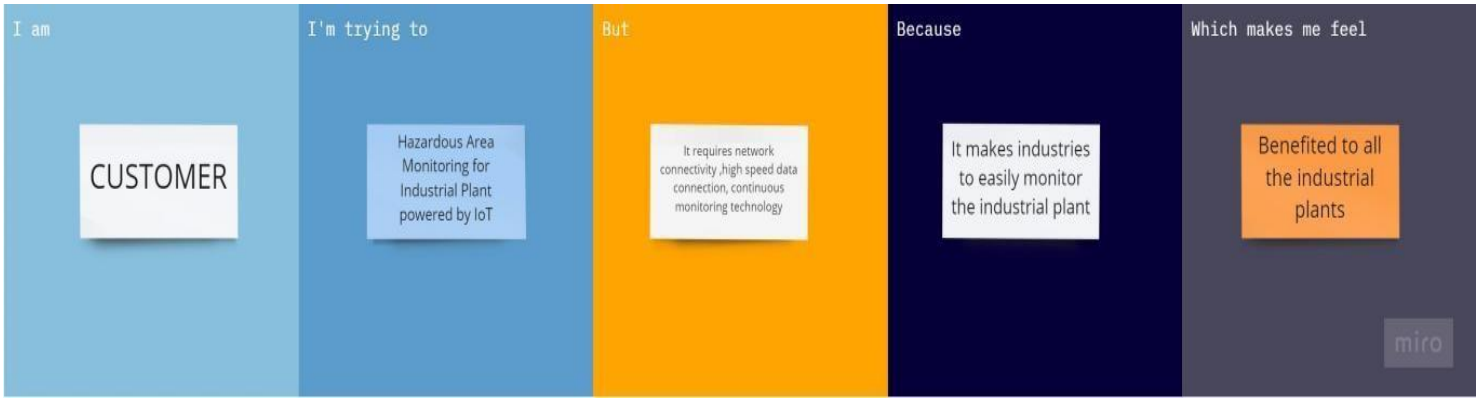
ProblemStatement

Generally in industrial plants there are some areas which are to be monitored time to time. Sometimes the conditions may become critical which may leads to loss of life and property.

Here in industrial plants EXPLOSION and FIRE are the two major constituents of these mishaps. Depending up on the environment these can be termed as ACCIDENTS or NEAR MISSES.

Here FIRE means a rapid oxidation reduction reaction which results in the production of heat and generally visible light

And EXPLOSION is a violent and sudden expansion of gasses produced by rapid combustion then strong forces when shunt in small space and create a loud sound sharp noise and shock waves.



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Problem Statement (PS)	I am	I'm trying to	But	Because,	Which makes me feel
PS-1	Fire accident detector	Detect fire accidents	Small amount of sparkle also leads to become fire accident	They are flammable and act as high source of ignition	It affect materials and endanger to humans if in case of rapid fire accident occurred
PS-2	Fire accident detector	To hire careful/experience employees in industry	Careless mistakes will affect whole industry	They are flammable and act as high source of ignition	If we done a work with careless method, it affect whole industry and their surrondings

