INDUSTRY SPECIFIC INTELLIGENT FIRE MANAGEMENT SYSTEM.

IBM PROJECT REPORT

TEAM ID : PNT2022TMID40213

SUBMITTED BY,

TEAM LEAD : S.LAVANYA (512719106010)

TEAM MEMBER 1 : G.BOOMIKA (512719106003)

TEAM MEMBER 2: T.POOJASRI (512719106014)

TEAM MEMBER 3: P.SRIMATHI (512719106016)

PROJECT REPORT.

TEAM ID: PNT2022TMID40213
PROJECT NAME: INDUSTRY SPECIFIC INTELLIGENT FIRE MANAGEMENT SYSTEM.
TEAM MEMBERS: S.LAVANYA(TEAM LEAD), G. BOOMIKA , T.POOJASRI, P.SRIMATHI.

INTRODUCTION:

PROJECT OVERVIEW:

The smart fire management system includes a gas sensor, flame sensor and temperature sensors to detect any changes in the environment. Based on the temperature readings and if any gases are present the exhaust fans are powered ON . If any flame is detected the sprinklers will be switched ON automatically . Emergency alerts are notified to the authorities and fire station .

PURPOSE:

The primary purpose of fire alarm system is to provide an early warning of fire so that people can be evacuated & immediate action can be taken to stop or eliminate of the fire effect as

soon as possible. Alarm can be triggered by using detectors or by manual call point (Remotely). To alert/evacuate the occupants siren are used. With the Intelligent Building of the rapid development of technology applications, commercial fire alarm market demand growth, the key is to use the bus system intelligent distributed computer system fire alarm system, although installation in the system much easier than in the past , but still cannot meet the modern needs, the installation costs of equipment costs about 33% ~ 70. The suggested technique in Fire alarm system used the addressable detectors units besides using the wireless connection between the detector in zones as a slave units and the main control unit as the master unit. The system shall include a control panel, alarm initiating devices, notification appliances, and the accessory equipment necessary for a complete functioning fire alarm system. In the wireless fire alarm, individual units are powered by primary & secondary batteries for the communication. [Hussam Elbehiery. Developed Intelligent Fire alarm system.

LITERATURE SURVEY:

A literature review is **a survey of scholarly sources (such as books, journal articles, and theses) related to a specific topic or research question**. It is often written as part of a thesis, dissertation, or research paper, in order to situate your work in relation to existing knowledge.

We collected the relevant information on our Web Phishing Detection project and we existed the solutions. We all gathered together and referred the following points through research publications.

Paper 1: Published year:2022 Author name:D Teja,M.Surajkhan,k Jyothi Journal name: International journal of engineering applied science and technology

Paper 2:Fire Detection, Monitoring and Alerting System based on IOT Published year: 2019 Author name :Shreya Gosrani, Abhishek Jadhav, Krutika Lekhak D Chheda

Paper 3:IoT Based Automatic Fire Alarm System Published year:2020 Author name:A.Jeevanandham,SivamuruganP Journal name: Bulletin of scientific research

Paper4:Fire detection and alarm system Publication year:2019 Author name:Trung Luong Journal name:HAMK Journal of Electrical and Automation Engineering

Paper5:Fire Detection and Intimation System Publication year:2010/2011 Author name:Wambura Makongo Journal name:DAR ES SALAAM INSTITUTE OF TECHNOLOGY

Paper6:Fire detection System based on ZigBee Wi-Fi Networks Publication year:2018 Author name:Mr.C.Santhana Krishnan,Akhilesh Galla,Naveen Arlapalli Journal name:International Journal of pure and Applied mathematics

Paper 7: IoT Based Automatic Fire Alarm System Publication: 2020 Author name:A.T. Jeevanandham, P. Sivamurgan Journal name: Vel Tech Rangarajan Dr Sagunthala R&D Institute of Science and Technology

Paper8:IoT based forest fire detection system Publication year: March - 2018 Author name:M. Trinath Basu1, Ragipati Karthik, J. Mahitha, V. Lokesh Reddy. Journal name:International Journal of Engineering & Technology

PROBLEM STATEMENT

Problem-solution essays consider the problems of a particular situation, and give solutions to those problems. They are in some ways similar to cause and effect essays, especially in terms of structure (see below). Problem-solution essays are actually a sub-type of another type of essay, which has the following four components:

- Situation
- Problem
- Solution
- Evaluation

By this problem statement we found some problems faced by the people like customers, students, merchant and weaver etc

Example are as follows:

*I’m a Merchant I’m trying to sell my goods and products in online,but customers hesitate to buy because the website is prone to fraudulent activity.

*I’m a customer I’m trying to buy products through online platform but it asking me to fill the bank details because payment is done through online.It makes me to feel reluctance.

IDEATION AND PROPOSED SOLUTION:

EMPATHY MAP: **EMPATHY MAPPING**

Empathy maps provide a glance into who a user is as a whole andare **not chronological** or sequential.

