PROJECT REPORT

1.INTRODUCTION:

PROJECT OVERVIEW:

IOT in workplace safety refers to the use of Internet of Things (IOT) technology to monitor and manage safety and health conditions in the workplace. This can include monitoring the environment for air quality, temperature, humidity, and sound levels, as well as tracking employee activity and movement.

Examples of IOT-enabled office products are intelligent lighting, smart thermostats, smart locks, GPS trackers, air quality monitoring apps, etc.

The industrial internet of things (IOT) is the use of smart sensors and actuators to enhance manufacturing and industrial processes.

Purpose:

While the most popular example of IOT in healthcare is remote patient monitoring—meaning IOT devices that collect patient data such as heart rate and body temperature—there are many other examples of IOT in the healthcare industry.

Harnessing connected devices means that employees are no longer required to be in the same physical space as one another to collaborate. Cloud-hosted software, fleet management systems, and portable devices allow your employees to manage their work from anywhere over shared networks.

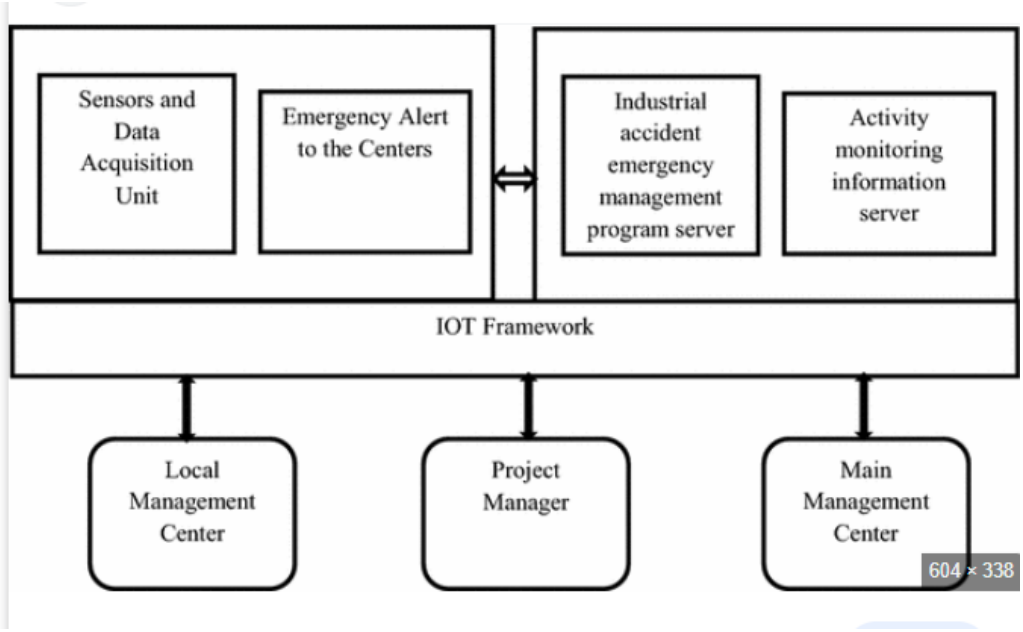
It provides organizations with solutions that streamline communication and collaboration within and outside the companies. You can use various tools that enhance productivity, process automation, and business communications. Thus high-speed connection allows you to excel in your company's performance.