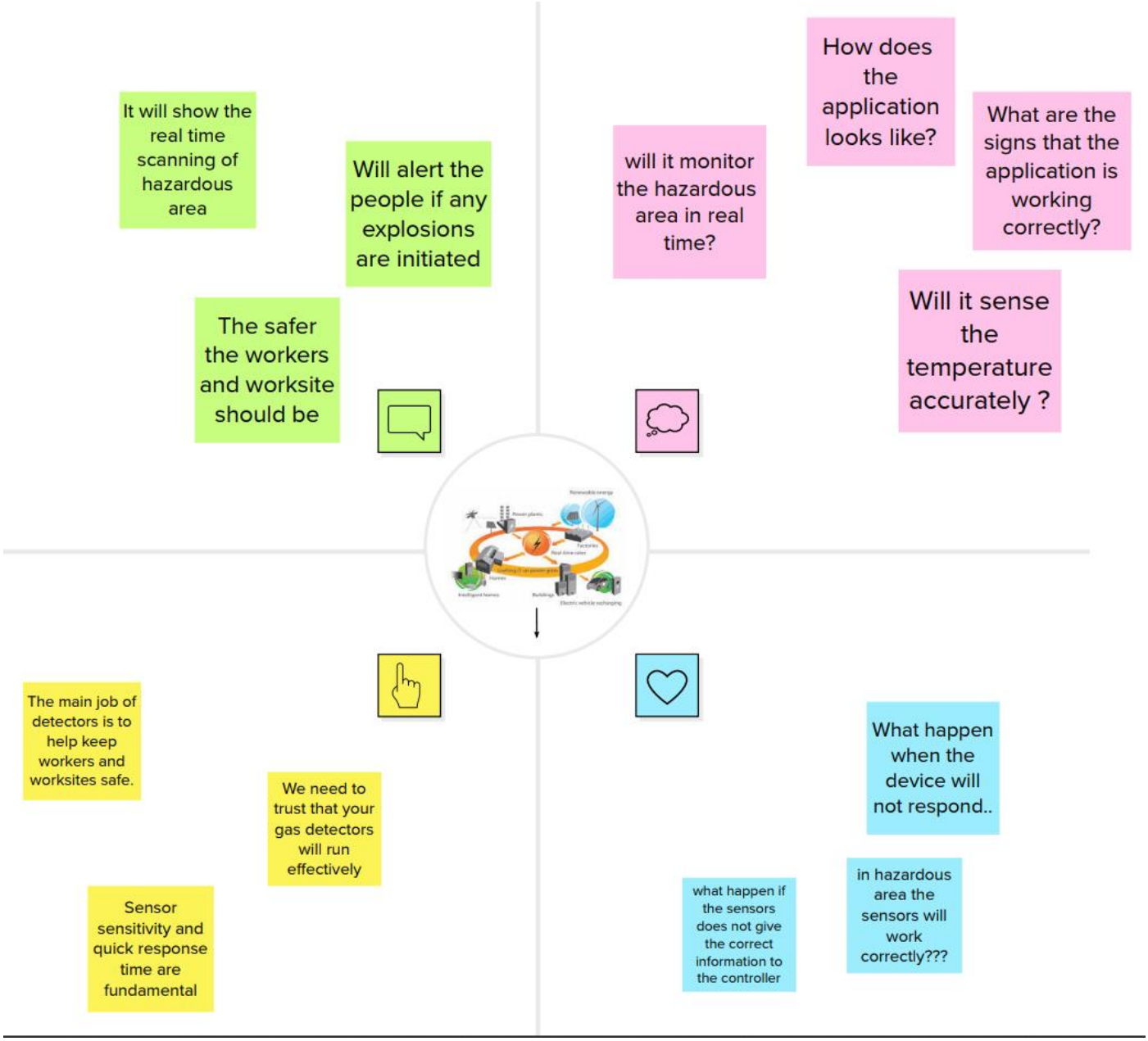
CHAPTER3

3. IDEATION&PROPOSEDSYSTEM

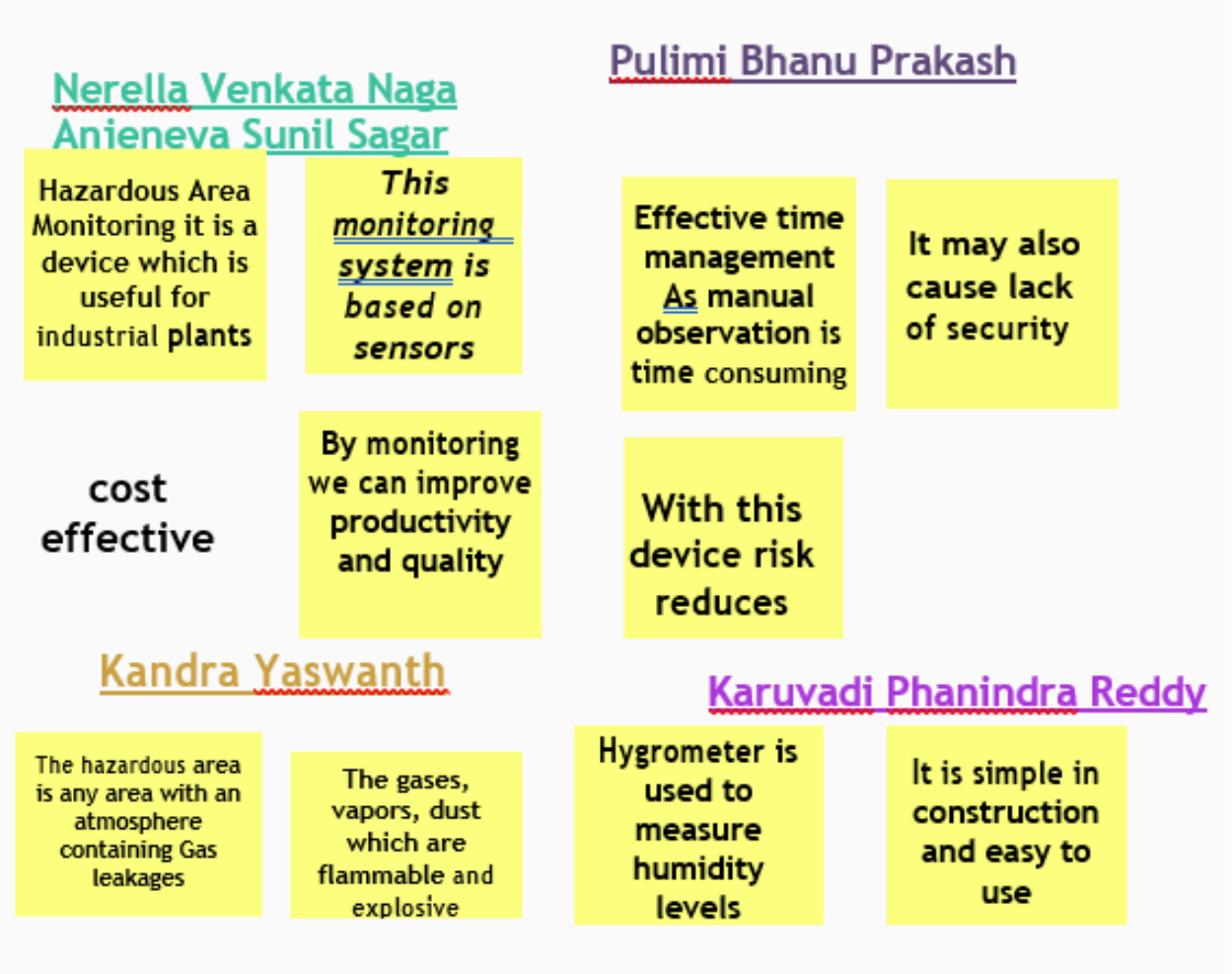
EmpathyMapCanvas

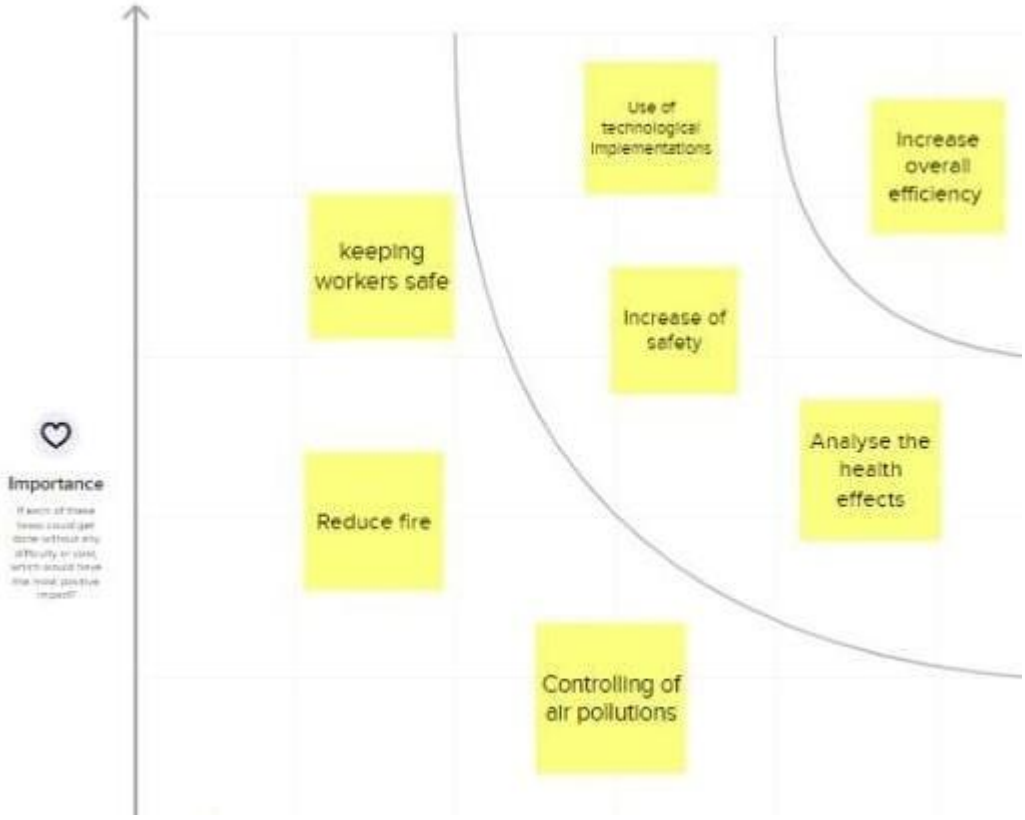
Anempathymapisastraightforward,simple-to-understandpicturethatsummarisesinformationaboutauser'sactionsandviews. It is a helpful tool that enables teams to comprehend their users morefully. It's important to comprehend both the actual issue and the person who isexperiencingitinordertodevelopaworkablesolution.Participantslearnto

thinkaboutsituationsfromtheuser's perspective,includinggoalsandchallenges,throughtheexerciseofcreatingthemap.



Ideation&Brainstorming:




Importance
keeping workers safe
Use of technological implementations
Increase overall efficiency
Increase of safety
Analyse the health effects
Reduce fire
Controlling of air pollutions

ProposedSolution:

1.	Problem Statement (Problem to be solved)	HazardousAreaMonitoringforIndustrialPlantpoweredbyIoT
2.	**S.No.**	**Parameter**
3.	Novelty / Uniqueness	* A hazardous area is any area with an atmosphere containing, or potentially containing, gases, vapor or du flammable or explosive. These areas are rigorously analyzed with condition monitoring when installing eq minimize the risk to individuals and assets. It is crucial that equipment operating in these conditions are ef monitored to pre-empt any issues before they occur. Unlike most industries, these issues not only result in present a significant safety risk. * Condition monitoring is integral in industrial operations to avoid downtime, to implement maintenance a risk of failure. Remote condition monitoring has previously been limited in hazardous areas due to the lack effective and easy to install solutions – and the often-challenging environments in which this equipment ex example, equipment used in subsea applications or on offshore operations cannot be monitored as frequent
4.	Social Impact / Customer Satisfaction	1) To prevent pollution 2) Real-time plant monitoring 3) Reduced risks of disasters 4) Automated detection 5) Excellent customer experience
5.	Business Model (Revenue Model)	Raspberry -Pi 3 Temperature Sensor - DS18B20 Gas Sensor - MQ 5/9 Breadboard Raspbian OS (Running on Rpi-3) Simple push API Thing speak Cloud Platform
6.	Scalability of the Solution	This system can be deployed in many industrial areas like mining, underground factories, metal refineries, welding factories and even heavy parts production lines. It will help to provide a safe and efficient workin in, while also opening new paths to improve the safety parameters of these places.

ProblemSolutionFit:

CHAPTER4

4. REQUIREMENTANALYSIS

FunctionalRequirements:

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Data Gathering	The smart beacon must be able to detect and the temperature of a particular area in real.
FR-2	Location Detection	The smart beacon must be able to detect whenawearabledevicehasenteredanarea nearit.
FR-3	Beacon Data Syncing	The smart beacon must be able to share its stored data with both the wearable device and admin dashboard through the cloud.
FR-4	Wearable Device Display	Thewearabledevicemustbeabletodisplay the temperature of the area where the worker is currentlypresent.
FR-5	SMS Notification	If the temperature of the area is found to reach dangerous levels, the worker should be informed via SMS to their phone instructing them to leave the area.
FR-6	Admin Dashboard	If the temperature of the area is found to reach dangerous levels the admin is informed via the dashboard and must take the necessary precautions.

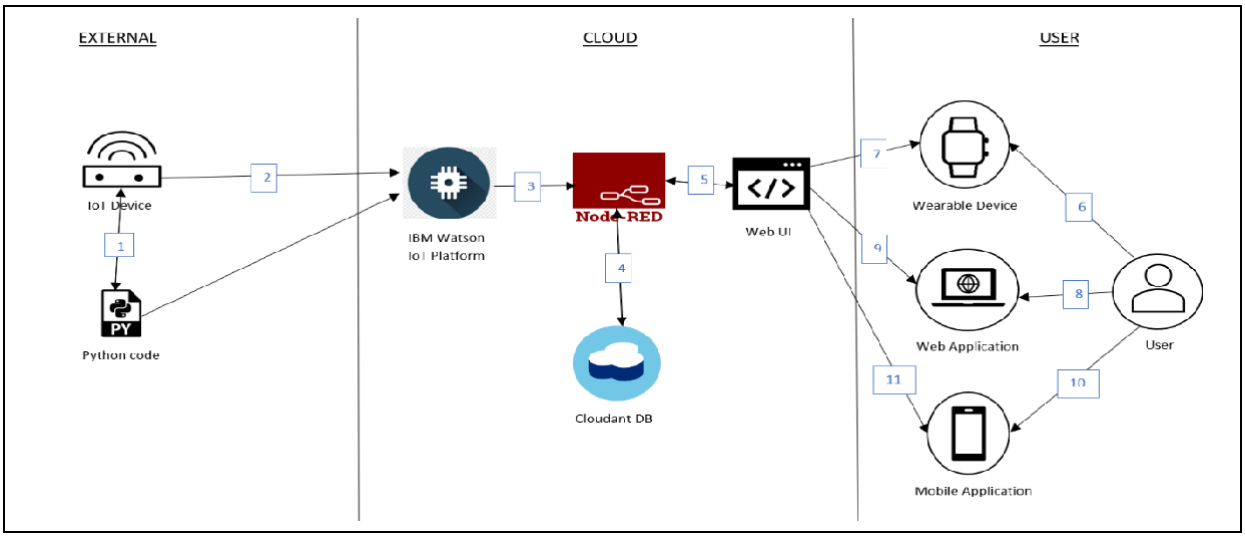
Non-FunctionalRequirements:

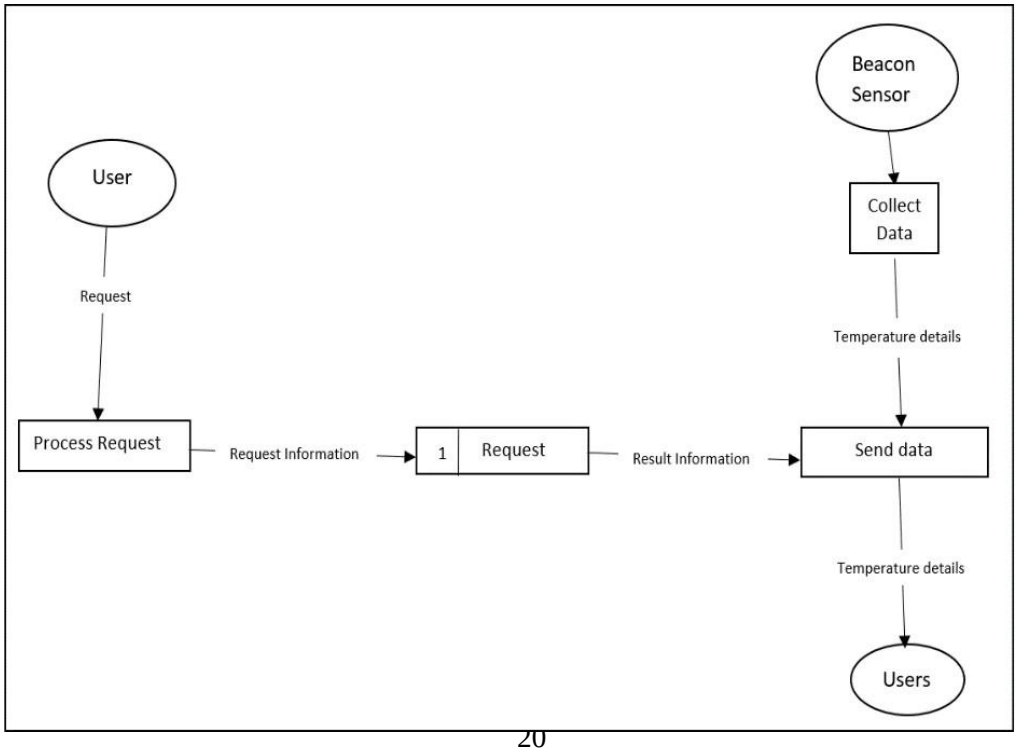
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The wearable device should be slim and not annoy or disturb the workers who are wearing them. They should also reliably display the temperature without large delays and notifications should be clear in cases of detected danger.
NFR-2	**Security**	The connection of the beacons to the cloud and wearable devices should be secure. The security of the database housing all the temperature data should also be bolstered.
NFR-3	**Reliability**	The wearable device should be able to function without any faults even at dangerous temperatures. If a fault is detected it should notify the user and the admin to be immediately repaired and replaced. The beacons should also be regularly maintained to ensure reliability.
NFR-4	**Performance**	The device should update temperature readings in real time and requires high end sensors and processors to do so. The time to send data to the cloud and other devices should also be made as small as possible.
NFR-5	**Availability**	The user should be able to check the temperature of the area no matter where or at what time they are in the plant. The dashboard should be constantly active so as to ensure safety precautions can be executed whenever danger is detected.
NFR-6	**Scalability**	If the area that needs to be monitored needs to be increased all one has to do is install new smart beacon devices and connect them to the same system as the previous beacons. It can also be replicated in different plants with different factors to be monitored giving it highly scalability.

CHAPTER5

DataFlowDiagrams:

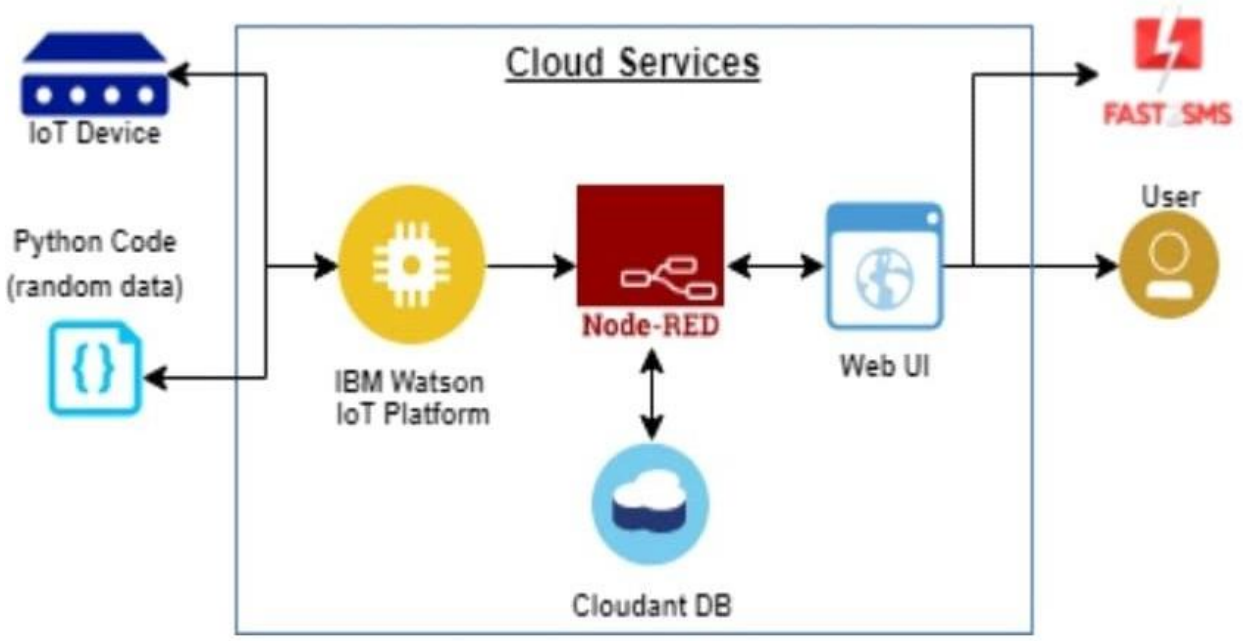
An information flow diagram can depict how data moves throughouta process. This covers data input/output, data storage, and the numerous data-movingsupportingoperations.StandardizedsymbolsandnotationsareusedtogenerateDFDsinordertocharacterizediverseentitiesandtheirrelationships.





Solution&TechnicalArchitecture:

For communication and analysis, IBM Cloud offers visualizations,exploration, dashboard reports, and tales. A view that includes visualizations,suchasagraph,chart,plot,table,map,oranyothertypeofvisualrepresentation ofdata,canbeputtogether.Adashboardprovidescriticalinsights and information about your data on one or more pages or screens,allowingyoutokeeptrackofeventsoractionsataglance.



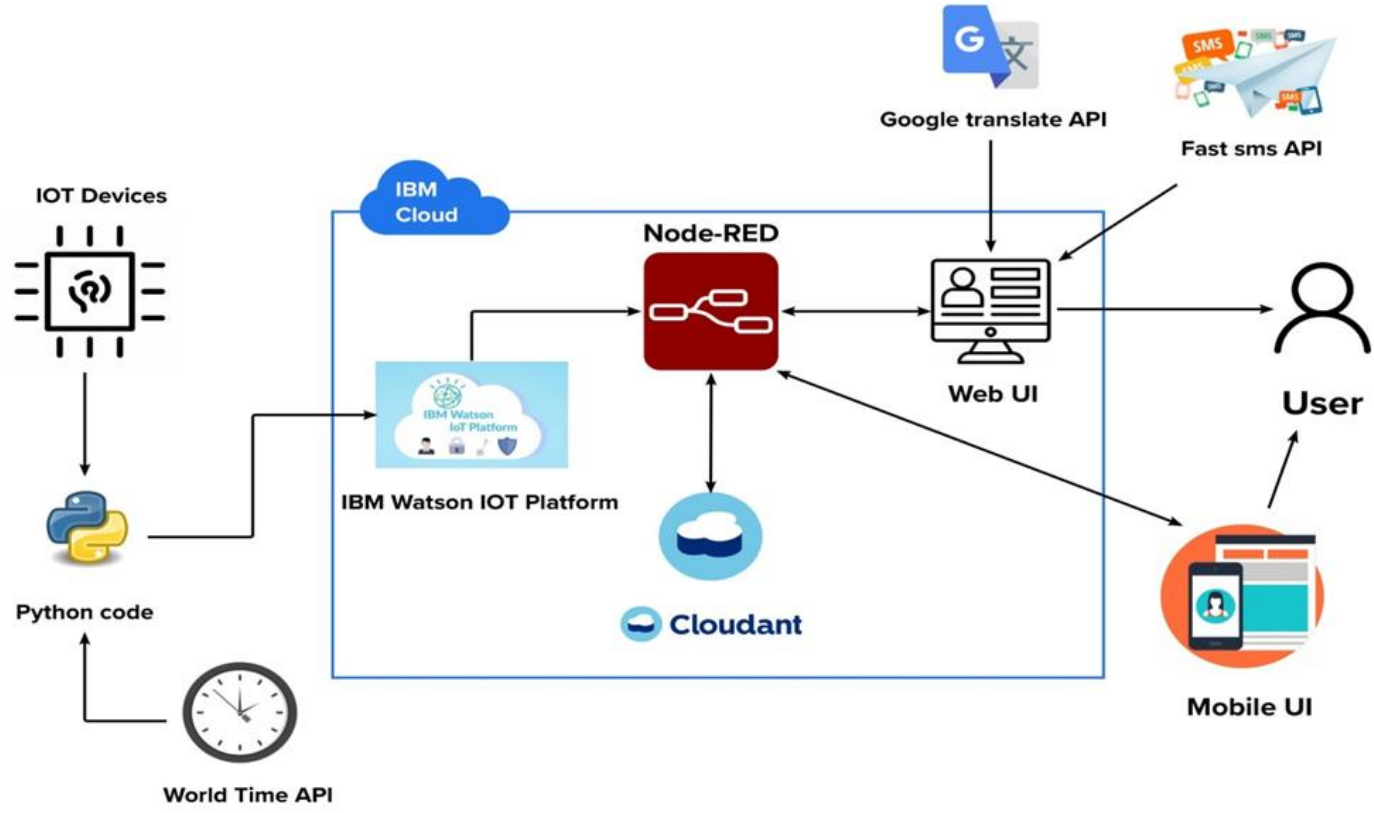
UserStories:

