PROJECT REPORT

INDUSTRY-SPECIFIC INTELLIGENT FIRE MANAGEMENT SYSTEM

Team ID	PNT2022TMID33266
Project Name	Industry Specific Intelligent Fire Management System

Project Report Submitted By

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Varun kumar.R	922119106110

1. INTRODUCTION

1.1 Project overview

Fire, explosion and toxic release are the three major hazards in the process industry, while fire is the most common one. Increasing number of fire incidents coupled with loss of property has enhanced the demand for automatic intelligent fire alarm systems in residential and commercial buildings. An intelligent fire alarm system is specifically designed to provide advantages such as identification of the fire location, locate any fault in the alarm system wiring, and ensure easier maintenance. This 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. Moreover, these modern intelligent fire alarm systems are more sensitive as compared to the classic models and are competent to detect false alarms.

1.2 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 the fire effect as soon as possible.

2. LITERATURE SURVEY

2.1 Existing problem

Systems for monitoring fires have typically relied on a single sensor, like smoke or flame. These single sensor systems are unable to differentiate between actual and fictitious fire presence. Energy inefficiency and environmental harm result from relying on a single sensor all day and risking false alarms. Not only do we need a system that is effective in precisely detecting fire, but we also need a smart solution. The smart fire management system incorporates a temperature sensor, a flame sensor, and a gas sensor to enhance the performance of current single sensor systems. Additionally, a reliable network with numerous smart devices connected to different panels is needed for this system.

2.2 References

1. Adekunle A., Umanah I.I., Ibe K.E. and Imonikosaye M.R. (2018) Statistical analysis of fire outbreaks in homes and public buildings in Nigeria. A Case Study of Lagos State, (pp. 21 - 30).
2. Amy, T., et al. (2019) Boston fire of 1872.encyclopedia of world history. Retrieved from https://www.britannica.com/event/ Boston-fire-of- 1872
3. Sarah, B. (2017) The great fire of nero and the ancient history of firefighting. Retrieved from https://www.forbes.com/emperor- nero,. 4. Erik, A.. Influential innovator. Ctesibius, (2016).

2.3 Problem Statement Definition

Definition Industry Specific Intelligent fire management system are designed to Prevent fire accidents due to Gas leakage and flame in industry.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

3.2 Ideation &Brainstorming

3.3 Proposed Solution

S. No	Parameter	Descripti

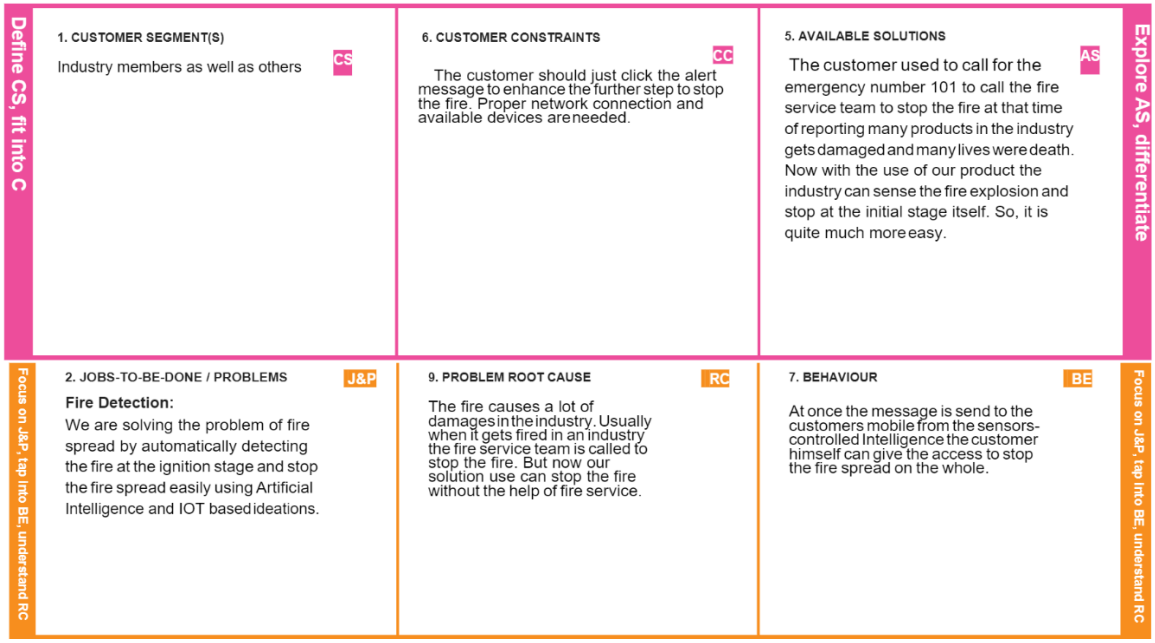
		on
1.	Problem Statement (Problem to be solved)	To improve the safety management system in industries. Improving the safety management system against the fire accidents in industries.
2.	Idea/Solution description	To implement the fire safety management in industry based on IOT using Arduino board with ESP8266 and using some Sensors (smoke, Temperature), LCD display and speaker.
3.	Novelty/Uniqueness	An SMS is sent to fire station with live location .Pre recorded voice assistant guide people to nearby exit.
4.	Social Impact/Customer Satisfaction	It early prevents the accident cost by fire in industries. Nearby location so maximum extend more accurate reliability.
5.	Business Model (Revenue Model)	This product can be utilized by industries. It is a productive and helpful item in industries for rescuing people from fire accidents and also damage of machines.
6.	Scalability of the Solution	It is trying to execute this technique as we need to introduce on Arduino gadget which was modified with an Arduino that takes received signals from sensors. Easy maintenance.