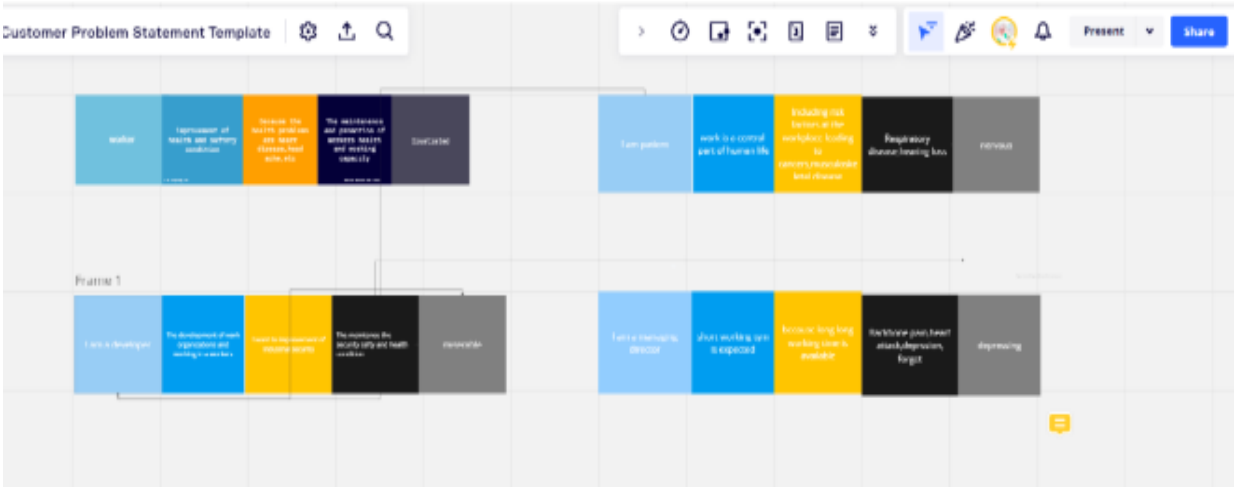
2.IDEATION & PROPOSED SOLUTION:

PROBLEM STATEMENT SOLUTION:

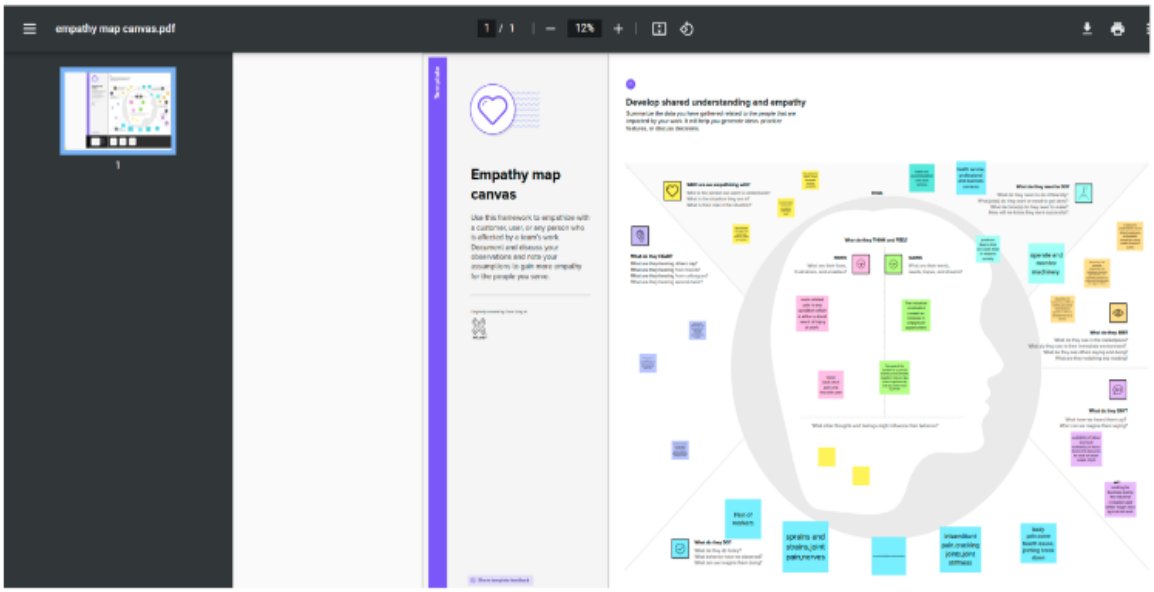
It has resulted in more automated and controlled performance. IoT has helped industries in enhancing results and operations hence improving productivity. The use of IoT technologies has helped the business to gain a competitive edge.

