Nalaiya Thiran

executed by

Industry-specific intelligent fire management system

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1. INTRODUCTION

FIRMS integrates remote sensing and GIS technologies to deliver MODIS fire data to natural resource managers around the world with a specific focus on protected areas FIRMS is building on and enhancing Web Fire Mapper The goal … to transition FIRMS to operational partners with a global monitoring mandate

1.1 Project Overview

Great to be able to check the Internet for fires – but even more convenient to get a message in your inbox

3 ways to specify your area:

- Using an Interactive Map
- Select Protected Area, with buffer option
- Select by country

Options:

- JPEG image or a link to the image

• CSV file containing fire locations (easily imported in to local GIS)

• Background imagery Overview of FIRMS Products: Email Alerts Sample email alert for Katavi National Park, Tanzania

1.2 Purpose

Detect a fire. **Alert occupants of the fire condition**. Activate safety control functions. Alert the local fire department.

2. LITERATURE SURVEY

2.1 Existing problem

The existing problems of the system are :

● Cost of ownership : The fire management system should be cost effective. On average, the fire management is expected to last 10 years. The biggest problem is when the system cannot be maintained any longer due to component non-availability or due to being unsupported by the manufacturer.

● Evacuation and fire strategy : The alert and the control measures are taken immediately, so that the building can be completely evacuated.

● System performance changes within specific environments : The industry will have unique or specified conditions at some time. The major problem caused is the false fire alarm

2.2 References

[1] Gazi weldesyase, Bahta G/meskel, Mekonen Abreha, Solomon Baynes, “GSM Based Fire and Smoke Detection and Prevention System”, on 08/10/2010, Adigrat, Tigray, Ethiopia.

[2] May Zaw Tun, Htay Myint, “Arduino based Fire Detection and Alarm System Using Smoke Sensor”, Volume 6, Issue 4, on April – 2020, Myanmar.

[3] Nitin Galugade, Mahesh Jakka, Devika Nair, Madhur Gawas, “Fire Monitoring and Controlling System based on Iot”, 2020, Mumbai, India

2.3 Problem Statement Definition

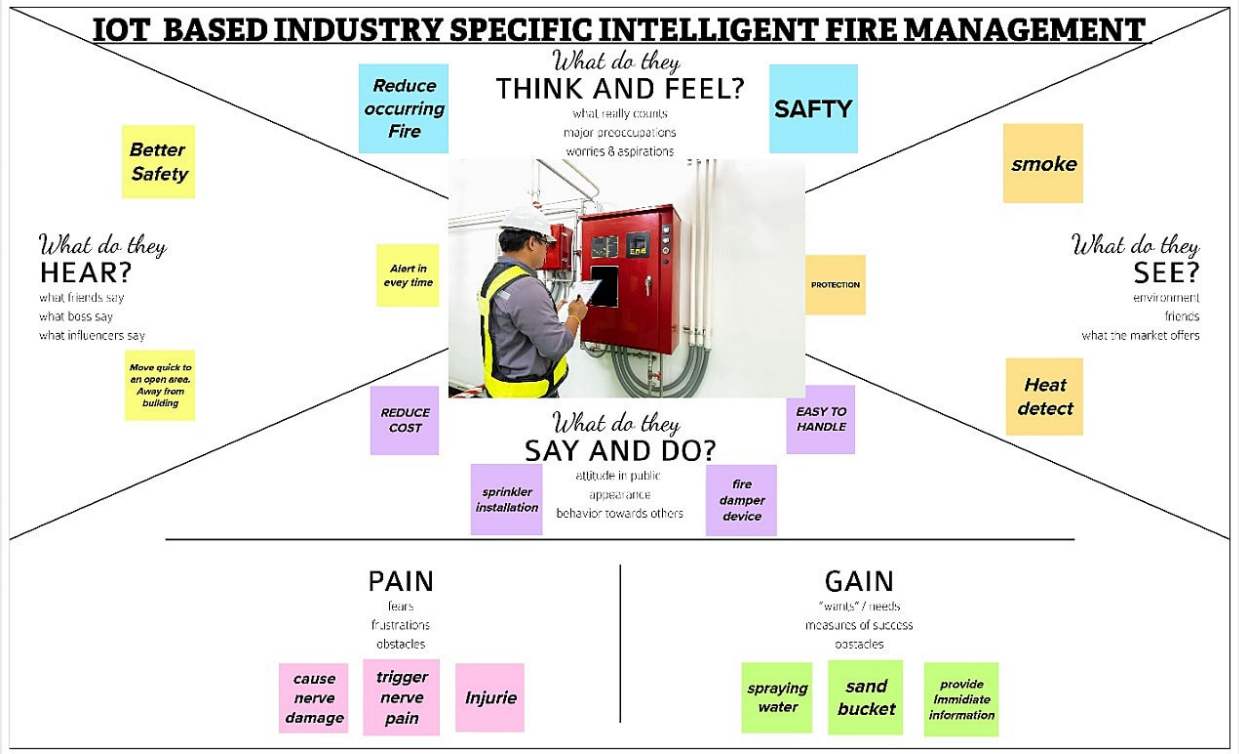
Background: Fire is the rapid oxidation of a material in the exothermic chemical process of combustion, releasing heat, light and various reaction products. Although it’s a natural process, it can lead to great destruction. On average, **everyday 35 people killed due to Fire-related accidents in the five years between 2016 and 2020**, according to a report by Accidental Deaths and Suicides in India (ADSI), maintained by the National Crime Records Bureau. Fire is one of the major concerns when analyzing the potential risks on the building. Industrial Fires and Explosions cost companies and governments billions of Rupees every year apart from the loss of life, which can’t be described in monetary terms. These Fires not only result in huge loss of Lives and Property but also disrupt production in the Industry. The Nilflisk says that the five major causes of industrial fires and