3.4 Problem Solution Fit

Project Title: Industry specific intelligent fire management system.

Project Design Phase-I
Solution Fit Template

Team ID: PNT2022TMID33266



4.REQUIREMENT ANALYSIS

4.1 Functional requirement

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement(Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through website or application Registration through Socialmedias Registration through LinkedIN
FR-2	User Confirmation	Verification viaEmailor OTP
FR-3	User Login	Login through website or App using the respectiveusername and password
FR-	User Access	Access the app requirements

4		
FR-5	User Upload	User should be able to upload the data
FR-6	User Solution	Data report should be generated and delivered to user for every 24 hours
FR-7	User Data Sync	API interface to increase to invoice system

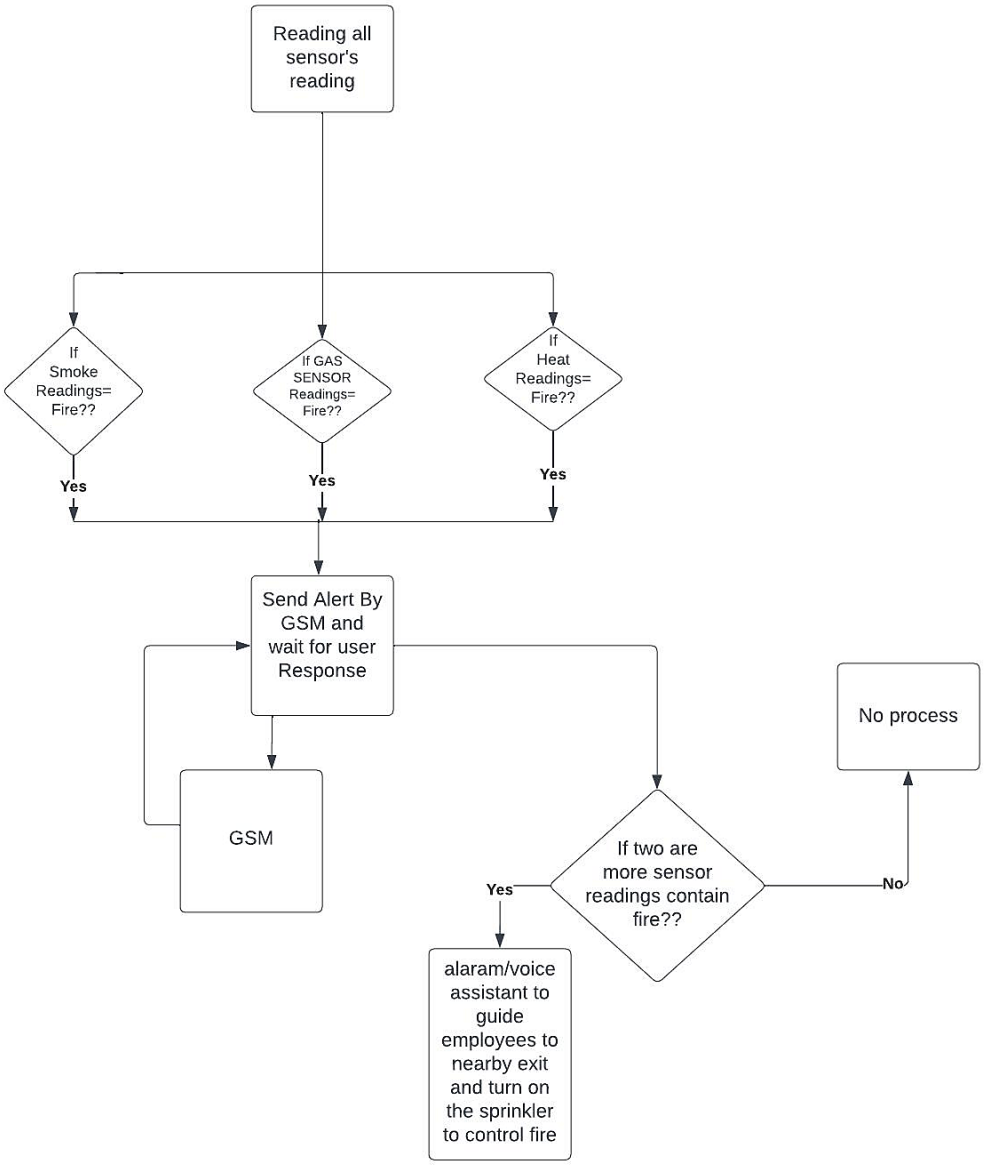
4.2 Non-Functional requirement

