Trithon 2026

Theme: Innovative improvement in Agriculture / Healthcare / Environment/Energy/ Education using AI/ ML/ DL / LLM Technologies

Team Name :

Problem Statement Title :

Team Leader Name :

Institute Name :

Team Lead Contact Number:

Hackathon Theme & Project Guidelines

Theme:

Innovative Improvements in Agriculture, Healthcare, Environment, Energy, and Education using AI, ML, DL, and LLM Techn

Participants are required to develop solutions strictly aligned with the above theme. Projects must clearly demonstrate the application **(AI), Machine Learning (ML), Deep Learning (DL), or Large Language Models (LLMs)** to deliver innovative, scalable, and impactf specified domains.

The hackathon primarily focuses on **software-based intelligent solutions** powered by AI/ML/DL/LLM technologies.

Projects that **do not align with the theme** or lack **substantial AI/ML/DL/LLM integration may not be** considered for evaluation.

Each team must include at least one girl, consist of six members including the team lead, and all members must be from the same col are not allowed.

Participants from colleges traveling more than 150 km will be provided hostel accommodation and hospitality only if their team of 6 me 20th March 2026 before 5:30 PM.

Download the PPT from Google Presentation by clicking File → Download → (.pptx) format, fill it properly, and upload it in

You may remove this slide titled 'Hackathon Theme & Project Guidelines', but all other 14 slides in the PPT are mandatory a

The Overview :

Deep Reinforcement Learning is used in the AI based traffic signal control system called Traffic-Mind.
Our system, in contrast to conventional fixed timer traffic lights, learns from the flow of traffic and modifies the timing of the signals as necessary to:

- Decrease traffic
- Reduce the amount of time that vehicles must wait.
- Give emergency vehicles priority.
- Reduced CO2 emissions and fuel consumption

Traffic-Mind creates a more intelligent, quicker, and environmentally friendly intersection by continuously analysing traffic flow and enhancing signal choices.

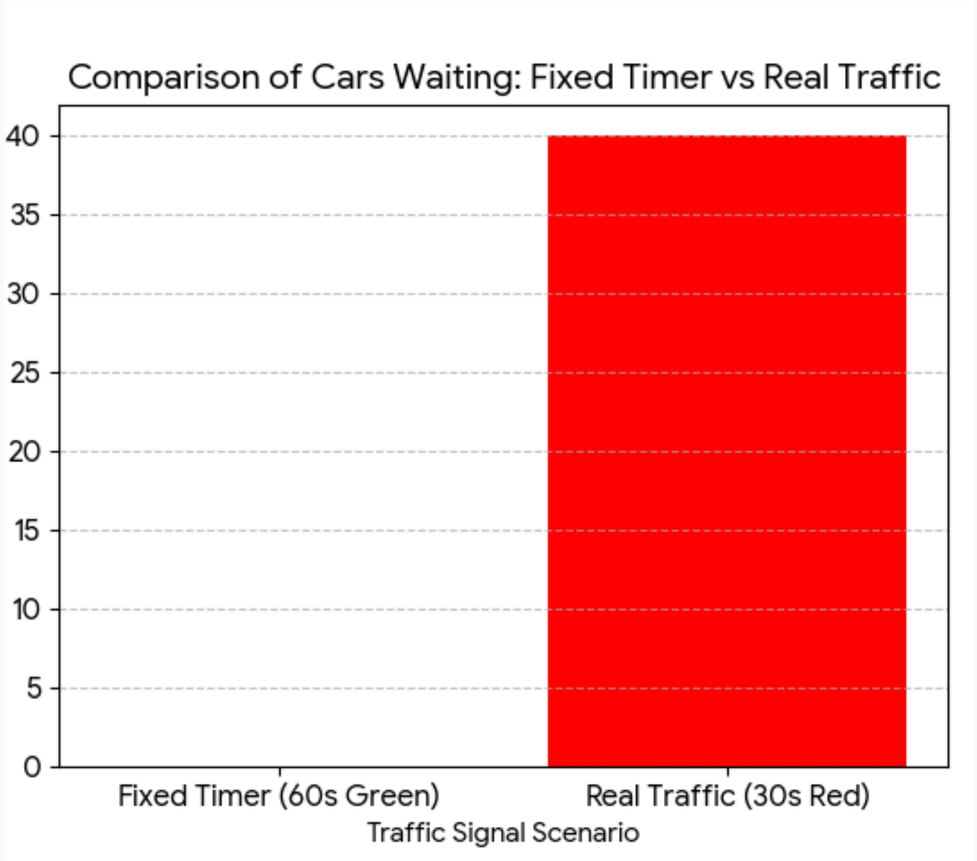
The Problem :

Inefficient Traffic Signal Systems

- Most traffic lights use fixed timers.
- They do not respond to real-time traffic conditions.
- Green lights stay on even when no vehicles are present.
- Heavy lanes continue waiting unnecessarily.
- Emergency vehicles get stuck in traffic.