explosions are **Combustible dust, hot works, Flammable liquids and gasses, equipment and machinery and Electrical hazards.**

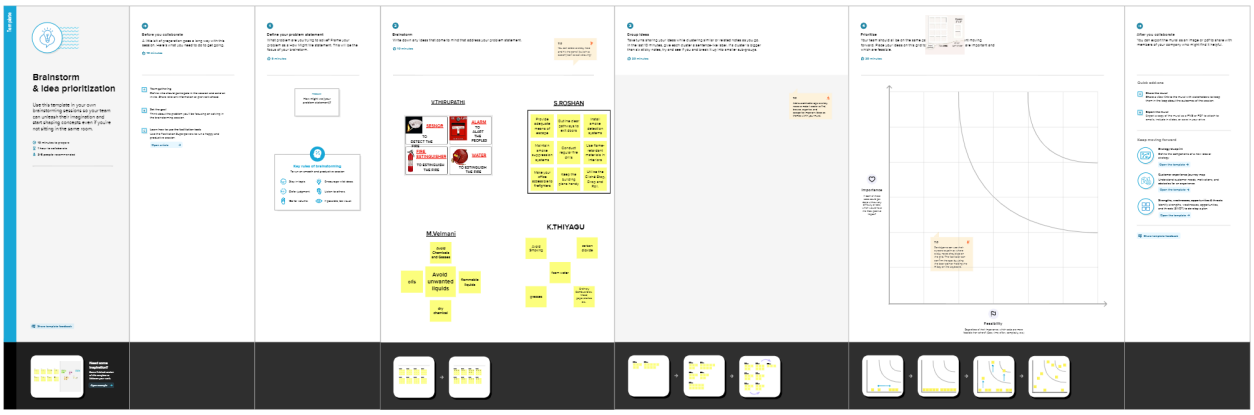
Objective: The objective of this Industry-Specific Intelligent Fire Management System is to detect any changes in environment like detecting hazardous gas, flame detection and temperature that can lead to fire and exploitation incident. Based on the temperature readings and if any Gasses are present the exhaust fans should be powered ON automatically to replace contaminated and stale air with fresh, healthy air. If any flame is detected the sprinklers will be switched on automatically. Emergency alerts are notified to the authorities and Fire station. So that the authorities and Fire Fighters can control the situation

