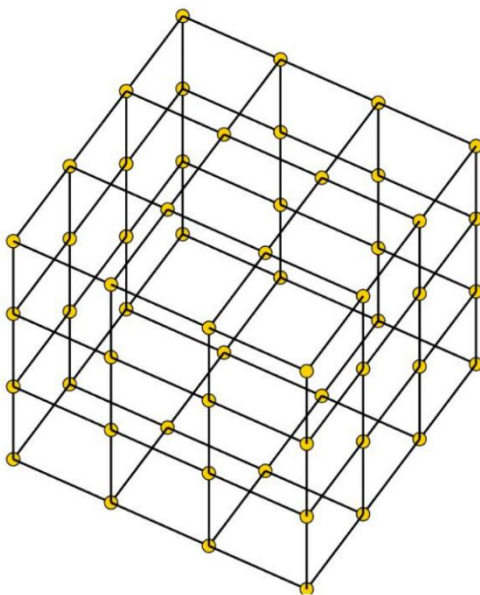


YELLOW MATRIX



ENGINEERING || INNOVATION

ARPIT CHAHANDE
Founder & CEO

Yellow Matrix Private Limited
CIN: U63999PN2023PTC221281

Smart Telematics for Simhastha'28

Fleet, Emergency & Crowd Visibility

COVER SLIDE

Registration Number: TH1065

Project Title: **Smart Telematics-Based Monitoring Platform for Vehicle, Crowd, and Emergency Management**

Theme:

Team Name: Yellow Matrix

Team Members with Role:

- Arpit Chahande- Project Lead
- Shubham – Hardware Engineer
- Abhishek –Hardware Engineer
- Ankit- Platform Engineer
- Swaraj- Platform frontend Engineer

Problem Statement: Efficient Management & Control

Simhastha 2028 is expected to witness a surge of millions of devotees. Managing such a crowd demands scalable, real-time monitoring of both people and vehicles for safety, situational awareness, and efficient response.



Safety Enabling emergency response and reducing incident risk



Visibility Real-time tracking of critical assets and personnel



Scalability Ready to support thousands of units across event zones



Preparedness Predictive insights to manage crowds and fleets efficiently



Reusability Long-term tech asset for future events and civic use

Proposed Solution: Track-Monitor-Control

- Deploying **Telematics control units (TCUs)** in official and emergency vehicles, convoys, and selected checkpoints.
- Monitoring & Controlling operations through a Centralized Integrated Platform

Track **vehicle location, orientation, usage patterns**

Monitor **vehicle performance and potential faults**

Send real-time alerts for **emergency response coordination**

Enable **predictive analytics** through centralized dashboard

Can also be extended to **crowd management** using mobile sensor hubs

Ambulance location & behavior tracking

VIP convoy health and movement visibility

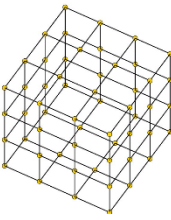
Monitoring municipal fleet during Simhastha

Predictive maintenance for high-use event vehicles

Zone-wise heatmap of movement (for traffic and crowd modeling)

Prototype Demo: Screenshots

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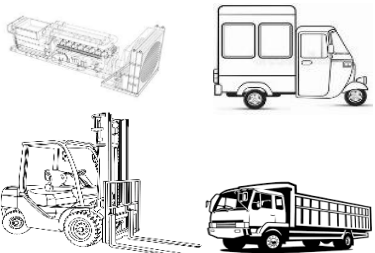


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Secured MQTT
Connection

GPS, Motion, CAN, GPIO Data



Vehicles, Assets

TrackMaster Hub

Yellow Matrix Private Limited

MOBILE APPS LIVE ALERTS SLIDE SHOW ? Admin

Dashboard

HOME

- Dashboard
- Reports

ACTIONS & EVENTS

- Mobilize/Immobilize
- Alerts
- Connectivity

DEPLOYMENT

- Status
- Rollout New
- Logs

GEO SERVICES

- POI
- Routes
- Trips
- Activity

MANAGE

- Logout

Tracking: 0

- Public Transport: 78
- VIP: 05
- Emergency: 15
- NO GPS: 0

Non Tracking: 17

- OFFLINE: 17
- NO DATA: 0
- DISCONNECTED : 0

Search Tracking Vehicles

<input type="checkbox"/>	TSUYOTES08	TSUYO001
	1 day ago	
<input type="checkbox"/>	TSUYOTES10	TSUYO001
	3 days ago	
<input type="checkbox"/>	TSUYOTES07	TSUYO001
	4 days ago	
<input type="checkbox"/>	TSUYOTES04	TSUYO001
	4 days ago	