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Usability requirements includes language barriers and localization tasks. Usability can beassessed by Efficiency of use.
NFR-2	**Security**	Access permissions for the particular systeminformation may only be changed by the system's data administrator.
NFR-3	**Reliability**	The database update process must roll back all related updates when any update fails.
NFR-4	**Performance**	The front-page load time must be no more than2seconds for users that access the website using an VoLTE mobile connection.
NFR-5	**Availability**	New module deployment must not impact frontpage, product pages, and check out pages availability and mustn't take longer than one hour.

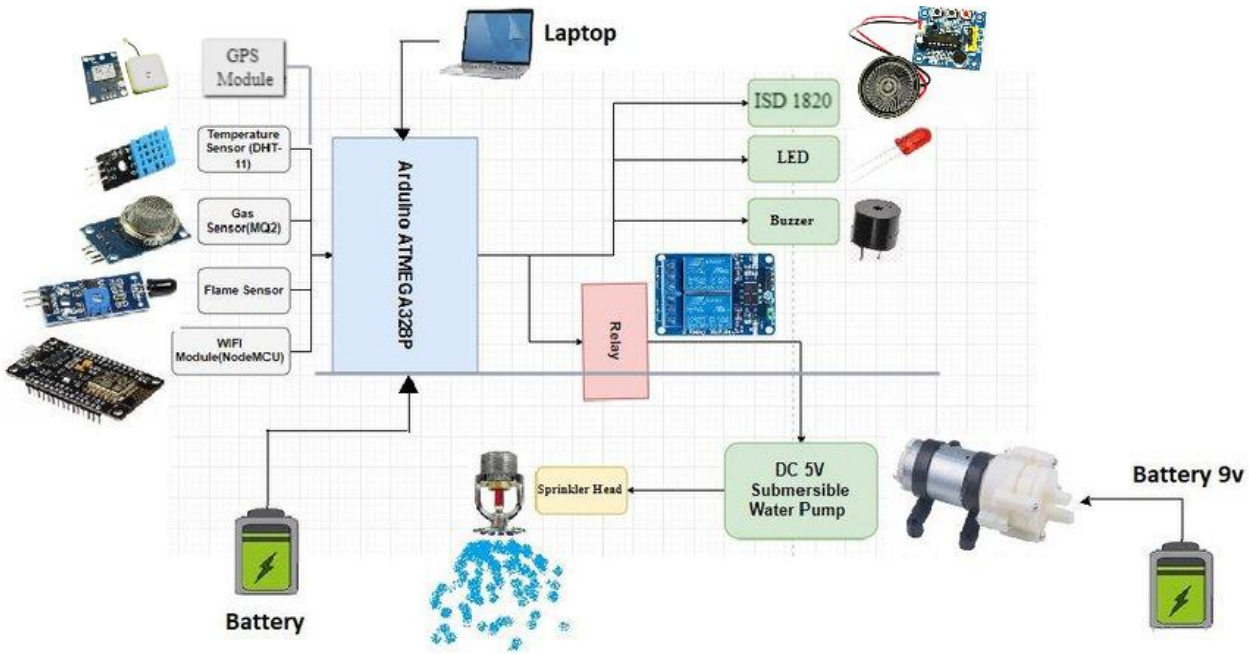
NFR-6	**Scalability**	We can increase scalability by adding memory,servers, or disk space. On the other hand, we can compress data, use optimizing algorithms.

