“SAMVED” HACKATHON 2026

TITLE PAGE

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Problem Statement ID	ID-04
Problem Statement Title	Smart Safety and Assistance System for Sanitation Workers of Solapur Municipal Corporation
Theme	Public Safety & Social Welfare
Team ID	302FEFA0
Team Name	Swasthya

Swasthya

IDEA TITLE

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Risk-aware System

Problem

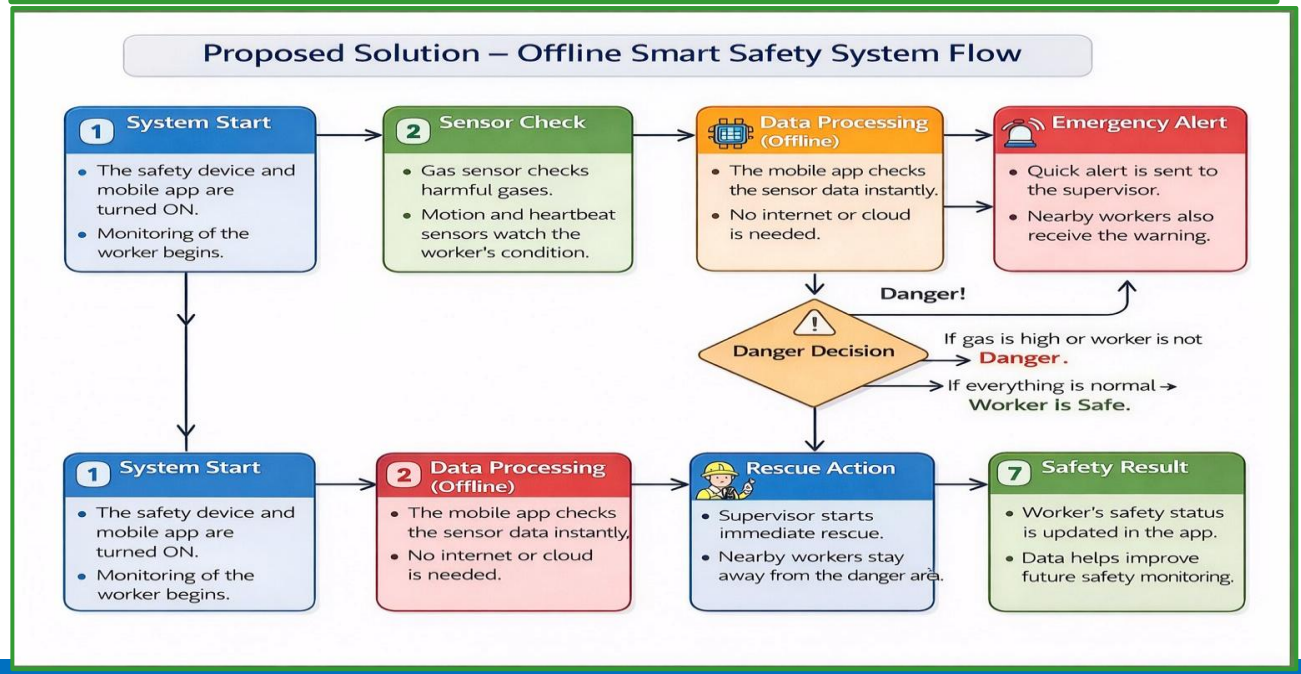
- **Manhole workers** are exposed to **toxic and harmful gases.**
- **Lack of oxygen** can make workers **unconscious** inside the **manhole.**
- **Rescue is often delayed** because danger is **not detected in time.**
- Result: **High risk** to worker safety and life.

Proposed Solution

- **Provide an offline smart safety** system **for manhole workers.**
- Workers wear **a small wearable device** with gas, motion, and heartbeat sensors.
- Data is shared using **peer-to-peer communication** without internet.
- **A smart mobile application detects danger early and sends instant alerts** to the supervisor and nearby workers.
- Result**: Faster rescue and improved worker safety**.

Innovation & Uniqueness

- Works **completely offline** in underground areas.
- Uses **peer-to-peer wireless communication** instead of cloud networks.
- **Provides automatic emergency alerts** even if the worker becomes unconscious.
- **Low-cost** and **scalable** for real municipal use.