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Technician	Installation	USN-1	The technician must install the smart beacons at points to ensure the entire area of the plant is covered.	A beacon can be found in every area of the plant.	High	Sprint-1
	Data Gathering	USN-2	The beacons obtain the temperature of their respective area using sensors.	The temperature of areas within the plant is obtained.	High	Sprint-1
	Data Sync	USN-3	The beacons send their data to the cloud in the real time which is in turn sent to nearby wearable devices and the administrators dashboard.	Data is sent to the cloud successfully and synced with other devices.	High	Sprint-1
Worker	Wearable device display	USN-4	The wearable devices should display the data sent by beacons within the area.	The user can see the temperature of the area on their device.	High	Sprint-1
	Wearable device adjustments	USN-5	The user can adjust the size of the wearable device to better suit them.	The user can make adjustments to the device to make working with it more comfortable.	Low	Sprint-2
	Wearable display customization	USN-6	The user can adjust the device display to suit their needs on the device itself.	The user can modify the display of the device to increase readability.	Medium	Sprint-2
	SMS Notifications	USN-7	The user is sent a notification to their phone from the wearable device through an API when the area they are in reaches dangerous temperatures.	The user is informed of potential danger via SMS as soon as it is detected by the beacons.	High	Sprint-1
Administrator	Admin Dashboard	USN-8	The beacons send the data through the cloud to a dashboard which is run by the administrator.	The data of all the beacons can be viewed by the administrator of the plant.	High	Sprint-1
	Dashboard Customization	USN-9	The dashboard can be customized by the admin to suit their personal requirements and priorities.	The admin can customize the UI for their dashboard.	Medium	Sprint-2

Customer Jouerney

1 Phases High-level steps your user needs to accomplish from start to finish	User enters an area in the industrial complex	The user checks on the temperature of their current location	The user enters an area which is at a dangerously high temperature	The admins are informed of the current state of the location
2 Steps Detailed actions your user has to perform	Smart beacon devices obtain the temperature of the area they are present in Smart beacon devices broadcast the temperature of that particular area to any nearby devices The wearable devices receive the data sent by the beacons when they enter the area	The device notifies the user that the temperature of the area has been received/updated The temperature is displayed on the wearable device	Check if the temperature of the area has reached a dangerous level Immediately inform the user via SMS using an API	All smart beacons send their data to a central database through the cloud The data is monitored by admin who take necessary precautions
3 Feelings What your user might be thinking and feeling at the moment	Feeling of ease knowing they will be informed in case of any risks	Calmness upon knowing that they are currently in a safe location	Fortunate that they are informed of the danger in a timely manner	Thankful for the information to take the necessary precautions
	Fear of entering a possible dangerous environment	Worry in case the location suddenly becomes unsafe	Panic that they are currently in an unsafe area Fear that there are more unsafe areas	Stress to make the necessary announcements and changes as soon as possible
4 Pain points Problems your user runs into	Users don't have a quick way to know if they are in a safe environment	Users must constantly check the wearable device for signs of changes	Users being informed of the present danger suddenly with no warning	The admin having to make sudden and immediate decisions to ensure a large number of visitors safety
5 Opportunities Potential improvements or enhancements to the experience	Make a sleek wearable device that the user can have at all times	Constantly updating the wearable devices data informing the user of the current situation	Immediate warnings are sent out via SMS through an API to the users mobile device User can also be informed in case changes are happening rapidly	Admins make necessary announcements as all data is seen by them from beacons through the cloud

Technical Architecture and Stack



1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web UI, Mobile App, SMS service and Wearable devices	Node-RED, Fast sms and MIT App inventor
2.	Application Logic-1	Getting input from smart beacons	Embedded C and Python
3.	Application Logic-2	Process data in cloud	IBM Watson IOT platform, Cloudant DB and Node-RED
4.	Application Logic-3	Display data to the user	Web UI, Fast sms and Mobile application
5.	Database	Real time database	Cloudant DB
6.	Cloud Database	Database Service on Cloud	IBM Cloudant
7.	External API-1	To send sms to user	Fast sms API
8.	External API-2	Language for the website is written to be dynamic	Google translate API
9.	External API-3	To access time	World time API
10.	Smart Beacon	To monitor the area and update the stats in the cloud	NodeMCU and Sensors
11.	Infrastructure (Server / Cloud)	Application Deployment on Cloud	IBM Cloud

CHAPTER6

6. PROJECTPLANNING&SCHEDULING

SprintPlanning&Estimation

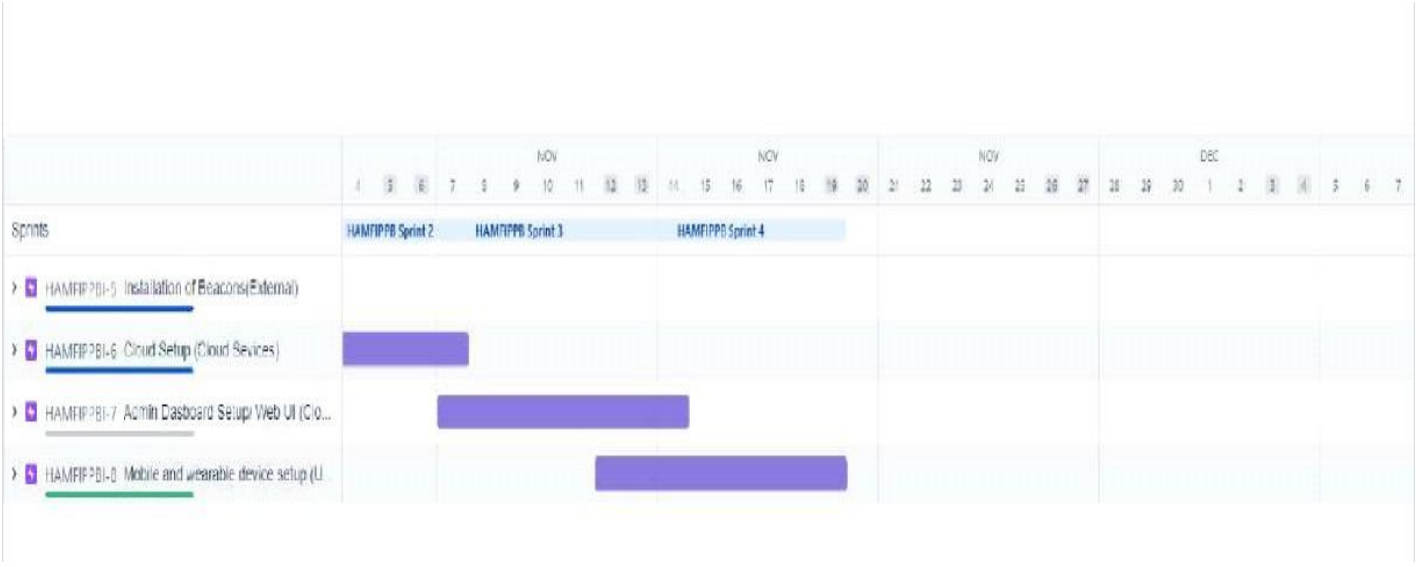
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Installation of Beacons	USN-1	First the Admin will be installing smart beacons at necessary places.	15	High	N.V Sunil Sagar, P Bhanu, K Yaswanth, K Phanindra
Sprint-1	Providing Wearables	USN-1	The Admin will be providing everyone at the Industry a wearable device.	5	Medium	N.V Sunil Sagar, P Bhanu, K Yaswanth, K Phanindra
Sprint-2	Cloud Setup	USN-2	The smart Beacons will connect with the cloud services. Where we can get the realtime data from the wearable	20	High	N.V Sunil Sagar, P Bhanu, K Yaswanth, K Phanindra
Sprint-3	Online Monitoring via Web	USN-3	Websites will be created and connected with the cloud services.	20	High	N.V Sunil Sagar, P Bhanu, K Yaswanth, K Phanindra
Sprint-4	Monitoring via Mobile	USN-4	Mobile Application will be created and fast sms will be used to alert abnormality to the user.	20	High	N.V Sunil Sagar, P Bhanu, K Yaswanth, K Phanindra

SprintDeliverySchedule:

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	10 Days	06 Nov 2022	15 Nov 2022	20	15 Nov 2022
Sprint-2	20	10 Days	16 Nov 2022	25 Nov 2022	20	25 Nov 2022
Sprint-3	20	10 Days	26 Nov 2022	05 Dec 2022	20	05 Dec 2022
Sprint-4	20	10 Days	06 Dec 2022	15 Dec 2022	20	15 Dec 2022

ReportsFromJIIRA:

Jira brings teams together for everything from agile softwaredevelopment and customer service to start-ups and companies. Jira assiststeamsin planning,assigning,tracking,reporting,and managingwork



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CHAPTER7

7. CODING&SOLUTIONING

Feature1:

To share your insights and analysis, IBM Cloud offersdashboards and stories. A view that includes visualizations, such as a graph,chart,plot,table,map,oranyothertypeofvisualrepresentationofdata,can beputtogether.