The ***Says*** quadrant contains what the user says out loud in an interview or some other usability study. Ideally, it contains verbatim and direct quotes from research.

The ***Thinks*** quadrant captures what the user is thinking throughout the experience. what occupies the user’s thoughts? What matters to the user? It is possible to have the same content in both *Says* and *Thinks.*

The ***Does*** quadrant encloses the actions the user takes. From the research, what does the user physically do? How does the user go about doing it.

The ***Feels*** quadrant is the user's emotional state, often represented as an adjective plus a short sentence for context. Ask yourself: what worries the user? What does the user get excited about? How does the user feel about the experience?

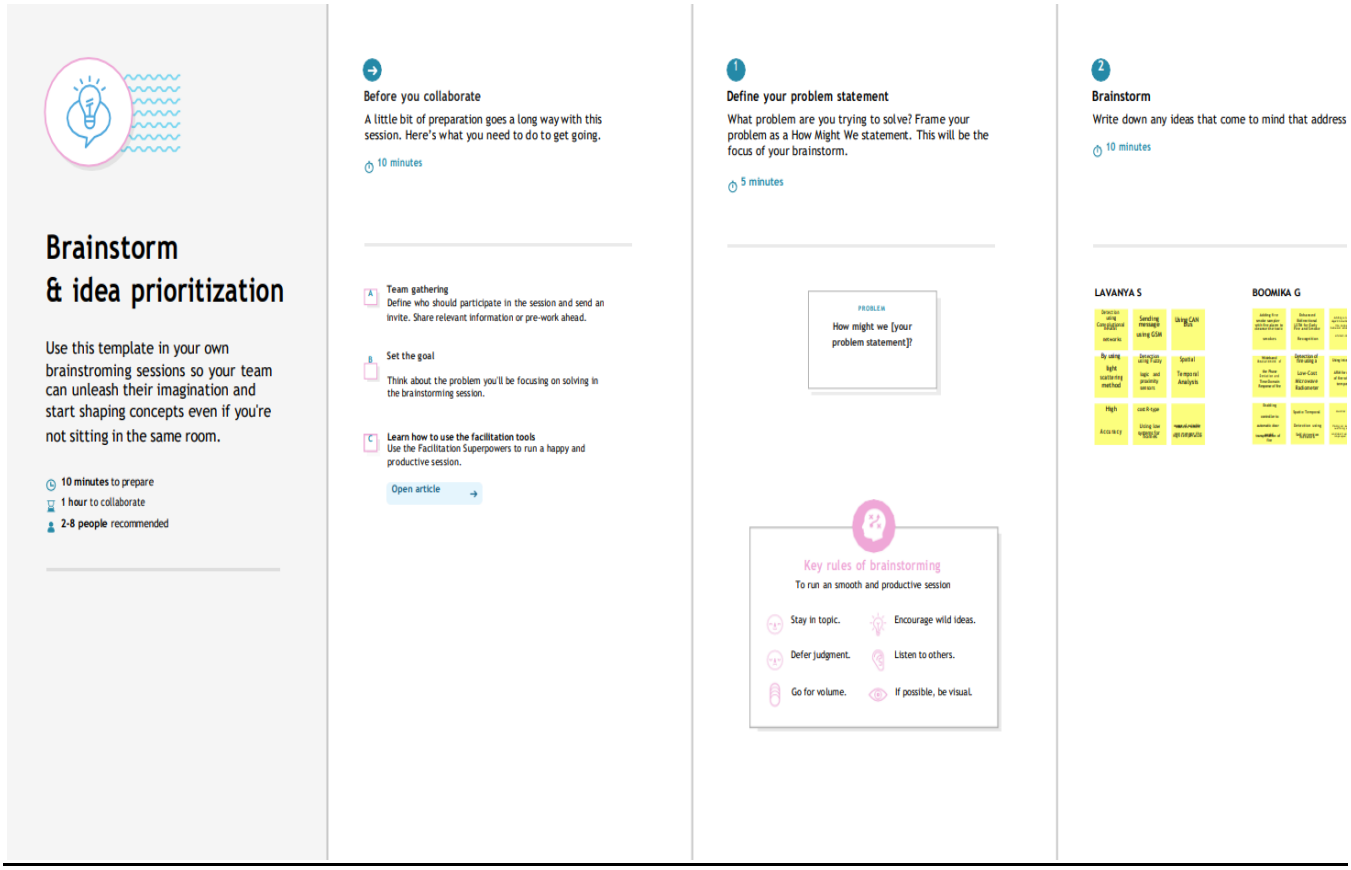
The empathy mapping is done using Mural platform.

EMPATHY MAP CANVAS:

BRAIN STROMING:

Brainstorming is partdesignthinking. You use it in the ideation phase. It’s extremely popular for design teams because they can expand in all directions.

Brainstorming is a method design teams use to generate ideas to solve clearly defined design problems.