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TECHNICAL APPROACH

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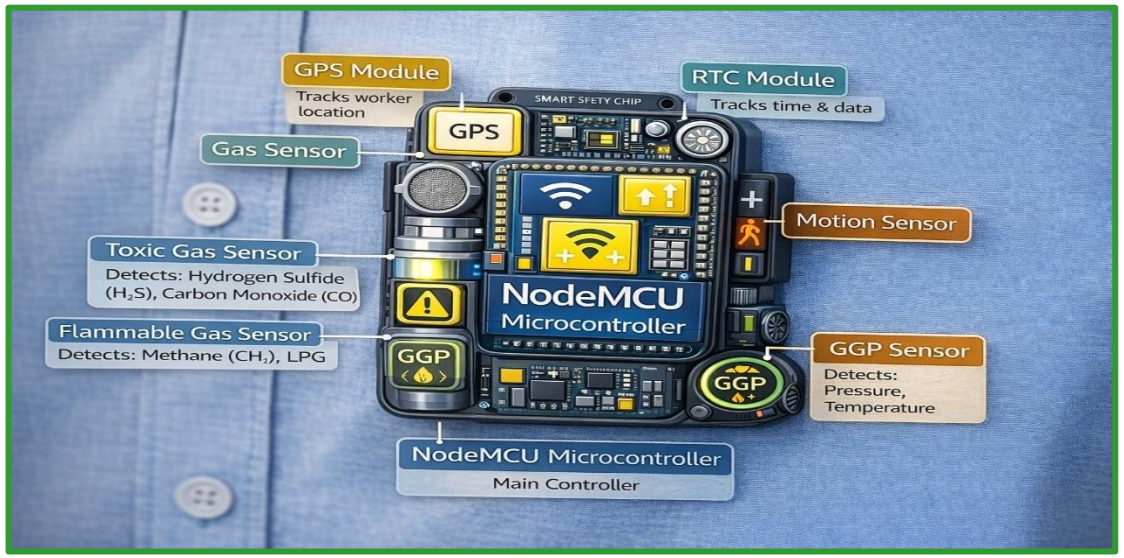
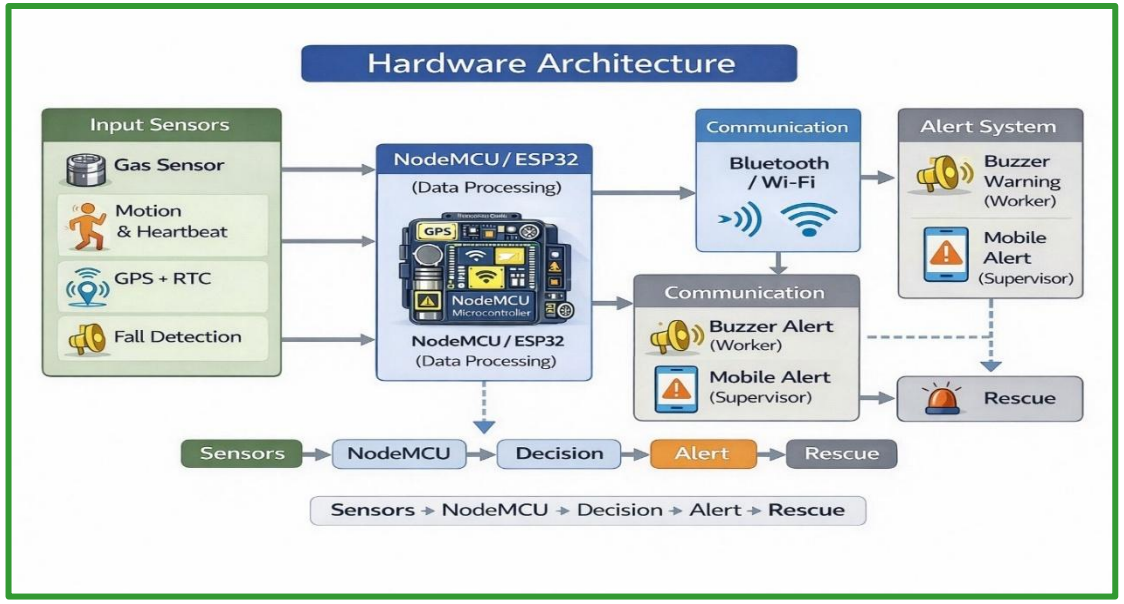
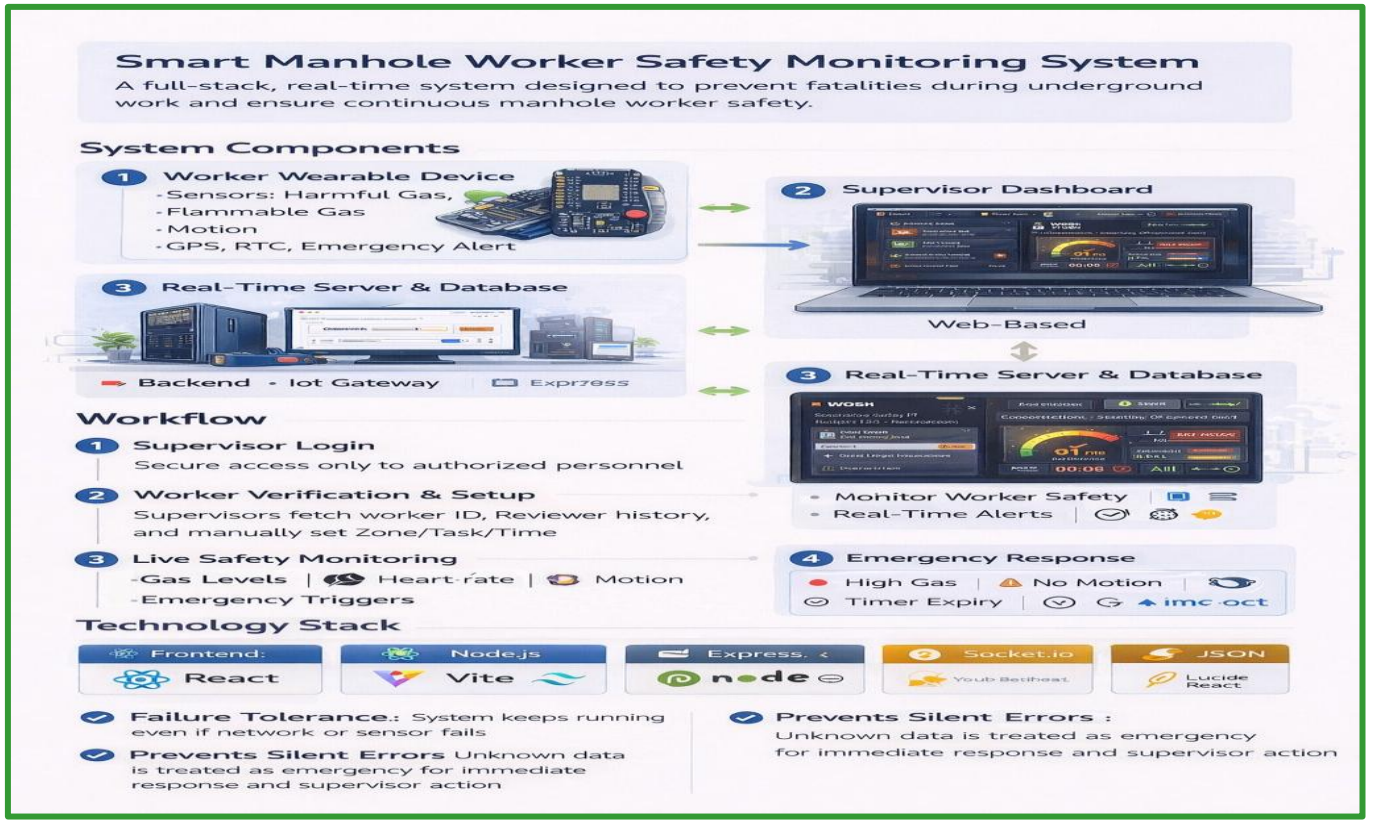
Sketch