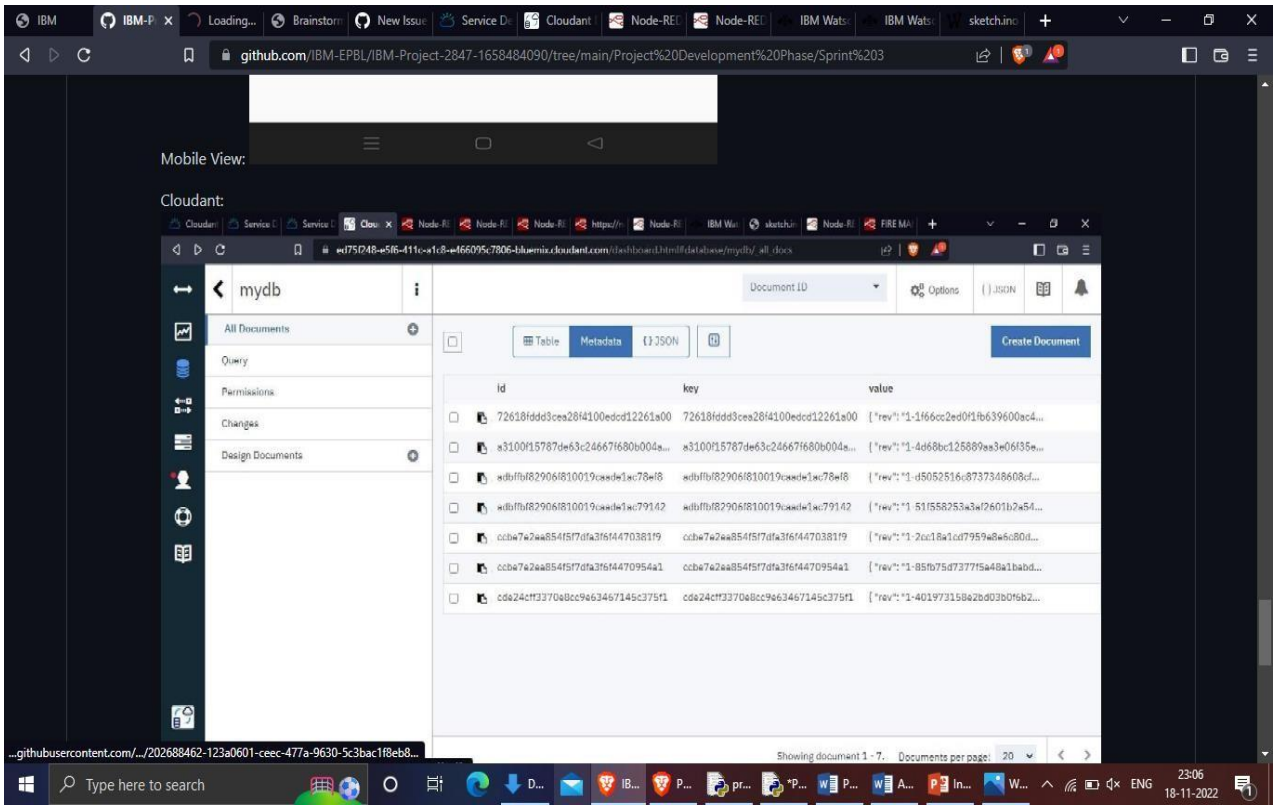
Feature2:

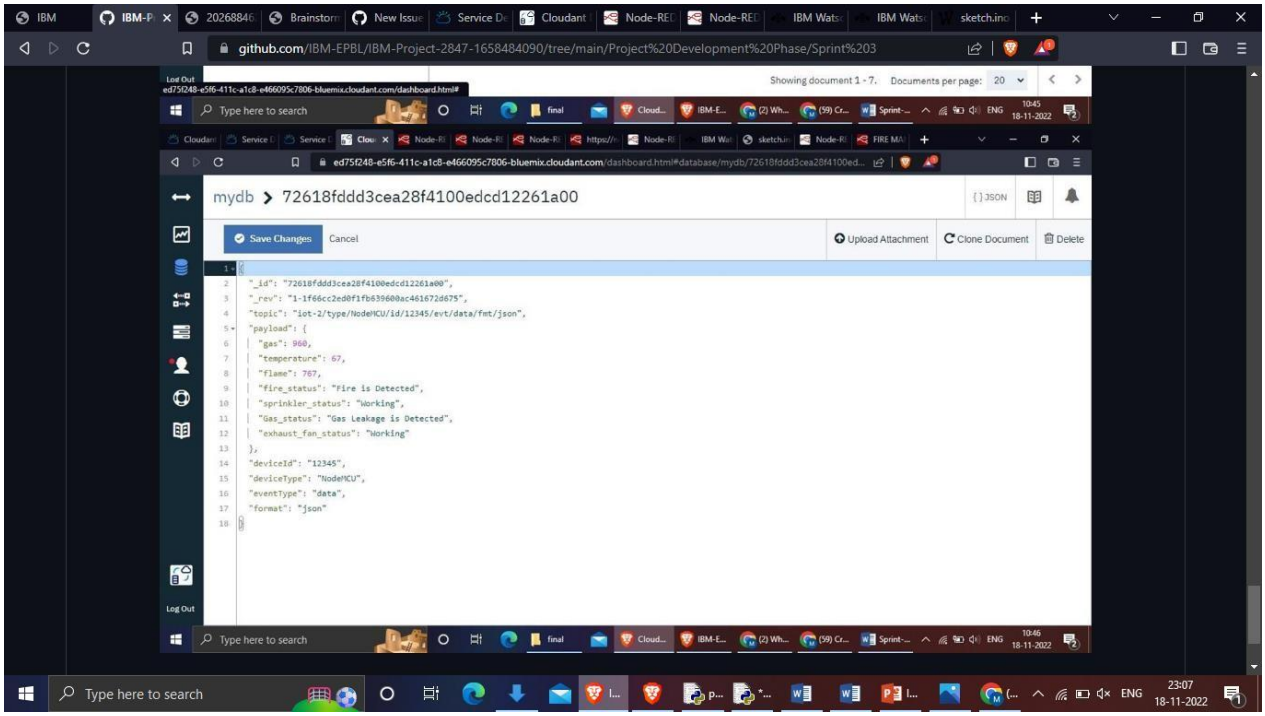
Discover trends and correlations that have an impact on your business by exploring sophisticated visualizations of your data in the IBMcloud. By presenting critical insights and analyses about your data on one ormore pages or screens, a dashboard enables you to keep track of events oractionsimmediately.

Themodulesin ourworkareasfollows:

1. Workingwiththedataset
2. Creating charts for data visualization
3. Building the dashboard

DatabaseSchema:





CHAPTER 8

8. Testing

TestCases:

Testing is done to look for mistakes. Testing is the process oflookingforanyflawsorweaknessesin apieceofwork.Itoffersameansoftesting whether parts, sub-assemblies, assemblies, and/or a finished productperform properly. It is the process of testing software to make sure that itsatisfies user expectations and meets requirements without failing in anunacceptable way. Different test types exist. Every test type responds to acertaintestingrequirement.

UserAcceptanceTesting:

Acceptance by users Any project's testing phase is crucial and necessitates the end user's active involvement. Additionally, it makes sure thesystem satisfies the functional specifications. At this step, all test cases areexecutedtomakesurethesoftwareisaccurateandcomplete.

Before the customer will accept the programme, the test must besuccessfully done. After customer personnel have verified that the preliminaryproduction statistics load is accurate and that the test suite has been completedflawlessly,thecustomerformallyacceptsthedeliveryofthissystem.