5. PROJECT DESIGN

5.1 Data Flow Diagram



5.2 Solution Architecture & Technical Architecture



5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer	Installation	USN-1	As a user, I can install the fire management device in every sections in the floor	I can do it by myself	High	Sprint-1
Customer	Power connection	USN-2	As a user, I want ensure power supply for all devices	I will ensure it	High	Sprint-2
Customer	Safety	USN-3	As a user, I want to ensure that the device should not be in contact with water	I will ensure that	High	Sprint-3
Customer	Battery Status	USN-4	As a user, I want check the battery status monthly once	I can assure that	Medium	Sprint-4

Customer	Internet Connectivity	USN-5	As a user, I want to check the internet connectivity	I will ensure that	High	Sprint-5

6. PROJECT PLANNING &SCHEDULING

6.1 Sprint Planning & Estimation

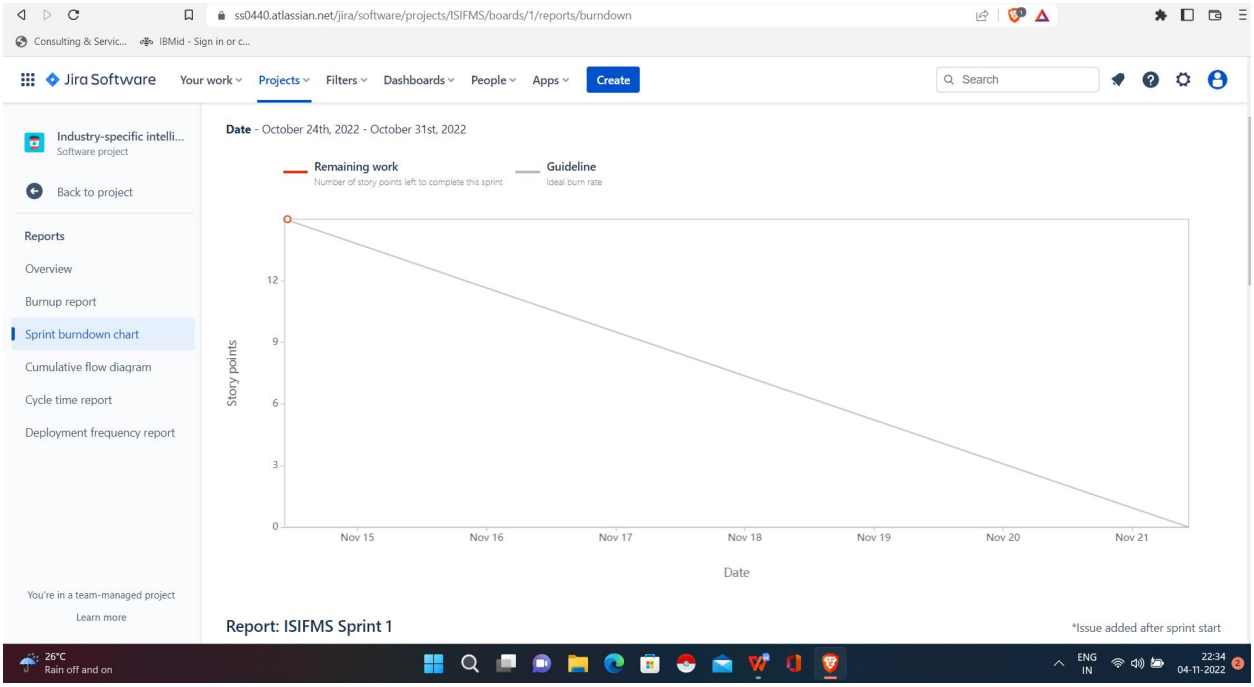
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a client, I can download the application	5	High	Sudharsun B
Sprint-1	Registration	USN-2	As a client, I can enlist for the application by entering my mobile number, email, password.	5	High	Sudharsun B
Sprint-1	Registration	USN-3	As a client, I will get confirmation email or OTP to SMS once I have enrolled for the application	4	High	Sudharsun B
Sprint-2	Login	USN-4	As a client, I can log into the application byentering email and secret code.	5	High	Sridhar R
Sprint-2	View	USN-5	As a client, I can see Temperature Readings.	2	Medium	Sridhar R

