“SAMVED” HACKATHON 2026

MIT Vishwaprayag University

- **Problem Statement ID – PS-001**
- **Problem Statement Title - Smart Road Damage reporting & Rapid Response System For Solapur Municipal Corporation**
- **Theme - General**
- **Team ID- 302CCE5B**
- **Team Name - TRIUMVIRATE**

सोलापूर
महानगरपालिका,
सोलापूर

TRIUMVIRATE

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Thermal Based Pothole Detection System

IDEA/SOLUTION:

Implementation of a **Thermal based pothole surveillance website** for Solapur Municipal Corporation

- ❑ Thermal camera to detect and monitor the pothole.
- ❑ Embedded programming and censor control to measure and give the approximate pothole size and depth.
- ❑ AI and ML models predict the cause and the risk factor of the pothole and give the appropriate solution to solve the problem.

PROBLEM RESOLUTION:

- ❖ Early and Automatic Detection.
- ❖ Severity and Risk Assessment.
- ❖ Cause Identification.
- ❖ Improvement in road safety.

UNIQUENESS OF THE SOLUTION:

- ✓ Thermal identification of the potholes.
- ✓ Identification as well as giving approximate properties of potholes.
- ✓ Giving approximate causes of the potholes.
- ✓ Risk factor assessment.

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TECHNICAL APPROACH

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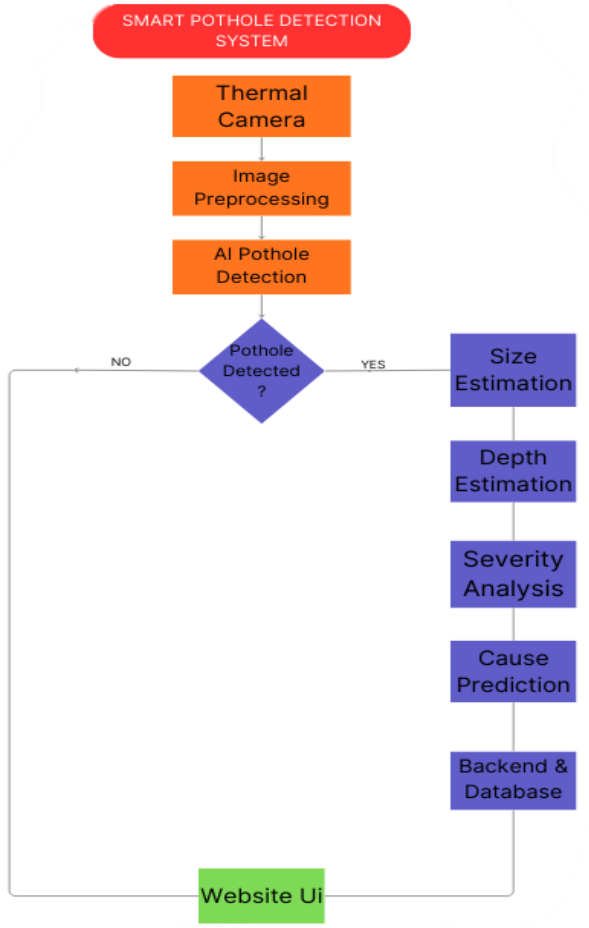
Programming Languages :

Python , SQL , JavaScript , CSS , HTML

Hardware :
Thermal Camera , sensors

Framework:
AI - ML , FASTAPI , IOT , React.js

PROCESS FLOW ARCHITECTURE



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FEASIBILITY AND VIABILITY

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FEASIBILITY:

Good connectivity , Cost Effective , Open to funding opportunities

VIABILITY:

Can be used in areas with **adverse weather conditions** or at **night**

POTENTIAL CHALLENGES AND RISKS:

- Infrastructure challenges include unreliable connectivity in rural areas , difficult hardware maintenance and power supply problems.
- Difficulty in obtaining information about potholes in an unpaved road.
- Socio culture barriers including low digital literacy and limited cultural and language adaptation.

STRATEGIES TO OVERCOME CHALLENGES:

Removing technological and connectivity glitches ,and effective monitoring.

IMPACT AND BENEFITS

IMPACTS AND BENEFITS:

- ✓ Can be used for immediate identification of potholes.
- ✓ Provides the approximate cause and risk factor of the potholes.
- ✓ Minimizes the amounts of accidents caused by potholes.
- ✓ User friendly interface .
- ✓ Can be used in harsh environments like areas with heavy rain, fog etc.
- ✓ Can be used in rural areas with different issues like power, signal etc.

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RESEARCH AND REFERENCES

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- **Article on Potholes : https://pavementinteractive.org/reference-desk/pavement-management/pavement-distresses/potholes/**
- **Pothole detection using computer vision based techniques : https://pubs.aip.org/aip/acp/article-abstract/3246/1/020007/3319232/Pothole-detection-using-computer-vision-based?redirectedFrom=fulltext**
- **Research on Road Pothole Recognition Based on Deep Convolutional Neural Networks : https://www.semanticscholar.org/paper/Research-on-Road-Pothole-Recognition-Based-on-Deep-Liu-Wang/cc1cd513bbf969e2bcdbf1acb27b91e89446744a#related-papers**
- **Evaluation of YOLOv8 and SSD Object Detection Models for Pothole Detection Systems : https://www.semanticscholar.org/paper/Evaluation-of-YOLOv8-and-SSD-Object-Detection-for-Sarange-Manmat/0532866871415d87c009e299315ec27a35b9c56**