A problem statement is a concise description of the problem or issues a project seeks to address. The problem statement identifies the current state, the desired future state and any gaps between the two.





EMPATHY MAP CANVAS:



IDEATION & BRAINSTORMING:

I

PROPOSED SOLUTION:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Automation can help to improve workplace safety by reducing the number of human workers who are exposed to potential hazards. Safety training. This is training that helps workers learn about potential hazards in the workplace and how to best avoid them.
2.	Idea / Solution description	The Internet Of Things has the potential to make workplaces safer by providing real time monitoring, predictive maintenance, Safety alerts, remote access control , location tracking, inventory management, wearable devices, vehicle tracking, process automation, safety data analysis, and data collection.
3.	Novelty / Uniqueness	IOT safe provides a common mechanism to secure IOT data communications using a highly trusted SIM, rather than using proprietary and potentially less trusted hardware secure elements implemented elsewhere within the
4.	Social Impact / Customer Satisfaction	Customer satisfaction is important role on this IOT. That satisfaction are, by using connected devices and sensors to gather data from their operations , manufactures can gain insights that can help them improves efficiency, reduce waste, and increase profitability.
5.	Business Model (Revenue Model)	A popular IOT business model is the data-driven model powered by the data generated by your device.
6.	Scalability of the Solution	IOT security is the practice that keeps your IOT system safe. IOT security tools protect from threats and branches, identify and monitor risks and can help fix vulnerabilities. IOT security ensures the availability , integrity, and confidentially of your IOT solution.

3. REQUIREMENT ANALYSIS:

FUNCTIONAL REQUIREMENTS:

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 Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3		
FR-4		

Non-functional Requirements:

Are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	IOT safe provides a common mechanism to Secure. IOT data communications using a highly trusted SIM, rather than using proprietary and potentially less trusted hardware secure elements implemented elsewhere within the device.
NFR-2	Security	Automation can help to improve workplace safety by reducing the number of human workers who are exposed to potential hazards. Safety training. This is training that helps workers learn about potential hazards in the workplace and how to best avoid them.
NFR-3	Reliability	By using connected devices and sensors to gather data from their, manufactures can gain insights that can help them improves efficiency, reduce waste, and increase profitability.
NFR-4	Performance	Data is capture at the source through sensors. Data is then transmitted to system for a storage and organization purposes.
NFR-5	Availability	Industrial IOT is defined as the network of devices, machinery and sensors connected to

		each other and to the internet, with the purpose of collecting data and analyze it to apy this information in continuous process improvement.
NFR-6	**Scalability**	**IOT security is the practice that keeps your IOT system safe. IOT security tools protect from threats and branches, identify and monitor risk sand can help fix vulnerabilities. IOT security ensures the availability, integrity, and confidentially of your IOT solution.**

4.PROJECT DESIGN

DATA FLOW DIAGRAMS:

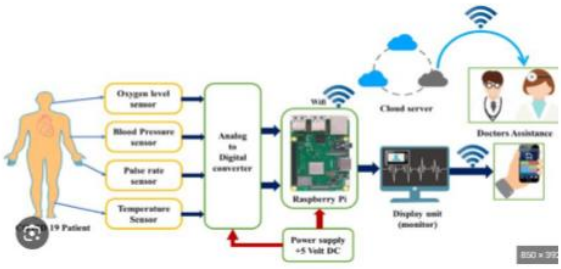
A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored. Data Flow Diagram of Industrial Workers Health And Safety System Based On IOT:

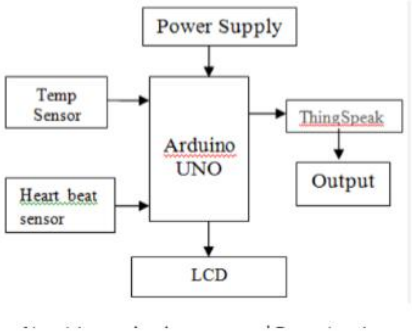
Example: (Simplified)

