Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	13 May 2023
Team ID	NM2023TMID10876
Project Name	industrial Workers Health and Safety System Based on Internet of Things

Technical Architecture:

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	Sensors	These are attached to the workers' shoes to capture data such as temperature, altitude, and distance walked. The sensors could include temperature sensors, altimeters, and pedometers or motion sensors.	Basic sensor modules are used
2.	Shoes	The sensors are integrated into the shoes worn by the workers. The shoes act as the physical interface between the sensors and the workers, allowing data collection as they perform their tasks.	Tanning
3.	Communication Module	The sensors are equipped with a communication module that enables them to transmit the collected data	Bluetooth, Wi-Fi, or cellular data
4.	Cloud Infrastructure	he data transmitted by the sensors is sent to a cloud-based infrastructure for storage and analysis. The cloud infrastructure provides the necessary scalability, availability, and reliability for handling large amounts of data from multiple workers.	IBM Watson Cloud Platorm

5.	Data Storage	he collected data is stored in a database within the cloud infrastructure. The type of database used would depend on the specific requirements of the application, such as the volume of data, data structure, and query requirements.	IBM Watson Cloud Platorm
6.	Mobile Application	A mobile application is developed for workers to access their personal data and receive notifications. The application can be installed on workers' smartphones, allowing them to view their status, track their progress, and receive safety precautions or alerts when working at higher altitudes.	MIT App
7.	Web Application	Authorities or supervisors can access a web application to monitor the status of all workers. The web application provides a dashboard or interface where they can view aggregated data, analyze trends, and identify workers who may require additional safety precautions based on their altitude or other parameters.	Ibm cloud dashboard
8.	Precautionary Alert System	The cloud infrastructure includes an analysis module that processes the collected data in real-time. When a worker is detected to be working at higher altitudes, the system triggers precautionary alerts or messages, which are sent to the worker's mobile application, providing them with relevant safety instructions or precautions.	MIT App
9.	Security Measures	The entire system should incorporate security measures to protect the privacy and integrity of the data. This includes secure communication protocols, encryption of sensitive data, access controls, and authentication mechanisms.	Mqtt Protocol

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology

1.	Open-Source Frameworks	Node-red, wokwi, MIT	Open source online platorm
2.	Security Implementations	Data Encryption, Secure Data Transmission, Access Control and Authentication, User Authorization, Data Anonymization	Encryption,Mqtt or https protocols over tcp protocol
3.	Scalable Architecture	The described architecture leverages sensor-based data collection, cloud storage, mobile and web applications, authority access, and a modular design to ensure scalability. By utilizing scalable technologies and design patterns, the system can accommodate a growing number of workers, data volume, and user access without compromising its performance and functionality.	Cloud computing,microservices architecture.
4.	Availability	The availability of mobile and web applications in this scenario ensures real-time monitoring, secure data storage, visualization, analysis, precautionary notifications, and easy accessibility for authorities. These benefits significantly contribute to improving worker safety and enable effective management and decision-making processes in the given working environment.	Open source softwares like MIT,Ibm cloud

5.	Performance	Network connectivity: Since the data is sent to the cloud for storage and analysis, the application should be designed to handle intermittent or unstable network connectivity. Implement mechanisms to handle data synchronization when the network connection is restored and provide appropriate feedback to the users when there are connectivity issues. Battery efficiency: Sensors attached to the workers' shoes may consume power, and the mobile application should be designed to minimize battery usage. Optimize data collection intervals and implement power-saving techniques in the application to maximize the battery life of the devices.	5g and Lithium ion battery