2 Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

TIP
You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

LAVANYA S

- Detection using Convolutional neural networks
- Sending message using GSM
- Using CAN Bus
- By using light scattering method
- Detection using Fuzzy logic and proximity sensors
- Spatial Temporal Analysis
- High Accuracy
- cost R-type Using low systems for homes

BOOMIKA G

- Detection of fire using a Low-Cost Microwave Radiometer
- Spatio-Temporal Detection using

POOJASRI T

- It detect the fire and spray suitable fire retardant
- Visual flame detectors
- Alert occupants and avoid smoke inhalation
- Use realtime artificial intelligence
- Laser based solution
- Addressable, Conventional and Wireless
- alarm detect Intelligent fire the false alarms
- release of To reduce the greenhouse gases
- diagnostics- Remote Cost efficient approach

SRIMATHI P

- The important factor is the fire alarm system
- Cost effective for larger application
- Faster identification of fire location
- Improve response time for emergency responders
- Cost is not suitable for smaller application
- Life safety system

3 Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

20 minutes

- CAN bus
- Low cost Microwave radiometer
- Visual flame detector
- Self diagnosis sytem
- Spraying fire retardant
- Convolution neural network
- Intelligent ARM system
- Faster response time

3 Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

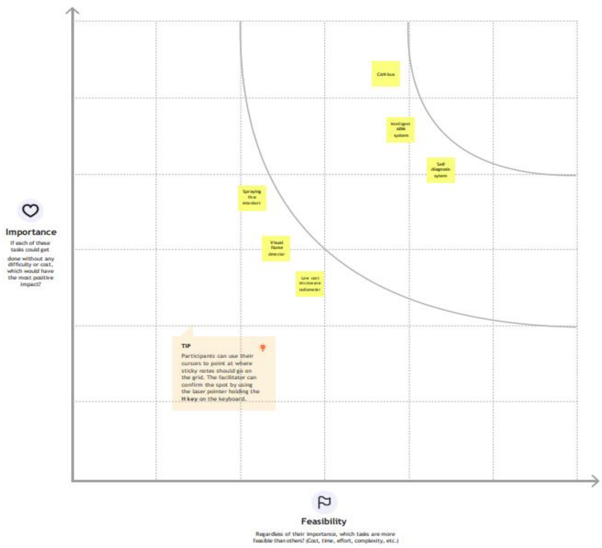
20 minutes

TIP
Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.

4 Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes



After you collabora
You can export the m
members of your cor

Quick add-ons

Share the mural
Share a view link t
them in the loop at

Export the mural
Export a copy of th
emails, include in s

Keep moving forw

Strategy
Define the
strategy.
Open th

Customer
Understan
obstacles
Open th

Strengths
Identify st
and threa
Open th

Share template feec

PROPOSED SOLUTION :

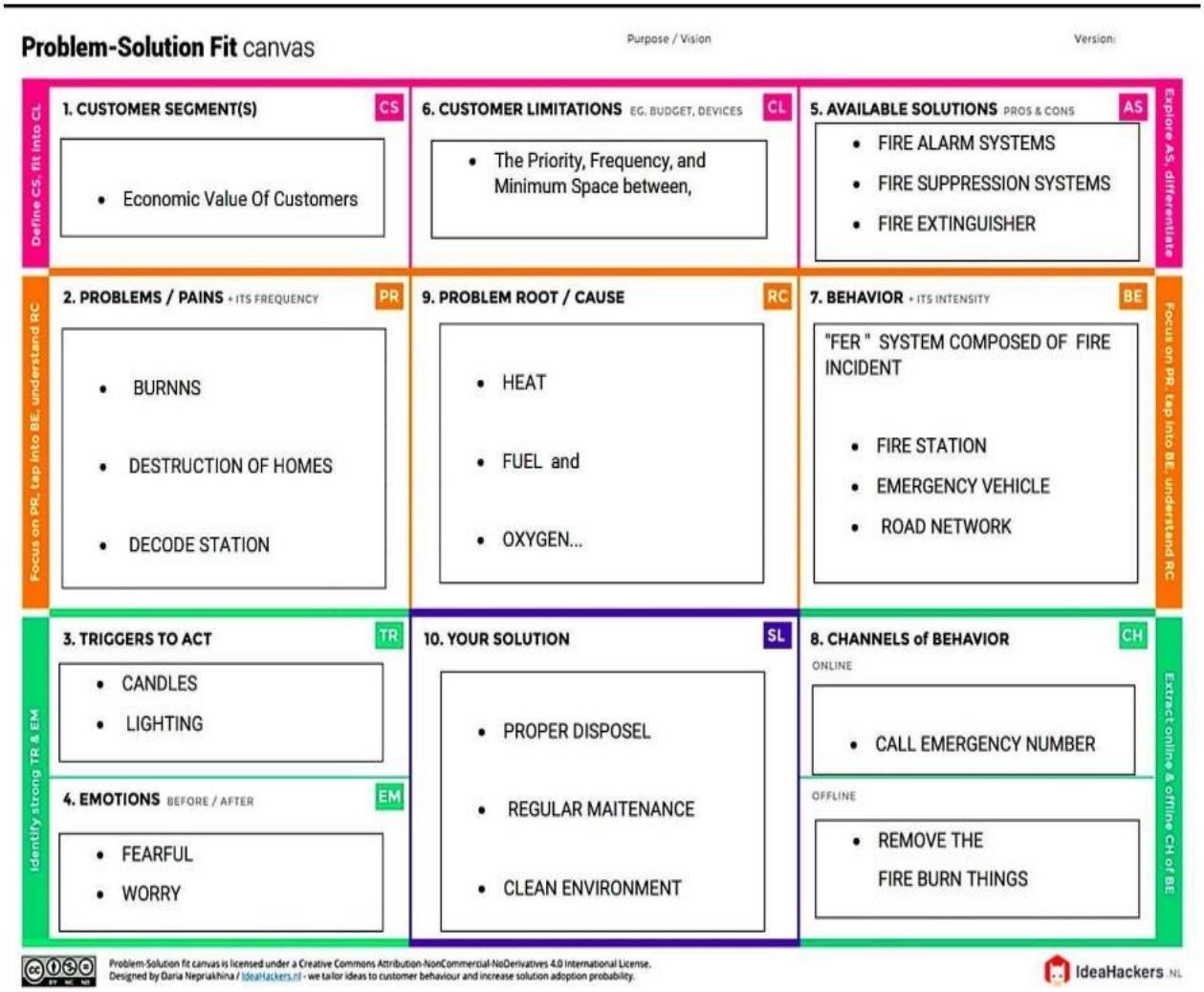
Your proposed solution should **relate the current situation to a desired result and describe the benefits that will accrue when the desired result is achieved**. So, begin your proposed solution by briefly describing this desired result.