CONFIDENTIAL

Tech Stack: Electronics Hardware + Cloud Platform

Hardware

Custom-built
Telematics Control Unit

- GPS, CAN, Accelerometer, Gyro, Voltage Sensor
- 12V/24V compatible
- NB-IoT/4G Enabled
- IP-rated for rugged deployments

Firmware

Custom Bootloader +
Application Layer

Secure OTA update
capabilities

CAN Stack + Fault
Monitoring

Cloud Platform

Real-time device data
ingestion

Event dashboards (Map
view, Alerts, Trends)

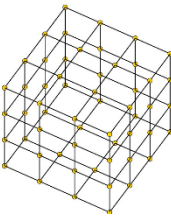
Alert Engine (over-
speed, harsh braking,
battery issues)

Reporting engine for
daily/monthly data

REST APIs for third-
party integration

Architecture – Modular and Scalable Design

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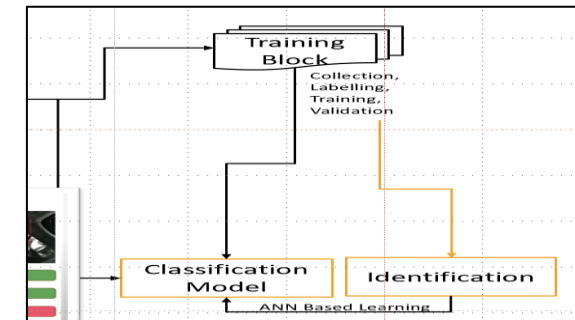
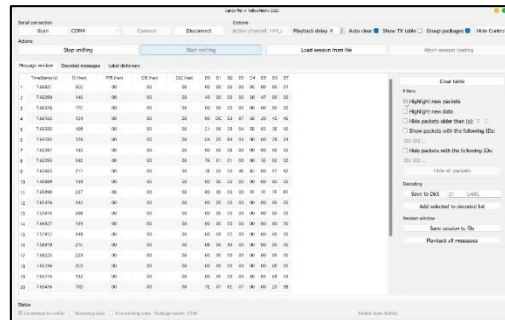
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Frontend

Backend

Edge software

Microservices



- Monitoring Dashboard - web/mobile
- Control & FoTA platform

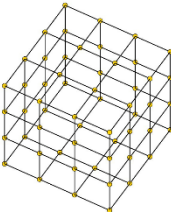
- APIs, Managed services
- Device Management, Alert Engine

- Firmware, Bootloader
- CAN stack, Data pre-processing
- Edge Alerts

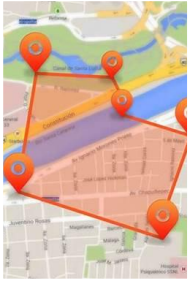
- Microservice based deployment
- Auth Services, Alerts & Notifications,
- Trip & Reoprt Management, analytics,

Impact: Efficient Movement Control

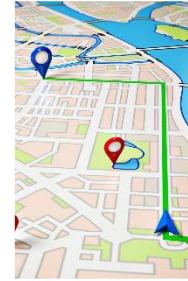
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Enhanced operational visibility across the Simhastha fleet



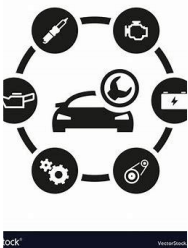
Reduced emergency response time via live GPS and fault alerts



Improved crowd management by vehicle flow insights



Data-driven planning for traffic and logistic teams



Preventive maintenance through predictive alerts



Platform reusable by the MP Govt for future public events

Current & Future Scope

Pre-Simhastha Deployment	<div>1. Deploy 100+ units across target fleets (ambulances, officials, patrol units, garbage collection, etc.)</div> <div>2. Define data logging and alert thresholds based on role</div> <div>3. Train staff and enable web dashboard access</div>
During Simhastha	<div>1. Live monitoring of key event vehicles</div> <div>2. Generate real-time alerts for malfunctioning/emergency units</div> <div>3. Run analytics for high-traffic zones, idle hotspots, delays</div>
Post-Event Analytics	<div>1. Summary report generation: heatmaps, alerts raised, action taken</div> <div>2. Insights for future preparedness</div>
Scalability	<div>1. Platform is cloud-hosted, easily scalable to thousands of devices</div> <div>2. Hardware is modular, can be programmed for other environmental parameters</div>