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming

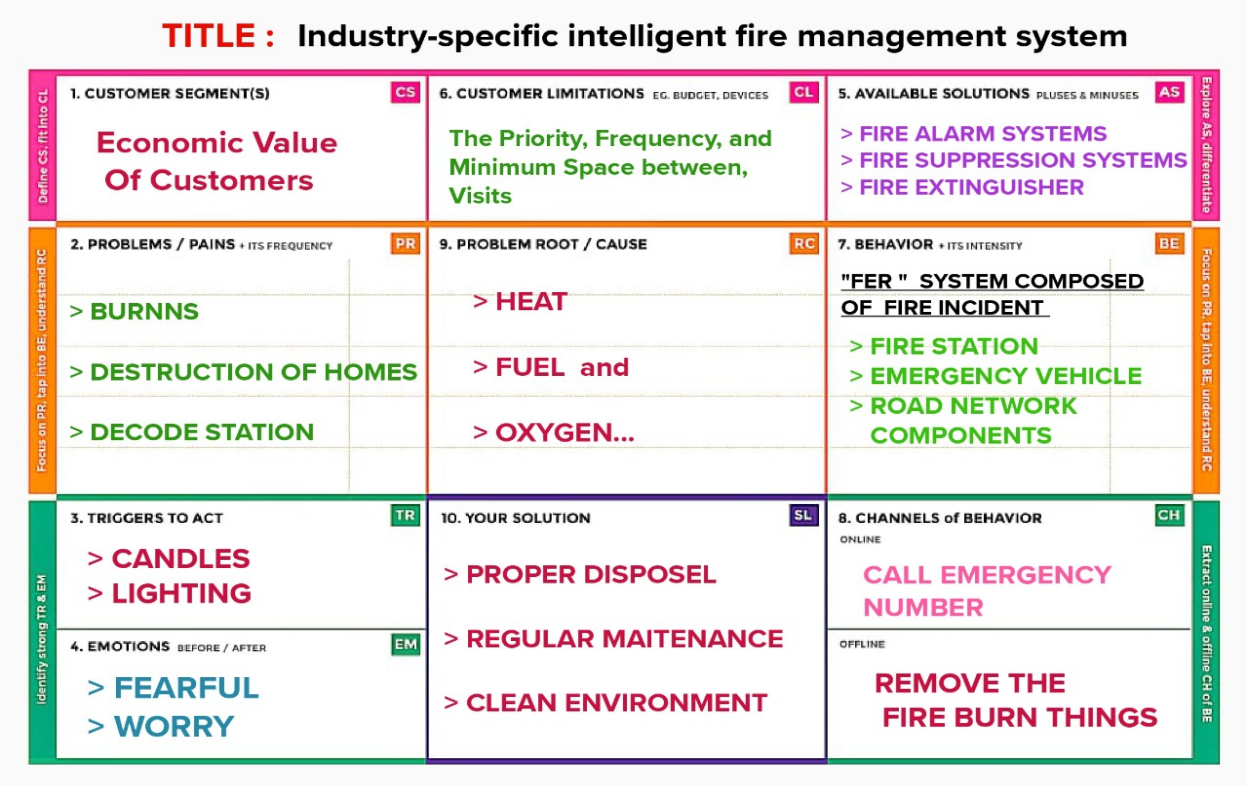


3.3 Proposed Solution

S.No	Parameter	Description
1.	Novelty / Uniqueness	In this paper, the installed Arduino device which was programmed with Android Studio receives gas smoke ,the temperature and humidity signal from the sensors . The sensor is connected to the input of the arduino with the help of connecting the cables or jumper cables . Further the circuit goes toward output where the buzzer is connected. If we differ the value of the buzzer then we get a variation in the buzzer sound.