S.No.	Parameter	Description
1.	Problem Statement(Problem to be solved)	Fire risk assessment is the process in which probability of an undesired event and consequences of it are evaluated in a safety perspective .Fire safety systems are usually well designed and properly installed and regular maintanence is important.
2.	Idea/Solution description	To avoid the impact of fire.We as a team proposing a solution as fire management system. After installationof a system. The customer will safe from fire,if fire is exist. By the alarm ,sprinklers and the alert messages end to the user by the fast sms or email.
3.	Novelty/Uniqueness	Effective fired detection system eliminates damage by ensuring that a fire can be prevented before it even starts .A fire detector may also have a direct connection to an alarm monitoring center. Fire alarm speciality equipment such as sampling systems , flame detectors and smoke detectors.
4.	Social Impact/ Customer Satisfaction	They help warn and keep customer safe and reduce the amount of destruction to a building.

5.	Business Model(Revenue Model)	The fire management business model underpins a risk management model. The model is used to calculate the probability of ignition and spread of fires across a landscape. This outcome allows for better understanding.
6.	ScalabilityoftheSolution	Fire detection systems increase response times, as they are able to alert the correct people in order to extinguish the fire.This reduces the amount of damage to the property.Fire detection systems can be connected to sprinklers that will automatically respond when a fire is detected.

PROBLEM_SOLUTION_FIT:

This occurs when you have evidence that customers care about certain jobs, pains, and gains. At this stage you've proved the existence of a problem and have designed a value proposition that addresses your customers' jobs, pains and gains.



REQUIREMENT ANALYSIS:

FUNCTIONAL REQUIREMENTS:

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	**User Requirements**	Workers and Product Protection Automatic Sprinkler System Monitors Smoke ,Gas and Temperature
FR-2	**User Registration**	Manual Registration Registration through webpage Registration through Form Registration through Gmail
FR-3	**User Confirmation**	Confirmation via Phone Confirmation via Email Confirmation via OTP
FR-4	**Payment Options**	Cash on Delivery Net Banking/UPI Credit/Debit/ATM Card
FR-5	**Product Delivery and Installation**	Door Step delivery Take away Free Installation and 1 year Warranty
FR-6	**Product Feedback**	Through Webpage Through Phone calls Through Google forms

NON FUNCTIONAL REQUIREMENTS:

Non-functional Requirements:

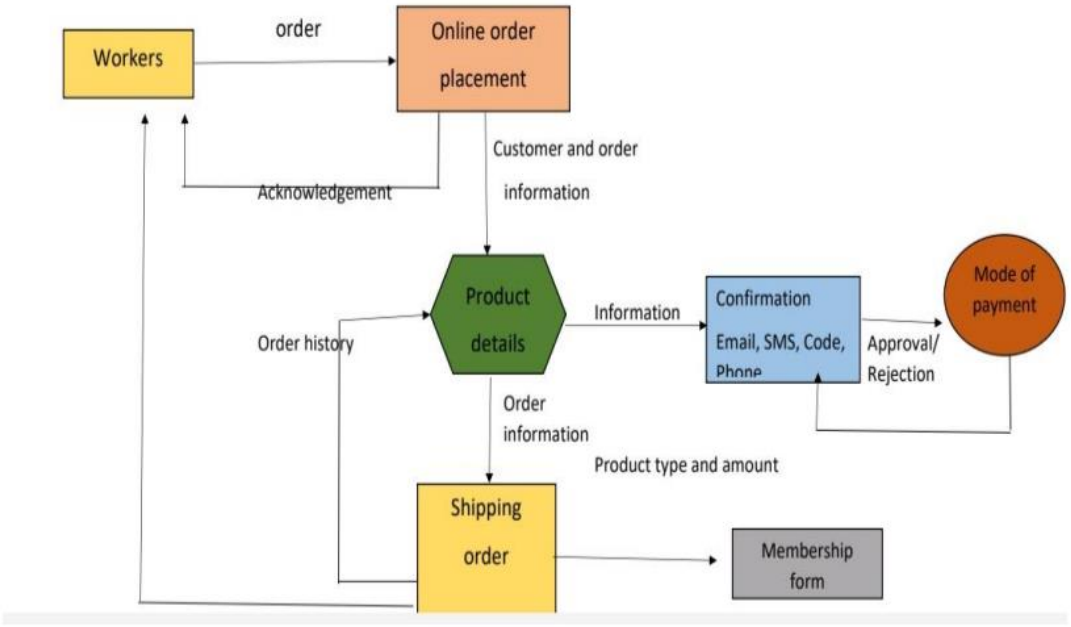
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Have a clear and self-explanatory manual. Easier to use. Easily accessible by everyone.
NFR-2	**Security**	Are inspected monthly by the Fire Alarm Technician. Inspected and tagged by a contractor annually.
NFR-3	**Reliability**	Hardware requires a regular checking and service ..Software may be updated periodically. Immediate alert is provided in case of any system failure.
NFR-4	**Performance**	The equipment must have a good user interface It should have a minimal energy requirement It has to save lives of people and things
NFR-5	**Availability**	All the features will be available when the user requires. It depends on the need of the user and the customization of the user has done.
NFR-6	**Scalability**	The product has to cover all the space of industry irrespective of the size or area.

PROJECT DESIGN :

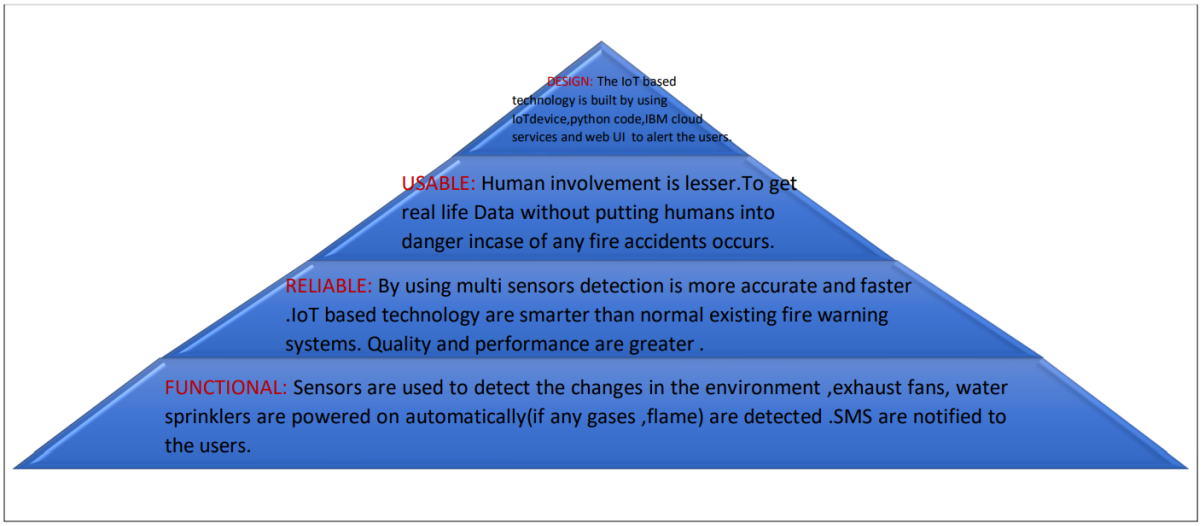
DATA FLOW DIAGRAMS:

A data-flow diagram is a way of representing a flow of data through a process or a system. The DFD also provides information about the outputs and inputs of each entity and the process itself. A data-flow diagram has no control flow — there are no decision rules and no loops.