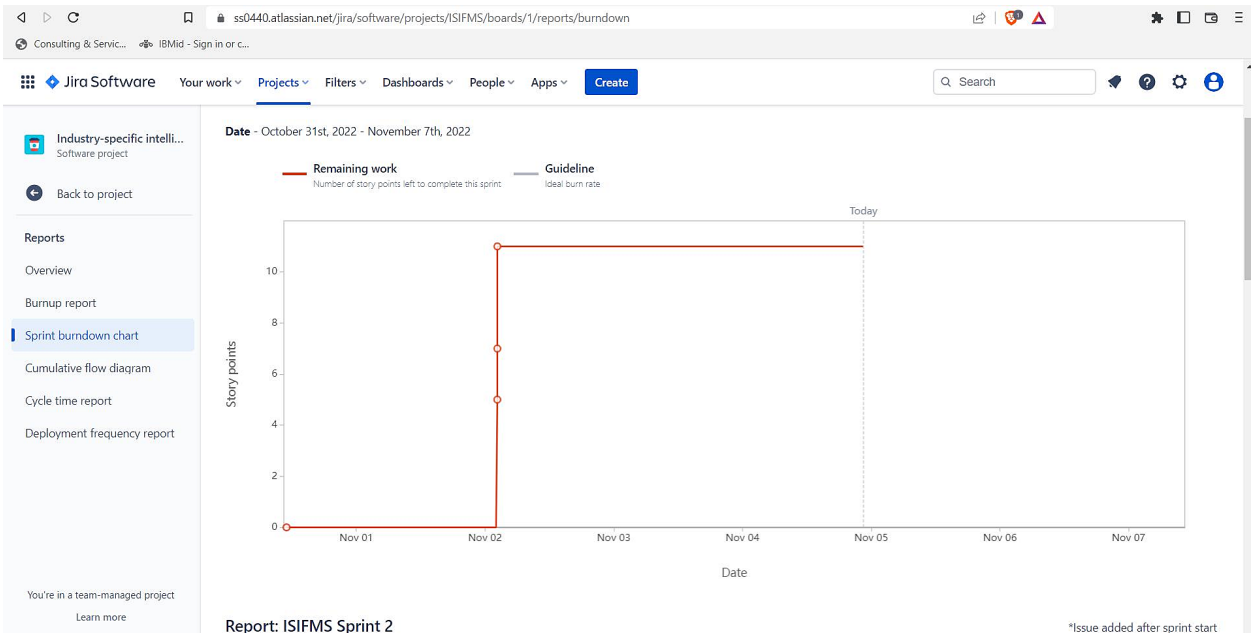
Sprint -2	View	USN-6	As a client , I can see any flame is detected in the industry.	4	High	Thirupathi R
Sprint-3	Actions	USN-7	As a client, I will have on and off button for operate sprinklers.	1	Medi um	Vengade sh G

Sprint	**Functional Requirement (Epic)**	**User Story Number**	**User Story / Task**	**Story Points**	**Priority**	**Team Members**
Sprint-3	Actions	USN-8	As a user, I will have an proper system for the conveyance of alert messages with accurate location.	2	Medium	Vengadesh G
Sprint-3	Management	USN-9	As a Administrator I can store the data in cloud database.	5	High	Sridhar R
Sprint-4	Testing	USN-10	As a tester , I can check whether the sensors are working properly.	5	High	Vengadesh G
Sprint-4	Testing	USN-11	As a tester I can check whether the sprinklers are working well and the warning messages are sent to respective persons with locations.	5	High	Varun kumar R

Sprint-4	Testing	USN-12	As a tester I can get the appropriate readings of the Temperature.	5	High	Varun kumar R