2.	Business Model (Revenue Model)	This product can be utilized by a industries .This can be thought of as a productive and helpful item as industries great many current rescuing people and machine from the fire accident
3.	Problem Statement (Problem to be solved)	this system can perform different parameter measurements early detection of building fires
4.	Scalability of the Solution	It is trying to execute this technique as we need to introduce an arduino gadget which was modified with an arduino studio that takes received signals from sensors . This recognizes the fire from each area in turn assuming there is fire in other area the framework can not distinguish . So this item will be introduced in each required area independently
5.	Social Impact / Customer Satisfaction	This product has huge social impact as presentation of the industry workers from fire related accidents.Prevention of the industry fire accident can also increases the industrial financial status

3.4 Problem Solution fit



4. REQUIREMENT ANALYSIS

Solution Requirements

(Functional & Non-functional)

4.1 Functional requirement

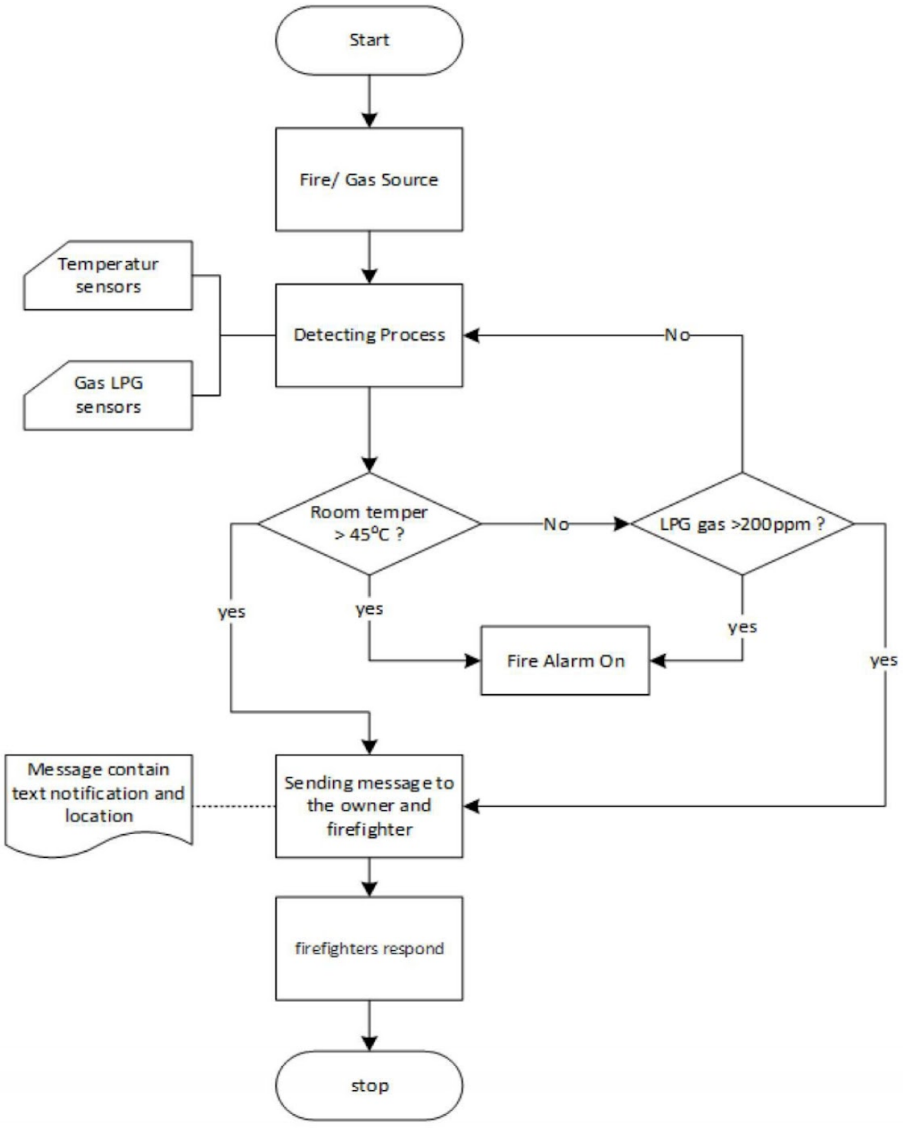
FR NO.	Functional Requirement	Sub Requirement
1	User Registration	Registration through website or application Registration through Social medias Registration through LinkedIN
2	User Confirmation	Verification via Email or OTP
3	User Login	Login through website or App using the respective username and password
4	User Access	Access the app requirement
5	User Upload	User should be able to upload the data
6	User Solution	Data report should be generated and delivered to user for every 24 hours
7	User Data Sync	API interface to increase to invoice system