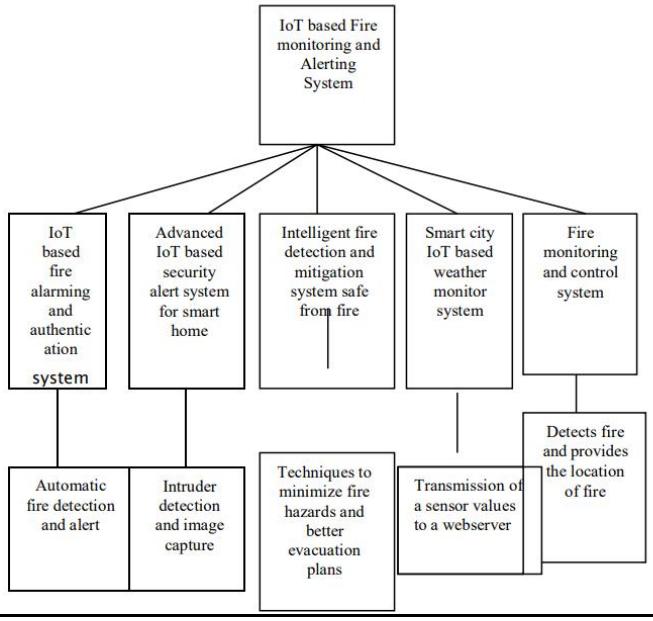


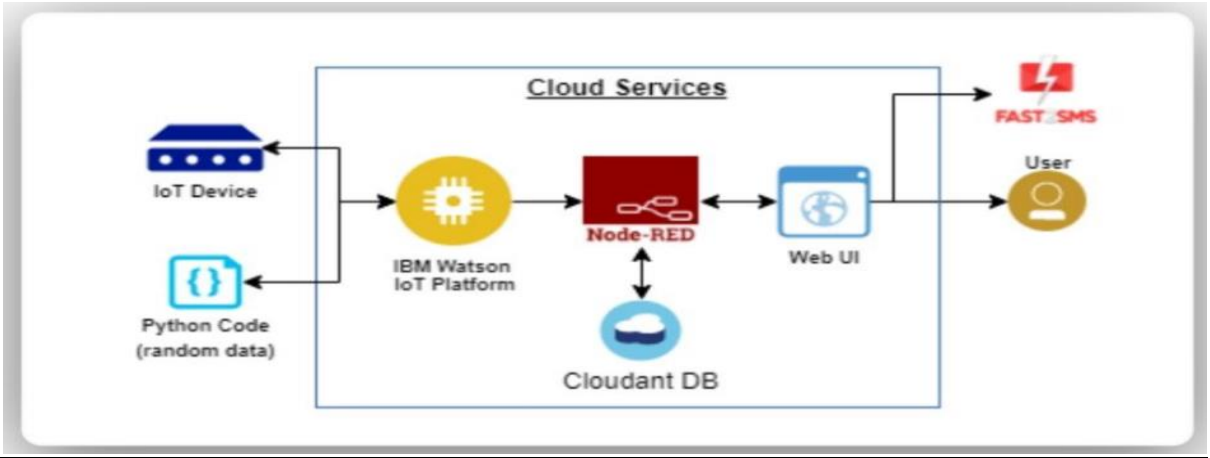
SOLUTION &TECHNICAL ARCHITECTURE

Solution architecture, term used in information technology with various definitions such as; "A description of a discrete and focused business operation or activity and how IS/IT supports that operation"



Architecture and Data flow of the IOT Based Industry – specific Fire Management System





USER STORIES:

USER STORIES

A user story is a short, simple description of a feature told from the perspective of the person who desires the new capability, usually a user or customer of the system.

User Type	Functional requirement (Epic)	User Story number	User Story/Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	User can enter into the web application	I can access my account /dashboard	High	Sprint 1
		USN-2	User can register their credentials like email id and password	I can receive confirmation email &click confirm	High	Sprint 1
	Login	USN-3	User can log into the application y entering email and password	I can login to my account	High	Sprint 1
	Dashboard	USN-4	User can View the temperature	I can view the data given by the device	High	Sprint 2
		USN-5	User can view the level of sensor monitoring value	I can view the data given by the device	High	Sprint 2
Customer (Web user)	Usage	USN-1	User can view the web page and get the information	I can view the data given by the device	High	Sprint 3
customer	Working	USN-1	User act according to the alert given by the device	I can get the data work according to it	High	Sprint 3
		USN-2	User turns ON the water motors/Buzzer/Sound Alarm when occur the disturbance on field	I can get the data work according to it		Sprint 4

Customer care Executive	Action	USN-1	User solve the problem when some faces any usage issues	I Can solve the issues when some one fails to understandin g the procedure	High	Sprint 4
Administrati on	Administrat ion	USN-1	Use store every information	I Can store the gained information	High	Sprint 4

PROJECT PLANNING AND SCHEDULING :

CODING AND SOLUTIONING :

FEATURES :

Fire safety is among the various areas that can realize the extraordinary benefits of the Internet of Things (IoT) as it has led to much of the world becoming smarter and more connected. With IoT, safety alerts can be sent to hundreds of people fast and effectively. Several leading fire safety companies have already launched IoT-enabled fire detectors. In a central alarm system, all detectors are connected to a central controller and send the signal directly to this controller.The controller actively monitors multiple locations and when it receives alarm input from the detection devices, it activates notification devices such as horns, strobe lights, and speakers to alert the occupants. Now, more and more connected and smart features are also coming to central alarm and evacuation systems. Mass notification systems now include a paging component to relay live audio instructions throughout the building in case of an emergency. Most mass notifications nowadays also include support for various types of emergency messages such as inclement weather emergency, security alerts, amber alerts, etc. Advanced features in mass notification systems include the capability to communicate alerts via SMS, text, email, pop-up, app message and push notification to targeted recipients, thus helping create quick and effective awareness.