6.2 Reports from JIRA

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Jira Software
Your work
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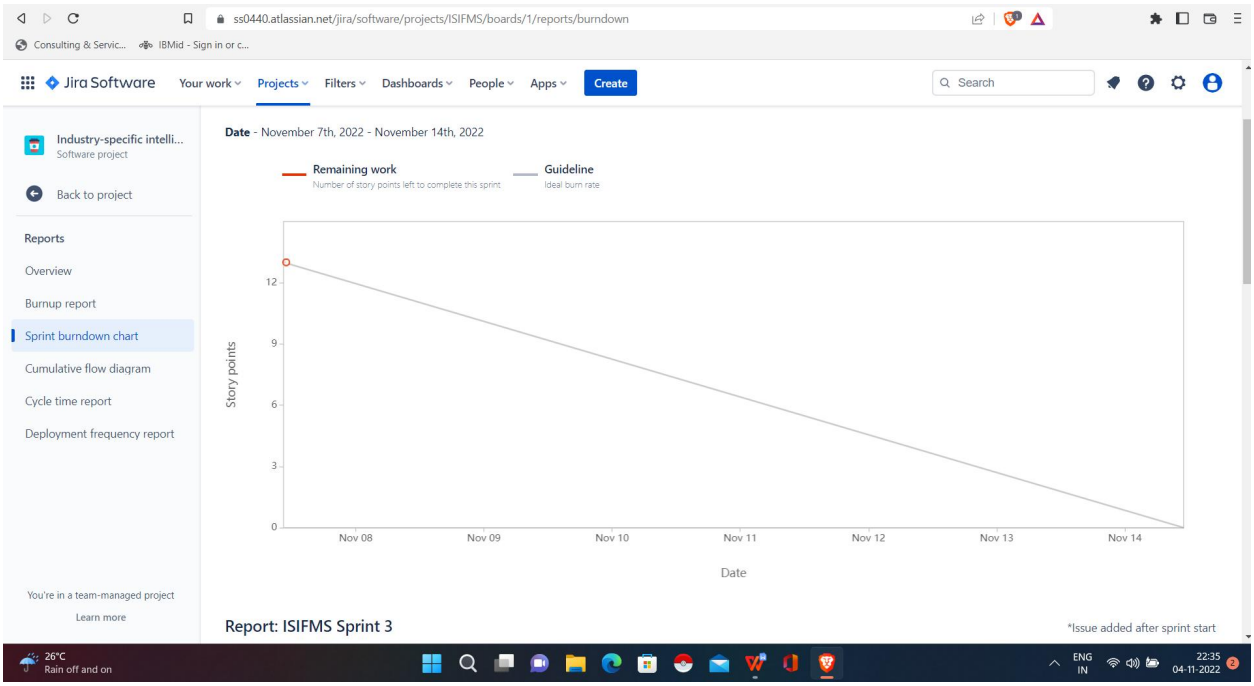
Filters
Dashboards
People
Apps
Create
Search
Industry-specific intelli...
Software project
Back to project
Reports
Overview
Burnup report
Sprint burndown chart
Cumulative flow diagram
Cycle time report
Deployment frequency report
You're in a team-managed project
Learn more
Date - October 31st, 2022 - November 7th, 2022
Remaining work
Number of story points left to complete this sprint
Guideline
Ideal burn rate
Today
Story points
Nov 01
Nov 02
Nov 03
Nov 04
Nov 05
Nov 06
Nov 07
Date
Report: ISIFMS Sprint 2