4.2 Non-Functional requirements

FR No	Non-Functional Requirement	Description
1	Usability	Usability requirements include language barriers and localization tasks. Usability can be assessed by Efficiency of use.
2	Security	Access permissions for the particular system information may only be chang
3	Reliability	The database update process must Roll back all related updates when any update fails.
4	Performance	The front - page load time must be no more than 2 seconds for user that website
5	Availability	New module deployment Must not impact front page, Product page,and check out Pages availability mustn't take longer than one hour.
6	Scalability	We can increase scalability by adding memory, servers, or disk space. On the other hand, we can compress data, use optimizing algorithms

5. PROJECT DESIGN

5.1 Data Flow Diagrams



5.2 Solution & Technical Architectur

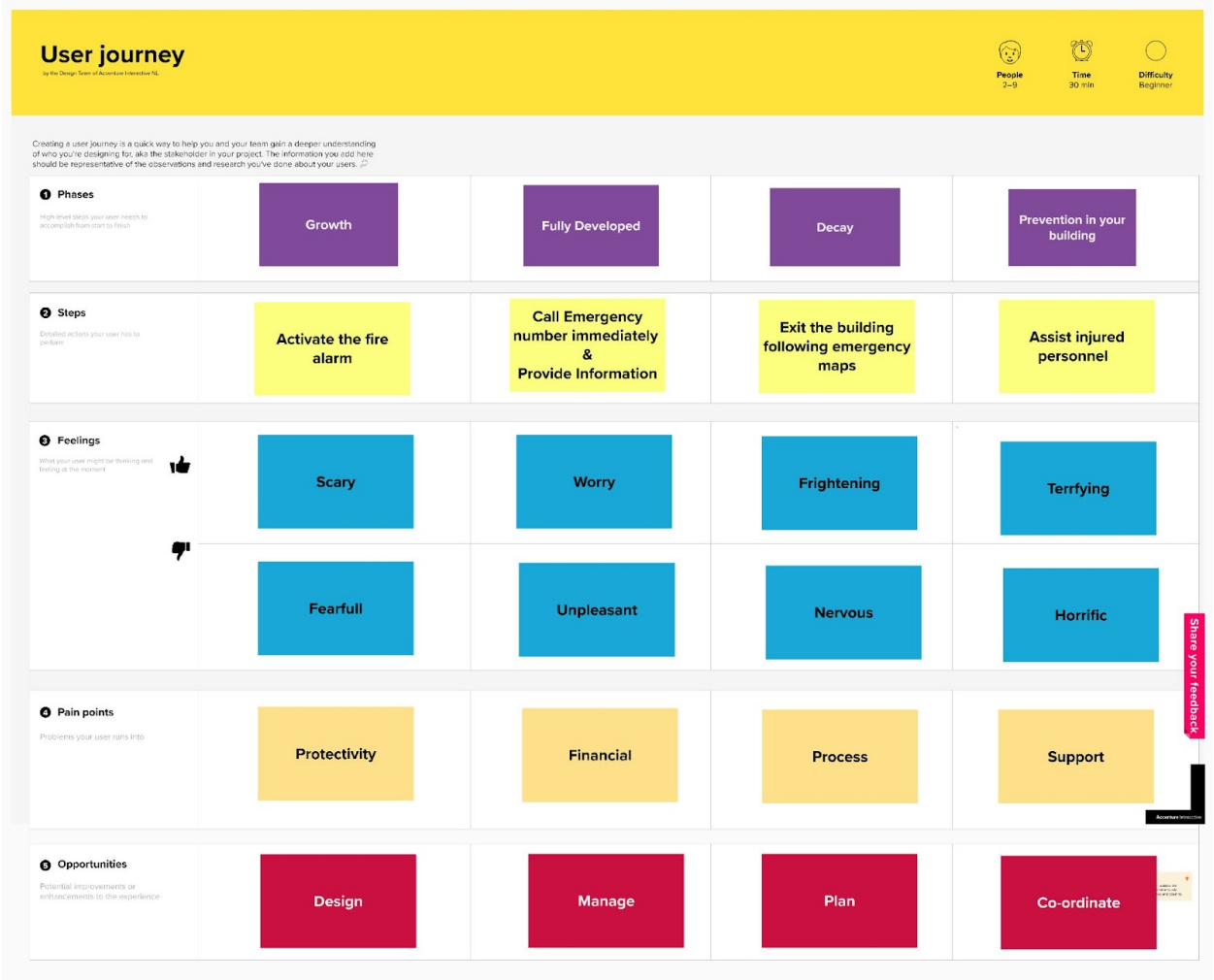
Project Design Phase-I

Solution Architecture:

Domain	IOT Based
Team ID	PNT2022TMID50107
Project Name	Industry-specific intelligent fire management system
Maximum Mark	4 Mark

Solution Architecture Diagram:

5.3 User Stories



6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Backlog, Sprint Schedule, and Estimation

Spri	Functional Requirement (Epic	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Sensing	USN-1	Use the sensors to sense the surroundings.	3	High	V.THIRUPATHI, M.VELMANI, S.ROSHAN, K.THIYAGU
	Operating	USN-2	Activating the fire sprinkler system and exhaust fan in case of a fire	3	Medium	V.THIRUPATHI, M.VELMANI, S.ROSHAN, K.THIYAGU
Sprint-2	Sending collected data to the IBM Watson platform	USN-3	Sending IBM Watson the data from the sensors.	3	High	V.THIRUPATHI, M.VELMANI, S.ROSHAN, K.THIYAGU

	Node red	USN-4	Data transmission from IBM Watson to Node Red	3	High	V.THIRUPATHI, M.VELMANI, S.ROSHAN, K.THIYAGU
Sprint-3	Storing of sensor data	USN-5	Keeping data in a Cloudant database	2	Medium	V.THIRUPATHI, M.VELMANI, S.ROSHAN, K.THIYAGU
	Registration	USN-6	My email and password are being entered to confirm the authentication process.	1	Medium	V.THIRUPATHI, M.VELMANI, S.ROSHAN, K.THIYAGU
	Web UI	USN-7	Keeps track of	3	High	V.THIRUPATHI, M.VELMANI, S.ROSHAN, K.THIYAGU
			environmental conditions and presents sensor data.			
Sprint-4	Fast SMS Service	USN-8	When parameters like temperature, flame, and gas sensor readings exceed the threshold value, use Fast SMS to send an alarm message	1	High	V.THIRUPATHI, M.VELMANI, S.ROSHAN, K.THIYAGU

	Turn ON/OFF the actuators	USN-9	In that case, the user has the option to turn off both the sprinkler system and the exhaust fan	2	Medium	V.THIRUPATHI, M.VELMANI, S.ROSHAN, K.THIYAGU
	Testing	USN-10	Project and final deliverables testing.	3	Low	V.THIRUPATHI, M.VELMANI, S.ROSHAN, K.THIYAGU