TESTING:

USER ACCEPTANCE TESTING:

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [ProductName] project at the time of the release to User Acceptance Testing (UAT).
It is a phase of software development in which the software is tested in the "real world" by the intended audience or business representative.

2. Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved. The Defect analysis dashboard provides an overview of product defects and inspection rates. The dashboard is made up of a number of reports that analyse defects by event code, location, and production batch.

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	14	8	4	2	28
Duplicate	2	1	4	0	7
External	3	2	1	1	7
Fixed	6	6	2	12	26
Not Reproduced	0	0	2	0	2
Skipped	0	0	5	2	7
Won't Fix	0	5	3	1	9
Totals	32	33	29	43	86

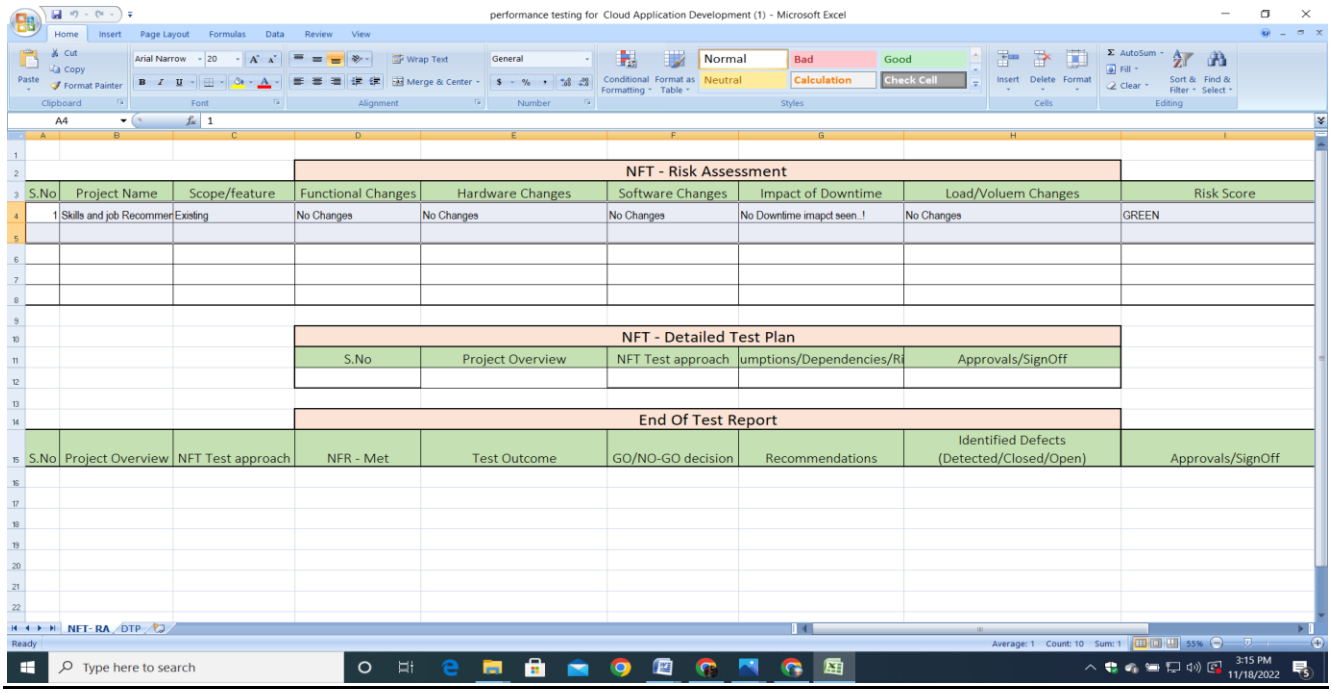
3. Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	6	0	0	6
Client Application	49	0	0	49
Security	3	0	0	3
Outsource Shipping	4	0	0	4
Exception Reporting	7	0	0	7
Final Report Output	5	0	0	5
Version Control	3	0	0	3

RESULTS

PERFORMANCE TESTING:



performance testing for Cloud Application Development (1) - Microsoft Excel

NFT - Risk Assessment

S.No	Project Name	Scope/feature	Functional Changes	Hardware Changes	Software Changes	Impact of Downtime	Load/Voluem Changes	Risk Score
1	Skills and job Recommer	Existing	No Changes	No Changes	No Changes	No Downtime imapct seen..!	No Changes	GREEN