*Issue added after sprint start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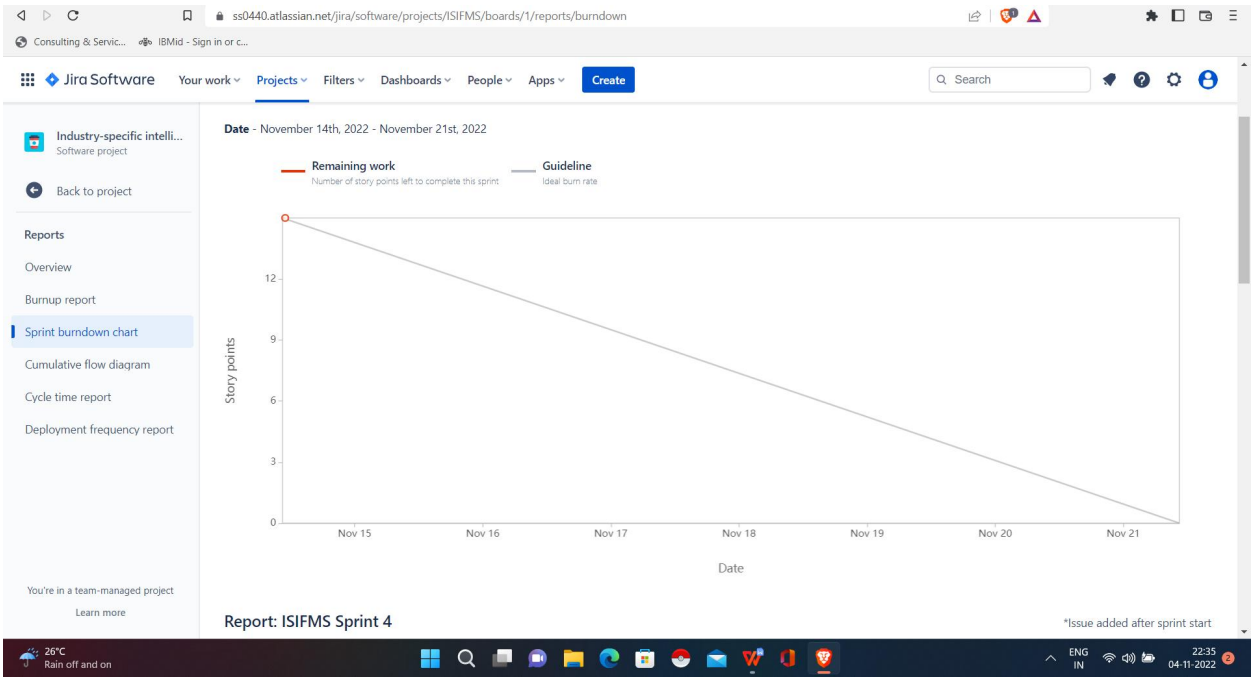
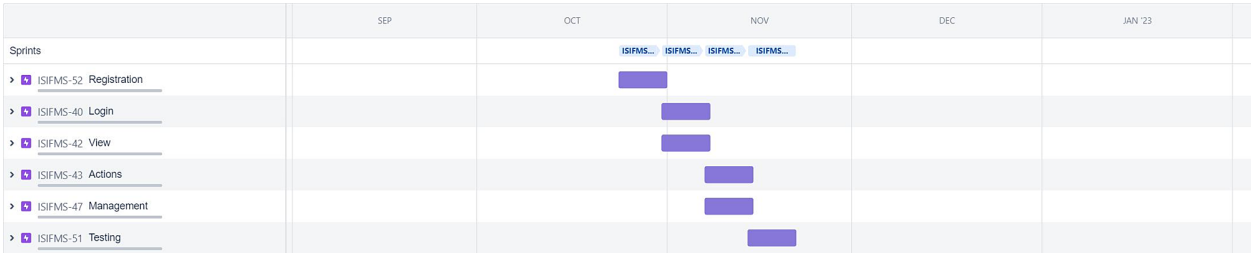
Jira Software
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
Industry-specific intelli...
Software project
Back to project
Reports
Overview
Burnup report
Sprint burndown chart
Cumulative flow diagram
Cycle time report
Deployment frequency report
You're in a team-managed project
Learn more
Date - November 7th, 2022 - November 14th, 2022
Remaining work
Number of story points left to complete this sprint
Guideline
Ideal burn rate
Story points
Nov 08
Nov 09
Nov 10
Nov 11
Nov 12
Nov 13
Nov 14
Date
Report: ISIFMS Sprint 3
*Issue added after sprint start
26°C
Rain off and on
ENG
IN
22:35
04-11-2022