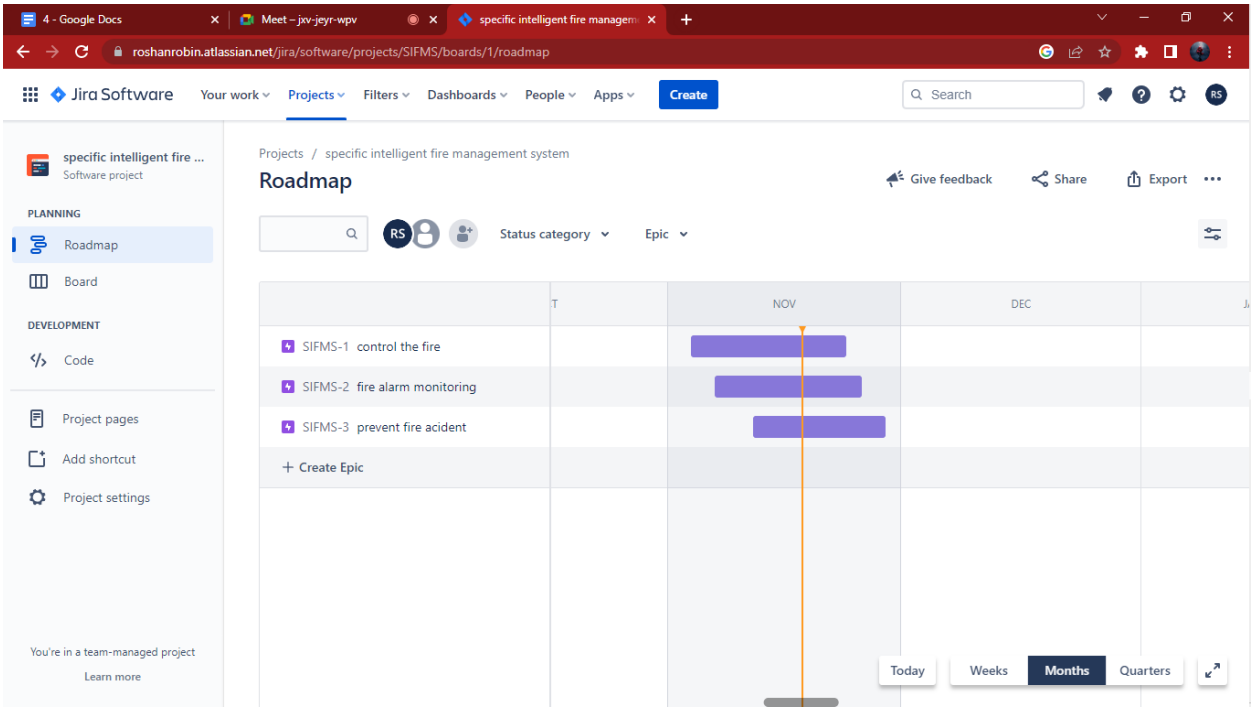
6.2 Sprint Delivery Schedule

Project Tracker, Velocity & Burndown Chart

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	6	6 Days	13 NOV 2022	19 NOV 2022	6	19 NOV 2022
Sprint-2	6	6 Days	13 NOV 2022	19 NOV 2022	6	19 NOV 2022
Sprint-3	6	6 Days	13 NOV 2022	19 NOV 2022	6	19 NOV 2022

Sprint-4	6	6 Days	13 NOV 2022	19 NOV 2022	6	19 NOV 2022

6.3 Reports from JIRA



7. CODING & SOLUTIONING (Explain the features

added in the project along with code)

7.1 Feature 1

The Specific intelligent fire management system is designed to alert us to an emergency so that we can take action to protect ourselves, staff and the general public.

7.2 Feature 2

The Specific intelligent fire management system may also incorporate a remote signal system which could then alert the fire brigade via a central station.

7.3 Database Schema (if Applicable

The user who is connected to the device can view the readings in mobile as well as the desktop. It is both mobile and web responsive so there is no need to install a separate mobile application in the mobile devices to view the device status

8. TESTING

8.1 Test Cases

In engineering and its various sub disciplines, acceptance testing is black- box testing performed on a system (e.g. software, lots of manufactured mechanical parts. or batches of chemical products) prior to its delivery. It is also known as functional testing, black-box testing, and release

acceptance. QA testing, application testing, confidence testing, final testing, validation testing, or factory acceptance testing

In software development. acceptance testing by the system provider is often distinguished from acceptance testing by the customer (the user or client) prior to accepting transfer of ownership. In such environments, acceptance testing performed by the customer is known as user acceptance testing (UAT). This is also known as end-user testing. site (acceptance) testing, or field (acceptance) testing.
A smoke test is used as an acceptance test prior to introducing a build to the main testing process. Acceptance test cards are ideally created during sprint planning or iteration planning meetings.

before development begins so that the developers have a clear idea of what to develop. Sometimes (due to bad planning!) acceptance tests may span multiple stories (that are not implemented in the same sprint) and there are different ways to test them out during actual sprints.

One popular technique is to mock external interfaces or data to mimic other stories which might not be played out during an iteration (as those stories may have been relatively lower business priority). A user story is not considered complete until the acceptance tests have passed.
The acceptance test suite is run against the supplied input data or using an acceptance test script to direct the testers. Then the results obtained are compared with the expected results. If there is a correct match for every case,

the test suite is said to pass. If not, the system may either be rejected or accepted on conditions previously agreed between the sponsor and the manufacturer.