NFT - Detailed Test Plan

S.No	Project Overview	NFT Test approach	umptions/Dependencies/Ri	Approvals/SignOff

End Of Test Report

S.No	Project Overview	NFT Test approach	NFR - Met	Test Outcome	GO/NO-GO decision	Recommendations	Identified Defects (Detected/Closed/Open)	Approvals/SignOff

ADVANTAGES:

- Cost effective for larger applications.
- The location of a fire condition is detected and recorded at each individual device , identifying exactly where the fire is occuring.
- This will improve response time for emergency responders.
- Addressable fire alarm systems give information about individual detectors, whereas conventional systems only give information about specific circuits (zones).
- Addressable systems allow a courtesy text label to allow easy identification of any event. For instance, detector 1 may be given the label ‘Bedroom 1’.
- Most addressable systems allow an early ‘prealarm’ warning, which allows the responsible person to investigate potential alarms before the system activates its sirens.

- Many addressable systems can alter the alarm threshold of the detectors, in order to meet the needs of different environments in different areas of the system.
- Addressable systems are usually wired in a loop.
- Conventional systems are usually wired as radial circuits.
- Addressable systems usually have a real time clock & event log to record system events.

DISADVANTAGES:

- The one thing most fire alarm system inspectors caution against with wireless systems is having to replace the battery. The system is essentially useless if the batteries aren"t changed , since it won"t work properly.

CONCLUSION :

A commercial fire alarm system was developed that was to be intelligent to meet the modern needs . His primary purpose for the system was to provide an early warning of fire so that people can be evacuated and immediate action can be taken to stop or eliminate the effects of fire as soon as possible.Early detection and response can save lives and considerable damage to a facility. An inventor has indicated that, the primary purpose of fire alarm system is to provide an early warning of fire so that people can be evacuated and immediate action taken to stop or eliminate the fire effects as soon as possible. Its utilization in residential places, commercial places, and in shopping centers, gives a feeling of comfort to the users who know that criminal and harmful activities will be detected.

FUTURE SCOPE:

The fire safety systems market was valued at USD 10.89 BILLION in 2020 and is expected to reach USD 16.76 billion by 2026, at a CAGR of 7.5% over the forecast period 2020- 2026 . knowing all, future alarm systems will be software based , where one needs to find a way to train one or two programmers to avoid being dependent on the equipment supplier. This can be help supplier and should lead to better pricing. Also improvement of sensors capabilities and communication channel technology, IoT devices present in industries and residential spaces have boosted the adoption of new tech fire safety solutions.

APPENDIX:

GITHUB LINK:

https://github.com/IBM-EPBL/IBM-Project-43333-1660716000

DEMO VIDEO LINK:

https://youtu.be/rUhnuKGSvhw

SOURCE CODE:

PYTHON CODE.py - C:\Python\Python37\PYTHON CODE.py (3.7.4)

File Edit Format Run Options Window Help

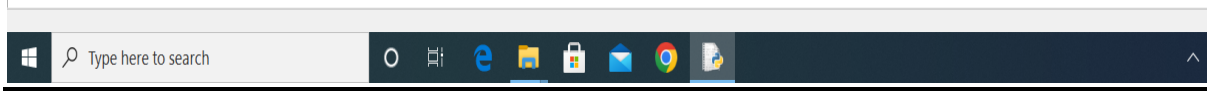
```
#IBM Watson IOT platfotm
#Pip install wiotp-sdk
import wiotp.sdk.device
import time
import random
import requests
import json
# For Cloud Device conectivity
myConfig={
 "identity":{
 "orgId": "346x5j",
 "typeId":"abc",
 "deviceId":"123"
 },
 "auth":{
 "token":"qwertyuiop"
 }
}
def myCommandCallback(cmd):

 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(-20,50) # Random Temperature data

 #flamesensor=random.randint(0,100)

 gas=random.randint(0,500) # Random Gas-sensor data
```



PYTHON CODE.py - C:\Python\Python37\PYTHON CODE.py (3.7.4)

File Edit Format Run Options Window Help

```
 m=cmd.data['command']
client=wiotp.sdk.device.DeviceClient(config=myConfig,logHandlers=None)
client.connect()
while True:

 temp=random.randint(-20,50) # Random Temperature data

 #flamesensor=random.randint(0,100)

 gas=random.randint(0,500) # Random Gas-sensor data

 myData={'temp':temp,'gas':gas}
 client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0, onPublish=None)
 print("Published data successfully:%", myData)
 client.commandCallback = myCommandCallback

 time.sleep(1) # time delay for 1 second

if (temp > 38):
  print("Alarm is ON due to High Temperature",temp)
else:
  print("Normal Temperature")
if (gas > 400):
  print("Alarm is ON due to High Air pollution",gas)
else:
  print("Normal Atmospheric gas")

  print() # dummy print for adding space between lines in output

 time.sleep(3) # time delay for 3 seconds
client.disconnect()
```

Ln: 1 Col: 0

Type here to search

8:12 PM
11/19/2022