7. CODING & SOLUTIONING

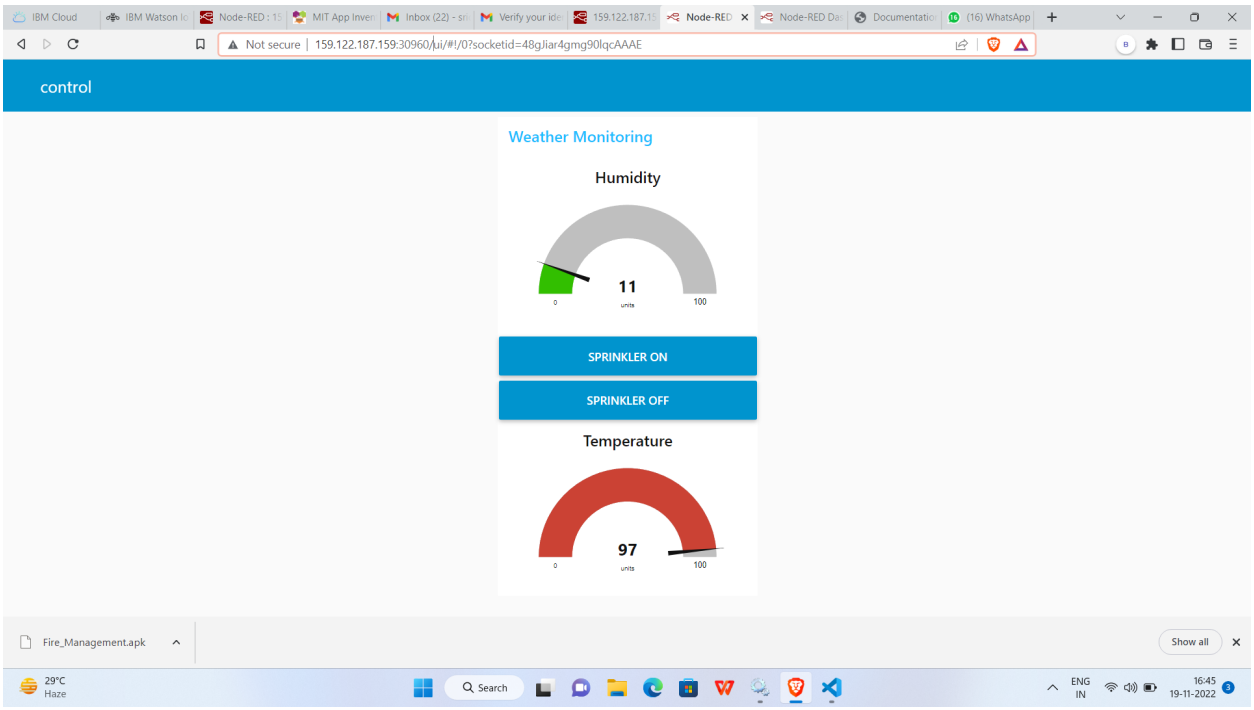
7.1 Feature 1

1 IoT device

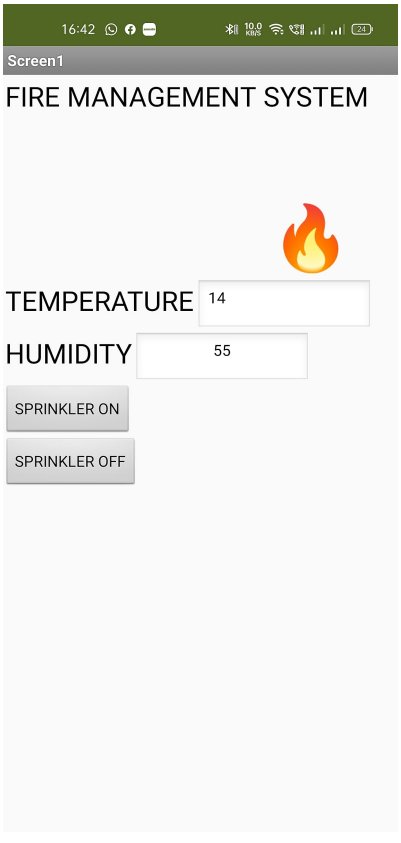
2 IBM Watson Platform

8.1 TESTING AND RESULTS

8.1 Test Cases



MOBILES INTERFERENCE



9. ADVANTAGES

1 Reduced installation cost.
2 They monitor 24/7.
3 Improved security in homes, industries and Offices
4 It pin points location of the fire.

10. DISADVANTAGES

1 Heat detectors are not considered as life saving devices because they aresensitive only to heat.

2 High battery or current consumption will need for these detectors.

3 Control pannel may need to be replaced if it becomes damaged**.**

11. CONCLUSION

This gas leakage device has numerous industrial applications in addition to home security. In the past, industrial and residential fires and gas leaks have caused extensive damage and losses. If the right steps are not taken promptly, gas leaks and fire outbreaks can expand rapidly and cause considerably greater loss of life and property. So, in this case, we suggested a system that alerts us to gas and fire outbreaks and identifies them so that the appropriate steps can be done to manage them.

12. FUTURE SCOPE

The function of smoke detectors and alarms is evolving from simple smoke detection to combination detectors and multicriteria detectors. The identification of more combustion byproducts, such as carbon monoxide, carbon dioxide, sulphur dioxide, and nitrogen dioxide, in addition to heat and particulate matter, will be possible in the future with multicriteria detection.

Within the next ten years, video image detection (VID), which enables the isolation and detection of the picture of smoke or flame from within a room or place using analytics, will become more widely used. The VID system would also be capable of detecting the presence of a person inside the area and, through integration with the notification appliances, would be able to provide an exit route.

13. APPENDIX

13.1 Source Code

```
import time
import sys
import ibmiotf.application
import ibmiotf.device
import random

#Provide your IBM Watson Device Credentials
organization = "djfg8g"
deviceType = "ssvt369"
deviceId = "Nalaiyathiran"
authMethod = "token"
authToken = "Ibmproject@369"

# Initialize GPIO
def myCommandCallback(cmd):
   print("Command received: %s" % cmd.data['command'])
   status=cmd.data['command']
   if status=="lighton":
      print ("led is on")
   elif status == "lightoff":
      print ("led is off")
   else :
      print ("please send proper command")

try:
        deviceOptions = {"org": organization, "type": deviceType, "id": deviceId, "auth-method":
authMethod, "auth-token": authToken}
        deviceCli = ibmiotf.device.Client(deviceOptions)
        #.....................................................
```

```
except Exception as e:
        print("Caught exception connecting device: %s" % str(e))
        sys.exit()

# Connect and send a datapoint "hello" with value "world" into the cloud as an event of type
"greeting" 10 times
deviceCli.connect()

while True:
    #Get Sensor Data from DHT11

    temp=random.randint(90,110)
    Humid=random.randint(60,100)

    data = { 'temp' : temp, 'Humid': Humid }
    #print data
    def myOnPublishCallback():
      print ("Published Temperature = %s C" % temp, "Humidity = %s %%" % Humid, "to IBM
Watson")

    success = deviceCli.publishEvent("IoTSensor", "json", data, qos=0,
on_publish=myOnPublishCallback)
    if not success:
      print("Not connected to IoTF")
    time.sleep(10)

    deviceCli.commandCallback = myCommandCallback

# Disconnect the device and application from the cloud
deviceCli.disconnect()
```

OUTPUT:

Github Link:

https://github.com/IBM-EPBL/IBM-Project-2290-1658469331