USER STORIES: Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confi
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login
		USN-4	As a user, I can register for the application through Gmail	

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria
	Login	USN-5	As a user, I can log into the application by entering email & password	
	Dashboard			
Customer (Web user)				
Customer Care Executive				
Administrator				





SOLUTION AND TECHNICAL ARCHIETECTURE:

SOLUTION ARCHIETECTURE:

TECHNICAL ARCHITECTURE:

S.No	Component	Description	Technology
	User Interface	How user interacts with application e.g. Web UI, Mobile App, Chatbot etc.	HTML, CSS, JavaScript / Angular Js / React Js etc.

	Application Logic-1	Logic for a process in the application	Java / Python
	Application Logic-2	Logic for a process in the application	IBM Watson STT service
	Application Logic-3	Logic for a process in the application	IBM Watson Assistant
	Database	Data Type, Configurations etc.	MySQL, NoSQL, etc.
	Cloud Database	Database Service on Cloud	IBM DB2, IBM Cloudant etc.
	File Storage	File storage requirements	IBM Block Storage or Other Storage Service or Local Filesystem
	External API-1	Purpose of External API used in the application	IBM Weather API, etc.
	External API-2	Purpose of External API used in the application	Aadhar API, etc.
	Machine Learning Model	Purpose of Machine Learning Model	Object Recognition Model, etc.
	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration :	Local, Cloud Foundry, Kubernetes, etc.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
	Open-Source Frameworks	List the open-source frameworks used	Technology of Opensource framework
	Security Implementations	List all the security / access controls implemented, use of firewalls etc.	e.g. SHA-256, Encryptions, IAM Controls, OWASP etc.
	Scalable Architecture	Justify the scalability of architecture (3 – tier, Micro-services)	Technology used
	Availability	Justify the availability of application (e.g. use of load balancers, distributed servers etc.)	Technology used
	Performance	Design consideration for the performance of the application (number of requests per sec, use of Cache, use of CDN's) etc.	Technology used

References:

https://c4model.com/

https://developer.ibm.com/patterns/online-order-processing-system-during-pandemic/

https://www.ibm.com/cloud/architecture

https://aws.amazon.com/architecture

https://medium.com/the-internal-startup/how-to-draw-useful-technical-architecture-diagrams-2d20c9fda90d