Software Approch



Component Description- Click here

Demo Prototype- Click here

Detailed proposed Solution- Click here

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FEASIBILITY AND VIABILITY

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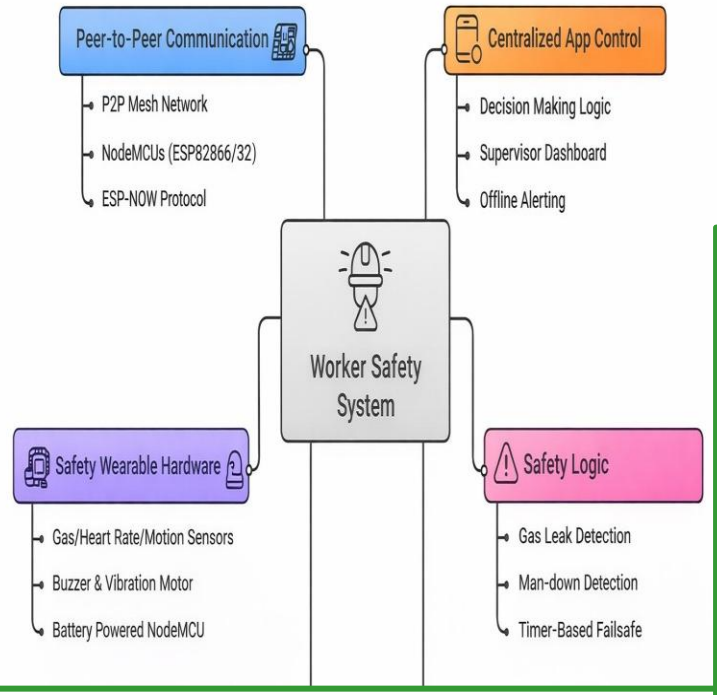
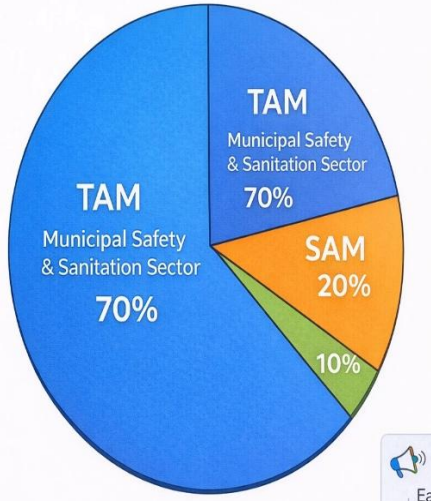
SMART SANITATION, SAFE INDIA

- Life-saving worker protection
- Offline, reliable safety monitoring
- Faster emergency response
- Scalable for smart cities

Technical Feasibility



Market Opportunity Breakdown – Worker Safety System



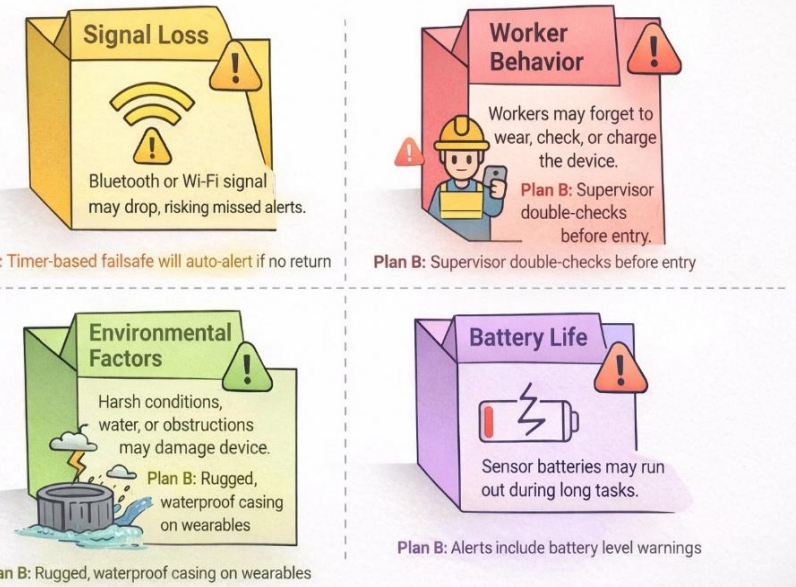
TAM
Municipal Safety & Sanitation Sector
70%

SAM
Smart Worker Safety Monitoring Systems
20%

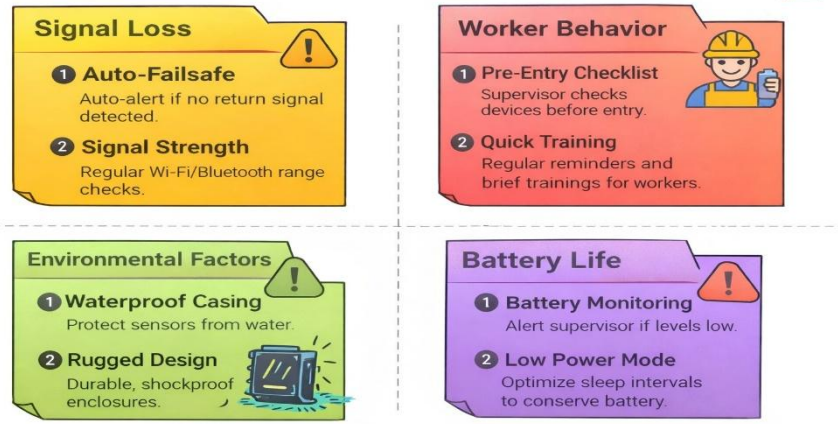
SOM
Manhole & Sewer Worker Protection Solutions
10%