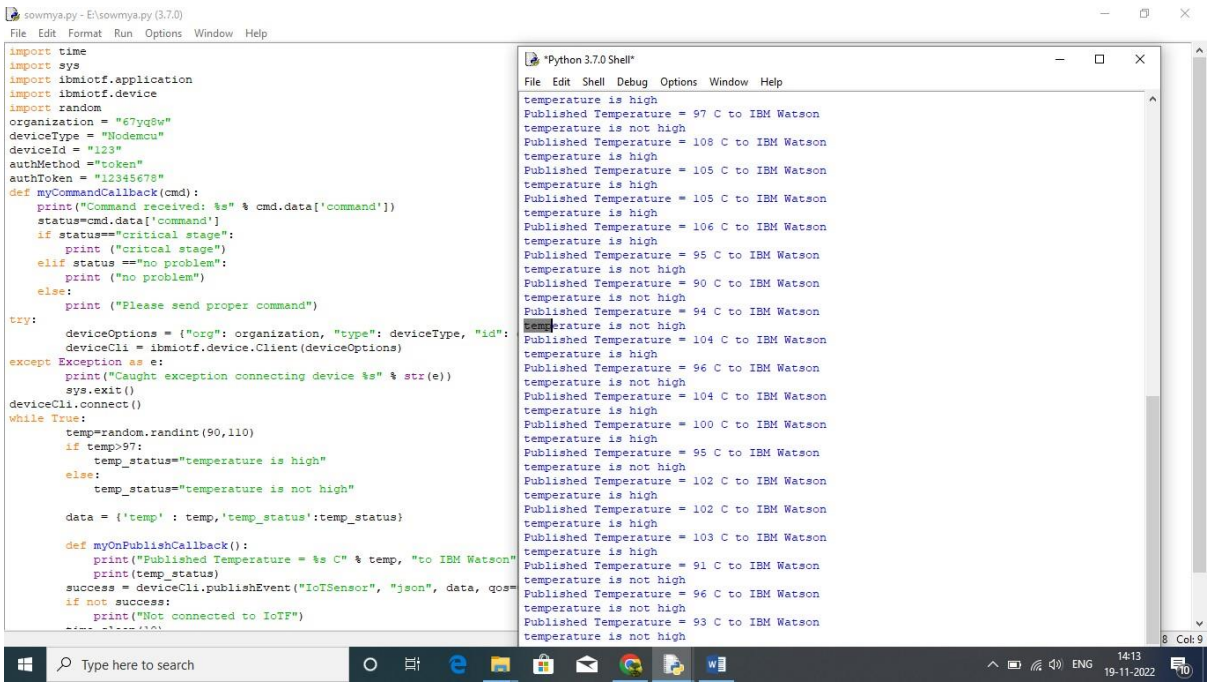
CHAPTER9

9. RESULTS

Performance Metrics:

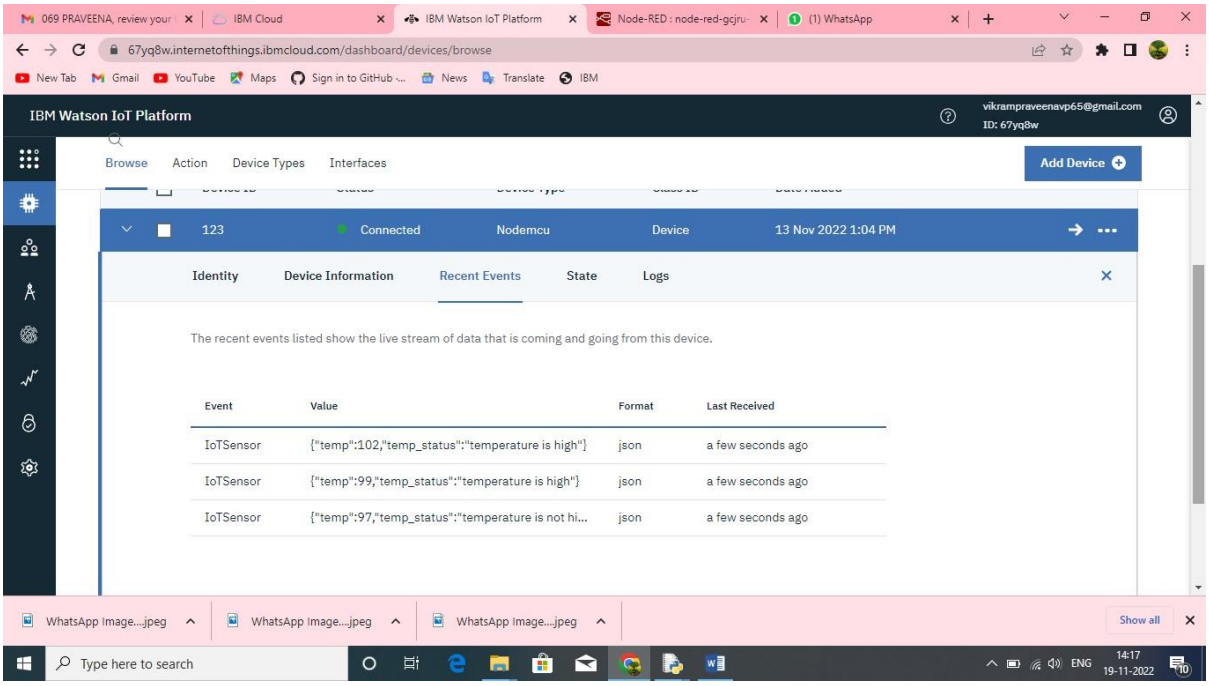
Python Code:

To create and execute the python program for the purpose of identify, detect and prevent the workers and their surrounding against fire accident. It send the detection of information to IBM Watson Cloud.



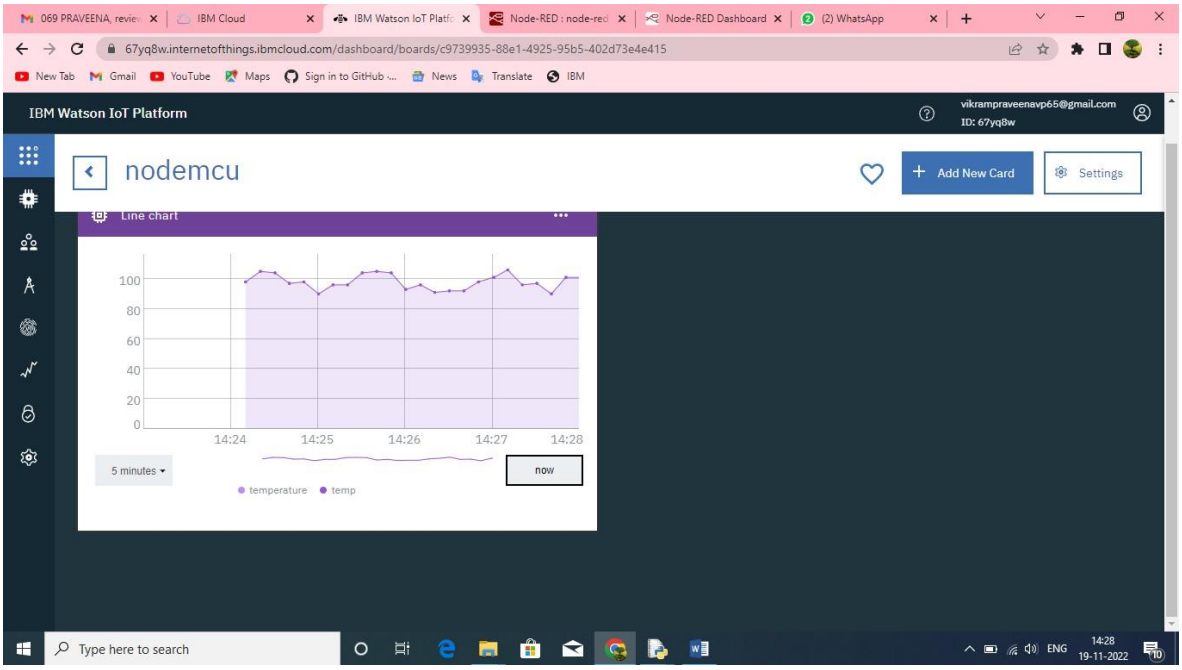
IBM Watson Output:

It is interconnect with Python code and transfer the detection of leakage output for preventing the industry and surroundings.



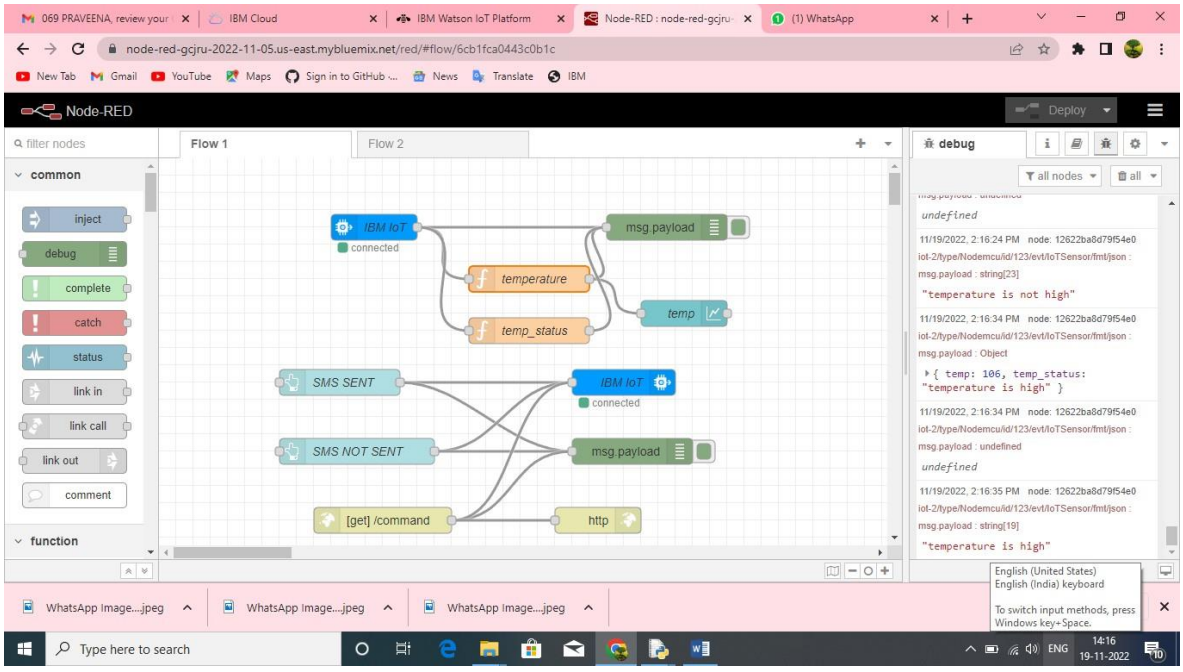
IBM Watson Dashboard:

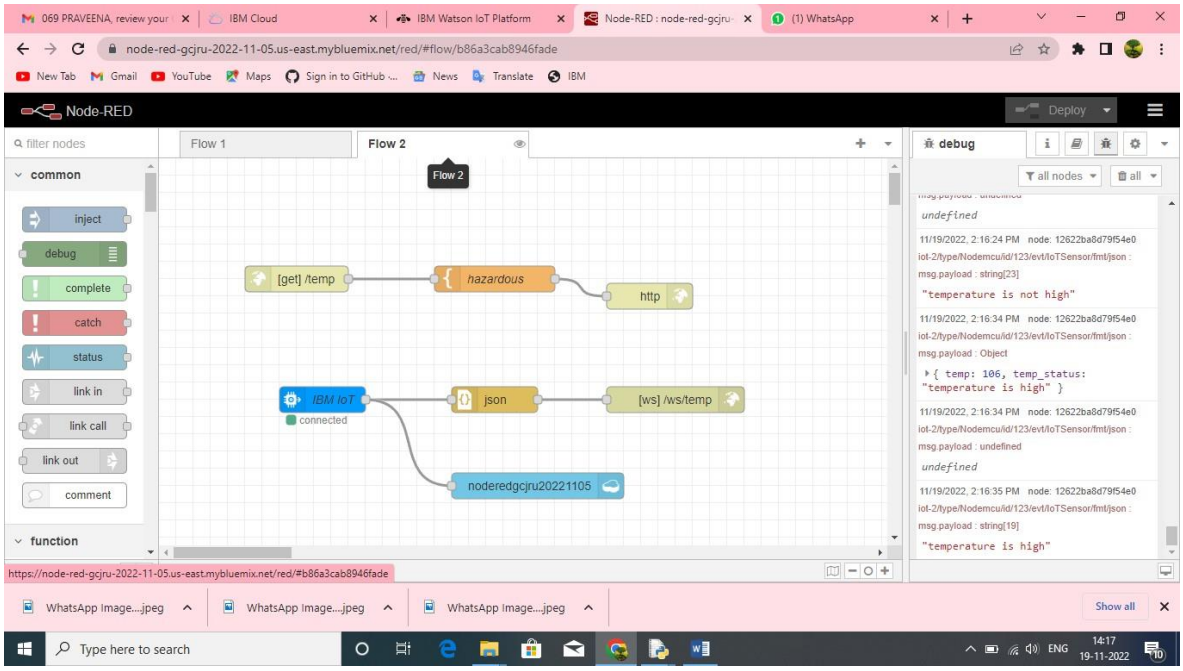
It is used to express the output in various form like flow chart, linechart, piechartetc..



Node-Red:

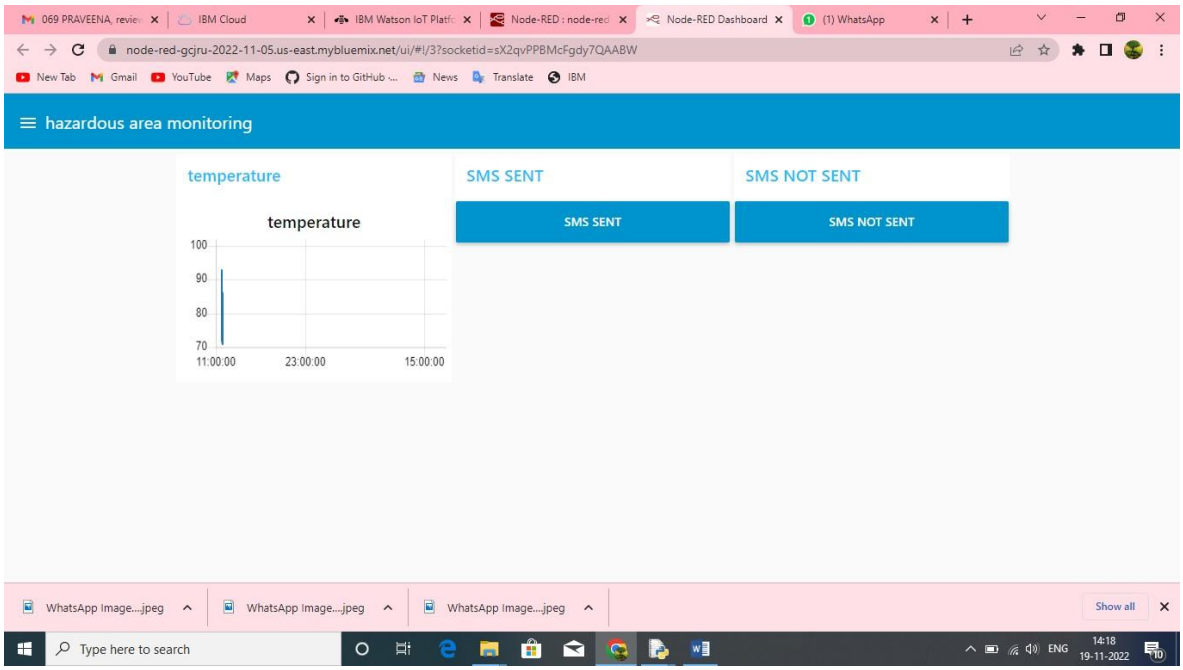
It interconnect with IBM Watson and used to create functionality by wiring together flows of data between nodes using a browser





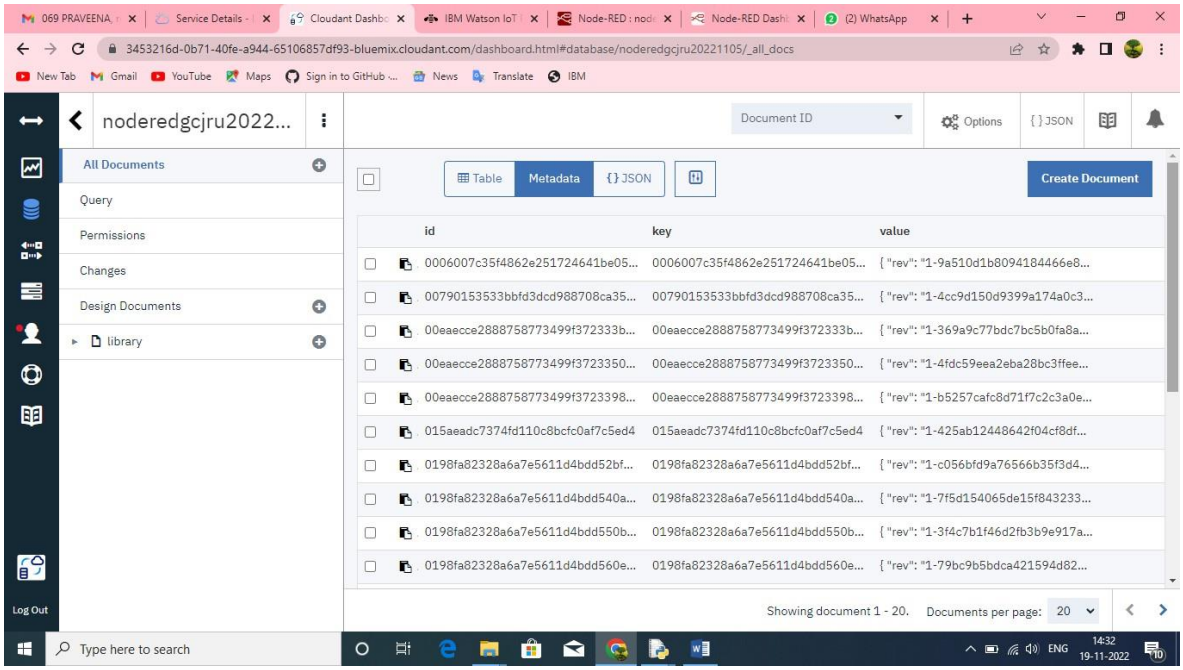
Node-RedDashboard:

Itis a module that provides a set of nodes in Node-RED to quicklycreate a live data dashboard. For example, it provides nodes to quickly create auser interfacewithbuttons,sliders,charts,gauges,etc.