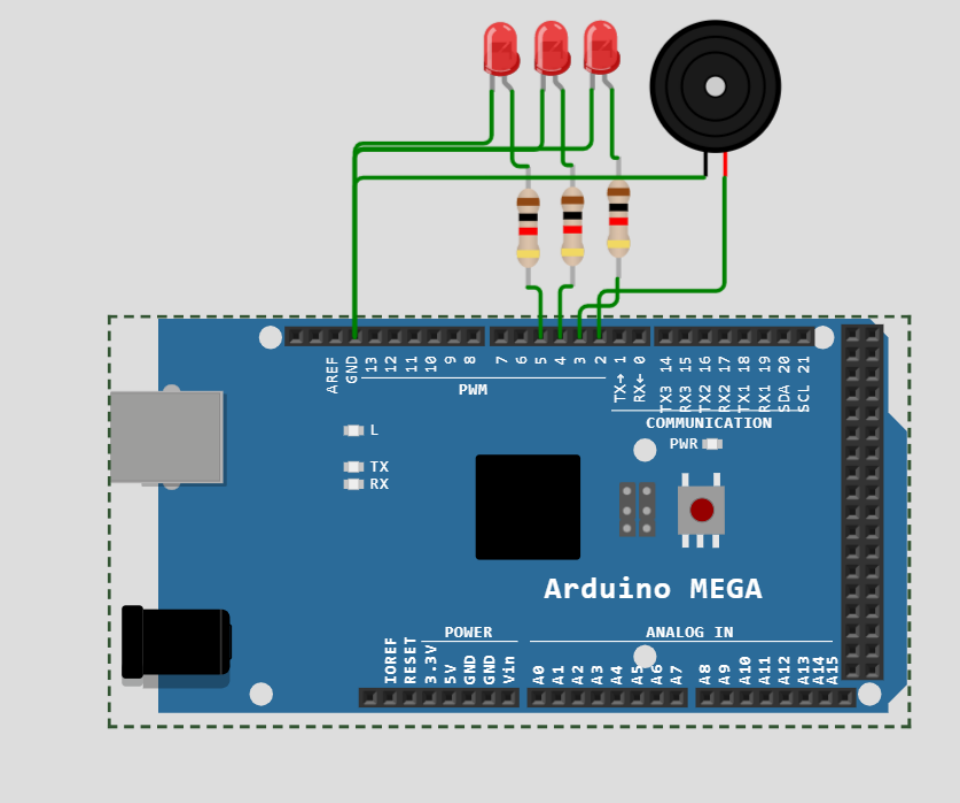
CODING & SOLUTIONING:

```
const int ledPin1 = 3;

const int ledPin2 = 4;
const int ledPin3 = 5;
const int buzzerPin = 2;

int menuSelection = 0;
int ledSpeed = 500;
int ledBrightness = 128;
int selection = 0;
int buzzerState = LOW;

void setup() {
  Serial.begin(9600);

  pinMode(buzzerPin, OUTPUT);
  pinMode(ledPin1, OUTPUT);
  pinMode(ledPin2, OUTPUT);
  pinMode(ledPin3, OUTPUT);

  digitalWrite(buzzerPin, LOW);
  digitalWrite(ledPin1, LOW);
  digitalWrite(ledPin2, LOW);
  digitalWrite(ledPin3, LOW);
  Serial.println("MENU:");
  Serial.println("1. Toggle buzzer on/off");
  Serial.println("2. Increase LED 2 speed");
  Serial.println("3. Decrease LED 2 speed");
  Serial.println("4. Toggle LED 3 brightness");
  Serial.println();
  Serial.print("Selection: ");
}

void loop() {
  int buzzerPinStateLast = digitalRead(buzzerPin);
  if (Serial.available()) {
    int inputChar = Serial.parseInt();

    switch (inputChar) {
      case 1:
```

```
      //Serial.println ("1");
      //digitalWrite(buzzerPin, !digitalRead(buzzerPin));
        ToggleBuzzer();
        selection = 0;
        break;
      case 2:
      Serial.println("case 2");
        ledSpeed -= 50;
        if (ledSpeed < 50) {
          ledSpeed = 50;
        }
        break;
      case 3:
      Serial.println("case 3");
        ledSpeed += 50;
        if (ledSpeed > 1000) {
          ledSpeed = 1000;
        }
        break;
      case 4:
      Serial.println("case 4");
        if (ledBrightness == 0) {
          ledBrightness = 128;
        } else {
          ledBrightness = 0;
        }
        break;
      default:
        break;
    }
  }

  digitalWrite(ledPin1, !digitalRead(ledPin1));
  delay(500);

  static unsigned long lastBlinkTime = 0;
  if (millis() - lastBlinkTime > ledSpeed) {
    digitalWrite(ledPin2, !digitalRead(ledPin2));
    lastBlinkTime = millis();
  }

  analogWrite(ledPin3, ledBrightness);
//Serial.println("MENU:");
  //Serial.println("1. Toggle buzzer on/off");
  //Serial.println("2. Increase LED 2 speed");
```

```
  //Serial.println("3. Decrease LED 2 speed");
  //Serial.println("4. Toggle LED 3 brightness");
  //Serial.println();
  //Serial.print("Selection: ");
  //delay (5000)

}
void ToggleBuzzer ()
{
  buzzerState= (buzzerState) ? LOW : HIGH;
    digitalWrite(buzzerPin, buzzerState);
  //int a = digitalWrite(buzzerPin, LOW);
  //if (a == 1)
  //{
    //digitalWrite(buzzerPin, HIGH);
    //digitalWrite(buzzerPin HIGH); attempt no. 3 failed with multiple errors
 // } else
 // {
 //   digitalWrite(buzzerPin, LOW);
 // }

}
```