Summary:
Each challenge is solved using **automatic safety** logic, backup communication, rugged hardware design, and power-efficient monitoring to ensure reliable worker protection in offline contined environments.

Challenges & Risk



Strategies to Overcome Challenges



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IMPACT AND BENEFITS

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Impacts

1. Safety Impact

- Reduces worker accident risk by **up to 80%** through instant gas detection, motion monitoring, and emergency alerts.

2. Rescue Impact

- Enables **faster emergency response** by sending real-time danger alerts to the supervisor and nearby workers.

3. Social Impact

- Improves **health, dignity,** and **protection** of sanitation workers by providing a safer working environment.

4. Policy & Market Impact

- Supports **government safety compliance** and promotes adoption of smart safety technology across cities.

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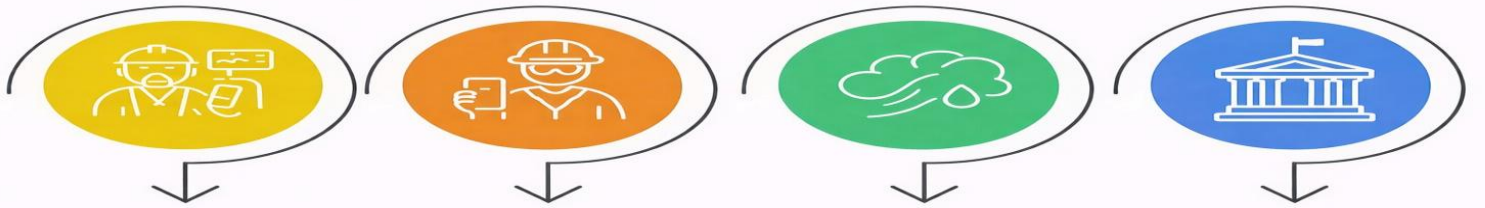
- Supports **government safety compliance** and promotes adoption of smart safety technology across cities.

Benefits



Workers

Safer working conditions with real-time gas detection, motion monitoring, and instant emergency alerts.

Supervisors

Can monitor worker safety remotely and respond quickly during emergencies.

Environment

Reduces harmful gas exposure and promotes safer underground sanitation work.

Government / Market

Supports safety regulations, smart city development, and scalable worker protection solutions.

Workers → "Real-time gas detection, motion monitoring, and instant alerts make manhole work much safer and reduce accident risk."

Supervisors → "Live safety monitoring and quick emergency alerts help supervisors respond faster and save lives."

Environment → "Safer underground operations reduce harmful gas exposure and support cleaner, healthier sanitation systems."

Government/Market "Supports worker safety laws, smart city initiatives, and scalable protection solutions across municiplaties."

Survey Of System- Click here
Use case Diagram- Click here
Feature List- Click here

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RESEARCH AND REFERENCES

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S. Kumar and R. Singh,"Real-Time Toxic Gas Detection and Monitoring Using Embedded Systems,"IEEE Sensors Journal, vol. 19, no. 12, pp. 4501–4509, 2019.doi: 10.1109/JSEN.2019.2901234Available: (Click here)

N. Ahmed and K. Lee,"Confined Space Monitoring Using IoT-Enabled Sensor Networks,"IEEE Internet of Things Journal, vol. 8, no. 3, pp. 1456–1465, 2021.doi: 10.1109/JIOT.2020.3015678Available: (Click here)

S. Rajasekaran and P. S. Manoharan,"Smart Helmet for Industrial Safety Using IoT,"IEEE International Conference on Intelligent Computing and Control Systems, 2018.(Click here)

Government of India,"The Prohibition of Employment as Manual Scavengers and Their Rehabilitation Act," 2013.(Click here)

A. Kumar, D. Singh, and R. Kumar,"IoT-Based Smart Monitoring System for Underground Sewer Workers,"Procedia Computer Science, vol. 171, pp. 237–246, 2020.(Click here)