The objective is to provide confidence that the delivered system meets the business requirements of both sponsors and users. The acceptance phase may also act as the final quality gateway. where any quality defects not previously detected may be uncovered.

In these testing procedures the project is given to the customer to test whether all requirements have been fulfilled and after the user is fully satisfied. The project is perfectly ready. If the user makes a request for any change and if they find any errors, all errors have to be taken into consideration and to be corrected to make a project a perfect project.

8.2 User Acceptance Testing

Purpose of Document : The purpose of this document is to briefly explain the test coverage and open issues of the Industry-specific intelligent fire management system project at the time of the release to User Acceptance Testing (UAT).

Defect Analysis :

Severity 1	Severity 2	Severity 3	Severity 4
10	4	2	3

1	**0**	**3**	**0**
2	**3**	**0**	**1**
11	**2**	**4**	**20**
0	**0**	**1**	**00**
0	**0**	**1**	**1**
0	**0**	**0**	**1**

Resolution Subtotal By Design 20 Duplicate 4 External 6 Fixed 37 Not Reproduced 1 Skipped 2 Won't Fix 8

Totals 24 14 13 26 70 Test Case Analysis

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

3	**0**	**0**
9	**0**	**0**
4	**0**	**0**

Outsource Shipping 3 Exception Reporting 9 Final Report Output 4

Version Control 2 0 0 2

9. RESULTS

9.1 Performance Metrics

specific intelligent fire management systems are a prime necessity in modern buildings and architecture, especially in banks, data centers and gas Stations. They detect the fire in ambience at a very early stage By sensing smoke or slash and heat and raise an alarm which warns people About the fire and furnish sufficient time to take preventive measures. It not only

prevents big losses caused by deadly fire but sometimes proves to be life savers. A specific intelligent fire management system is a device that detects the presence of fire and atmospheric changes relating to smoke. The fire management system operates to alert people to evacuate a location in which a fire or smoke accumulation is present. When functioning properly, if the fire alarm sounds too naughty five people are on an immediate fire emergency. The distinct sound exists to allow the notification to be heard. The fire alarm constructed by this project Is reliable at low-c.

10. ADVANTAGES & DISADVANTAGES

● The Advantages of this Industry-Specific Intelligent System are as Fire Management follows

● The user need not require expertise knowledge to control this system. This system is simple. The user can easily view the sensor values and take control actions.

● The control actions are taken automatically.

● If it is implemented in hardware, then the cost of implementation will be affordable.

● As we are sensing the sensor values continuously, any slight change in the environment is detected

● This system is in User-Friendly format. The Disadvantage of this Industry-Specific Intelligent Fire Management system are as follows

● This system will not be able to detect the origin of fire.

● This system will not provide the escape route if there is a fire

outbreak.

- If the industry has specific changes in the environment, then this system will give false alarm

11. CONCLUSION

- An understanding and having Fire Management system in the industry is of utmost importance.This project is a fire management system that can be user in the industry based on IOT.This system creates a simulation device credentials in IBM WATSON IOT PLATFORM.In node red,necessary nodes are installed and used.These nodes are installed and used.These nodes are deployed and the data is collected.In the event of fire, this system can issue sprinkler on,exhaust fan on.This remote user monitoring system can monitor the system status of each node in real time.This system monitors the data continuously so that the any slight change in the environment can be easily detected.This ensures good control accuracy .ThisIndustry-Specific Intelligent Fire Management ensures the protection of property, asset and the processes are cost effective and the automatic measures are in control.

12. FUTURE SCOPE

The future scope of this project is to add additional features like triggering the extinguisher automatically, predict the escape route if the fire outbreaks and to implement this system in real time using hardware.

13. APPENDIX

Source Code

https://github.com/IBM-EPBL/IBM-Project-37993-1660367088/blob/main/IBM%20ASSESMENT/Final%20Deliverables/Source%20code.py

GitHub & Project Demo Link

GitHub Link : https://github.com/IBM-EPBL/IBM-Project-37993-1660367088

Project Demo Link :

https://drive.google.com/file/d/1En1Fw2RMcWRXi8tuZxHkuZtDplbB2eD3/view?usp=share_link