Output:


AREF
GND
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TX→ 1
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PWM
COMMUNICATION
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POWER
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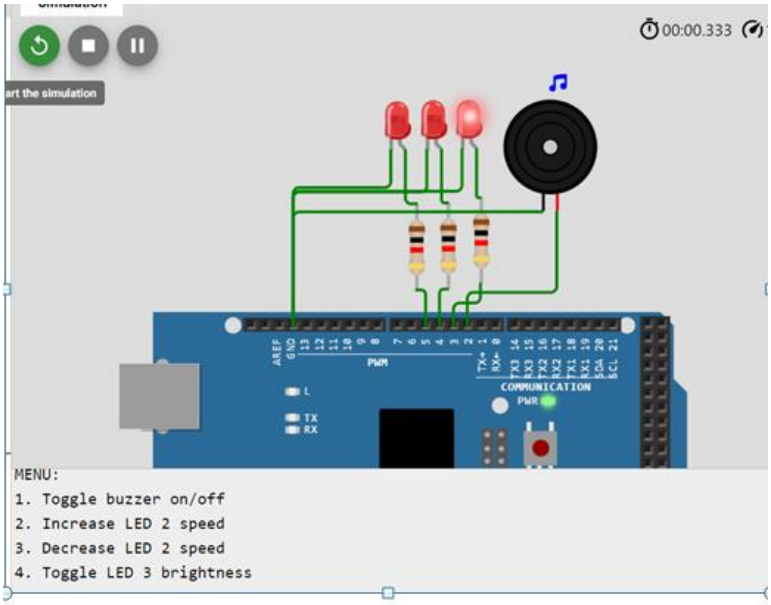

RESULT

PERFORMANCE MATRICE:

By the end of the project, you will:

- **Gain knowledge of Watson IoT Platform**
- **Explore Wokwi Platform**
- **Explore the devices and its simulation of the wokwi platform.**
- **Explore the libraries present in Wokwi.**
- **Will be able to code to connect the devices across the cloud platform.**
- **Connecting the devices on wokwi to the IoT platform device to exchange the sensor data.**
- **Gain knowledge of creating devices and platforms using IBM Watson IoT Platform.**
- **Gain knowledge of web application development through node-red**

ADVANTAGES AND DISADVANTAGES

ADVANTAGES:

• Solar street light is independent of grid as a result of this operating cost is much low.

• Maintenance cost is much low compared to conventional street light.

• Intensity of LED can be controlled effectively without changes in its light color.

• Risk of accidents is very low.

• It is environmental friendly, no harmful emissions.

• Longer life compared to conventional street lights.

• Power consumption is much lower.:

• Initial investment is very high.

DISADVANTAGES:

• Rechargeable batteries have to be replaced from time to time.

• Non-availability of sunlight during rainy and winter seasons is a problem.

• Dust accumulation on the surface of panel creates a problem.

• It is sensitive to ambient light and require careful shielding.

• Can be more complicated to align detector pairs.

• Photo resistors are only sensitive to light and no other force can power It without riskingdamage.

Conclusion:

This project "IOT Based Weather Adaptive Street Lighting System" may be a worth effective, eco-friendly and thus the safest technique to avoid wasting energy and through this technique, the sunshine standing data is accessed from any time and anywhere. It clearly tackles the matter the earth is facing lately that's, saving energy. The project has the scope in varied various applications like for providing lighting in industries, campuses, and parking uncountable massive areas like malls. The project presents more advantages that could overshadow the present limitations. Keeping in view the long run advantages and thus the initial worth would ne'er be an associate issue because the investment repetition time is extraordinarily less.