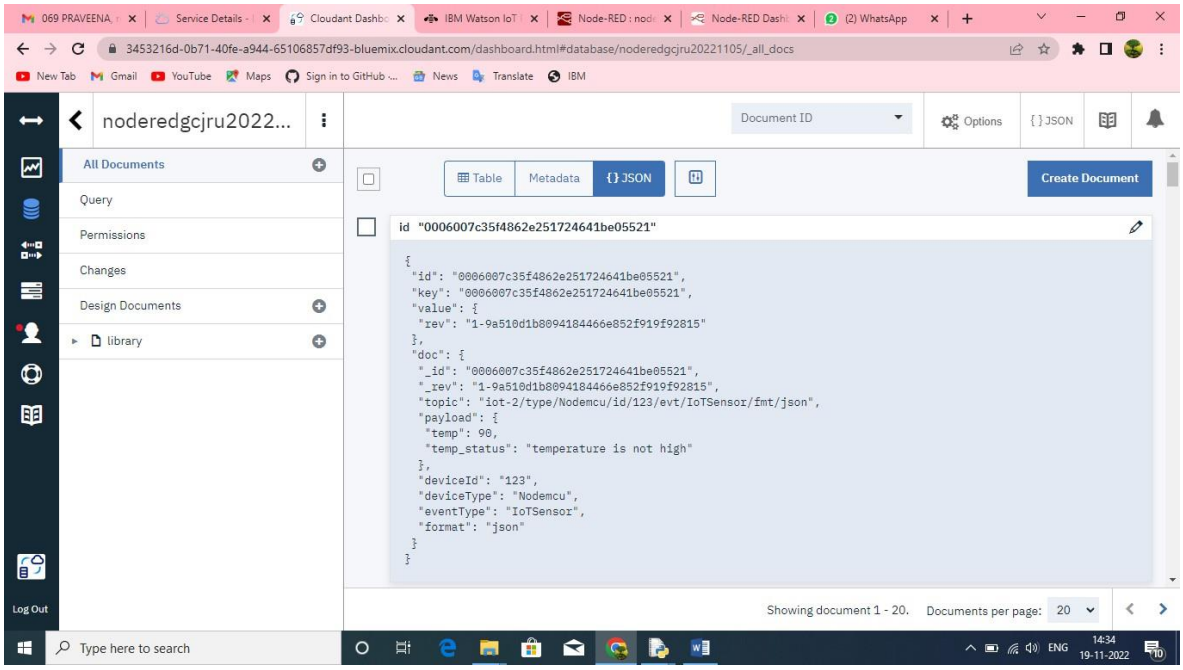


Cloudant:

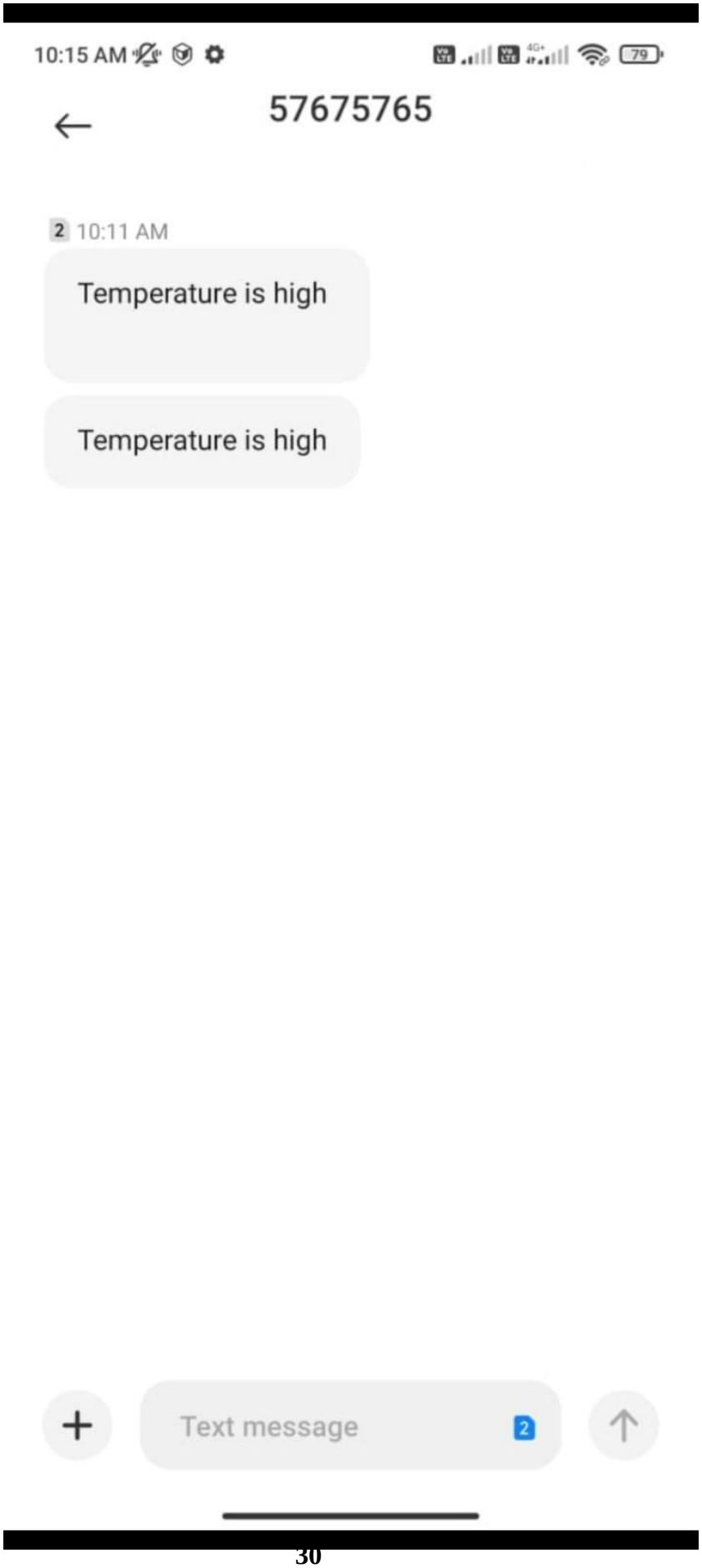
It hand less of software and hardware provisioning, management and scaling, and support.



Cloudant Dashboard:



SMS Output


10:15 AM
57675765
2 10:11 AM
Temperature is high
Temperature is high
Text message

CHAPTER 10

10.ADVANTAGES & DIS-ADVANTAGES

Advantages:

- Whencomparedtohydroelectricproducingstations,thermalpowerplantsar eless expensivetobuildinitially.
- Comparedtothehydroelectricpowerstation,ittakesuplessspace.
- Compared togas, thecostofthefuelislower.
- TPS iscapableofproducingalargequantityofelectricity.
- Compared todieselpowerplants, thecostofgeneratingislower.

Dis-Advantages:

- Incomparisontohydropowerstations,thermalpowerplantshavehigher operatingcosts.
- Duetothesubstantialsmokeand fumegeneration,itpollutestheatmosphere.
- Cost ofmaintenanceishigher.
- The power station needs to be built and maintained by skilled individuals.
- Storage of coal and ash requires more land.

11. CONCLUSION

The IoT-based study can be improved even more by giving industrypersonnel advanced functions via an Android app to enhance industry controland monitoring. To protect workers and goods in the event of a fire orpoisonous gas leak, smoke and tem sensors can also be connected to thesystem. Data can be used, among other things, to reduce industrial risks inwell-known factories, monitor power plant production, ensure safety in fast-pacedindustries,andevaluatenuclearsafetylevels.Iftheinformationisgiven swiftly, time can be saved. The need for real-time monitoring systems based onphysical models is necessary for accurate damage and defectidentification.Through this project, we intend to obtain practical experiencewith the "Internet of Things" and "Embedded System" technologies that arenow popular. In a number of industries, IoT-enabled industrial monitoringsolutions are becoming more and more common because they raise safetystandards by offering real-time monitoring of crucial characteristics astemperature, humidity, and smoke, as well as frequently informing authoritiesandstaff.Thedeploymentcouldboostindustryyieldsin additiontobeingdonefor safety concerns. The Internet of Things (IoT) is utilized in our project togather data and facilitate online communication. Our goal is to save lives andproperty from accidents and risks that industry frequently ignores byimplementingour initiativeinindustriesacrossIndia.

12. FUTURESCOPE

In our current concept, we solely use the GSM Technology to detect gases, temperatures, and people. Therefore, we might broaden the application of this idea in another method to centralize data collection. We can utilize the IR courting at theentry gate, which is tracked by the camera and will continuously record photos of the people entering the risky areas, for that purpose. Currently, only a few gases can be detected by gas sensors; however, in the future, we can expand to more types ofgases.

CHAPTER13

13.APPENDIX

SourceCode:

```
importtime
importsys
importibmiotf.application
import
ibmiotf.deviceimportrand
omorganization =
"67yq8w"deviceType =
"Nodemcu"deviceId=
"123"authMethod="token
"authToken="12345678"
defmyCommandCallback(cmd):
   print("Commandreceived:%s"%cmd.data['command'])status=cmd.data['com
```

```
    mand']
    if status=="critical
        stage":print("critcalsta
        ge")
    elifstatus=="noproblem":p
        rint("noproblem")
    else:
        print("Pleasesendpropercommand")
try:
        deviceOptions={"org":organization,"type":deviceType,"id":deviceId,
"auth-method": authMethod, "auth-token"
        :authToken}deviceCli=ibmiotf.device.Client(devi
        ceOptions)
exceptExceptionase:
        print("Caughtexceptionconnectingdevice%s"%str(e))sys.exit()
deviceCli.connect()
whileTrue:
        temp=random.randint(90,110)
        data={'temp':temp,'temp_status':temp_status}

        if
            temp>97:temp_status="temperatu
            reishigh"
        else:
            temp_status="temperature is not
        high"defmyOnPublishCallback():
            print("PublishedTemperature=%sC"%temp,"toIBMWatson")print(temp
            _status)
        success=deviceCli.publishEvent("IoTSensor","json",data,qos=0,on_publis
```

```
h=myOnPublishCallback)
        ifnotsuccess:
            print("NotconnectedtoIoTF")ti
        me.sleep(10)
deviceClid.commandCallback=myCommandCallback
deviceCli.disconnect()
```

GitHub&ProjectDemoLink:

GitHub:
https://github.com/IBM-EPBL/IBM-Project-27018-1660043817

Project DemoLink:

PNT2022TMID14999 Hazardous area monitoring for power plants

https://drive.google.com/file/d/1jQRfPKR9SkJkh1cVszvYQJF3sZRTf6La/view?usp=share_link