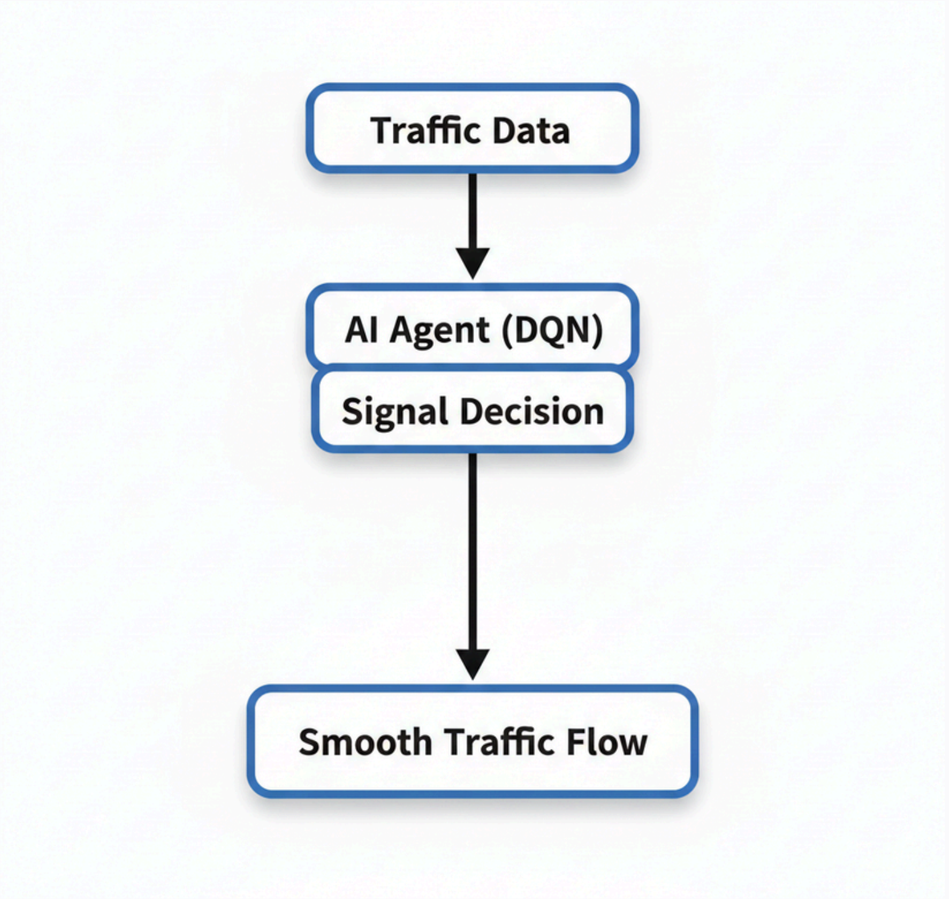
Consequences:

- Congestion
- Fuel loss
- Pollution
- Emergency delays



Solution Suggested:

- Deep Reinforcement Learning (DQN) based adaptive traffic signal system driven by AI.
- Dynamically modifies signal timing while continuously monitoring traffic conditions in real time.
- Establishes an automated Green Corridor to give priority to emergency vehicles.
- Lowers CO2 emissions, traffic, waiting times, and fuel use.



Technology Stack :

Layer	Technology	Primary Role
1. Simulation	**PyGame**	Handles vehicle physics, lane dynamics, and 2D intersection modeling.
2. AI Agent	**Deep Q-Network (DQN)**	Learns high-value actions (signal timing) to minimize wait times via reinforcement learning.
3. Framework	**Custom Environment**	Implements training interface (State/Action/Reward) for the AI agent.
4. Deep Learning	**PyTorch**	Powers the neural network training and mathematical gradients for decision-making.
5. Core Logic	**Python**	Acts as the "glue" code; manages API calls (like TraCI) and safety overrides.
6. Visualization	**PyGame GUI + Matplotlib**	Provides a graphical interface for simulation display and analytics charts.
7. Analytics	**Matplotlib**	Visualizes historical data like queue lengths, CO2 emissions, and total throughput.

Whether similar solution exist ?

🌆 Existing Systems	⚠ Limitations	🚀 Traffic-Mind
SCATS, SCOOT	Expensive infrastructure	Deep RL-based learning
Smart City AI lights	Sensor-heavy	Low-cost scalable model
Adaptive timers	Mostly rule-based	Self-learning DQN agent
Used in developed cities	Limited emergency automation	Automatic green corridor

Your novelty, either in tech or otherwise :

Traditional Systems
↓
Rule-Based Optimization
↓
Limited Adaptability

vs

Traffic-Mind
↓
Deep Reinforcement Learning
↓
Self-Learning + Emergency Override
↓
Real-Time Eco Impact Monitoring

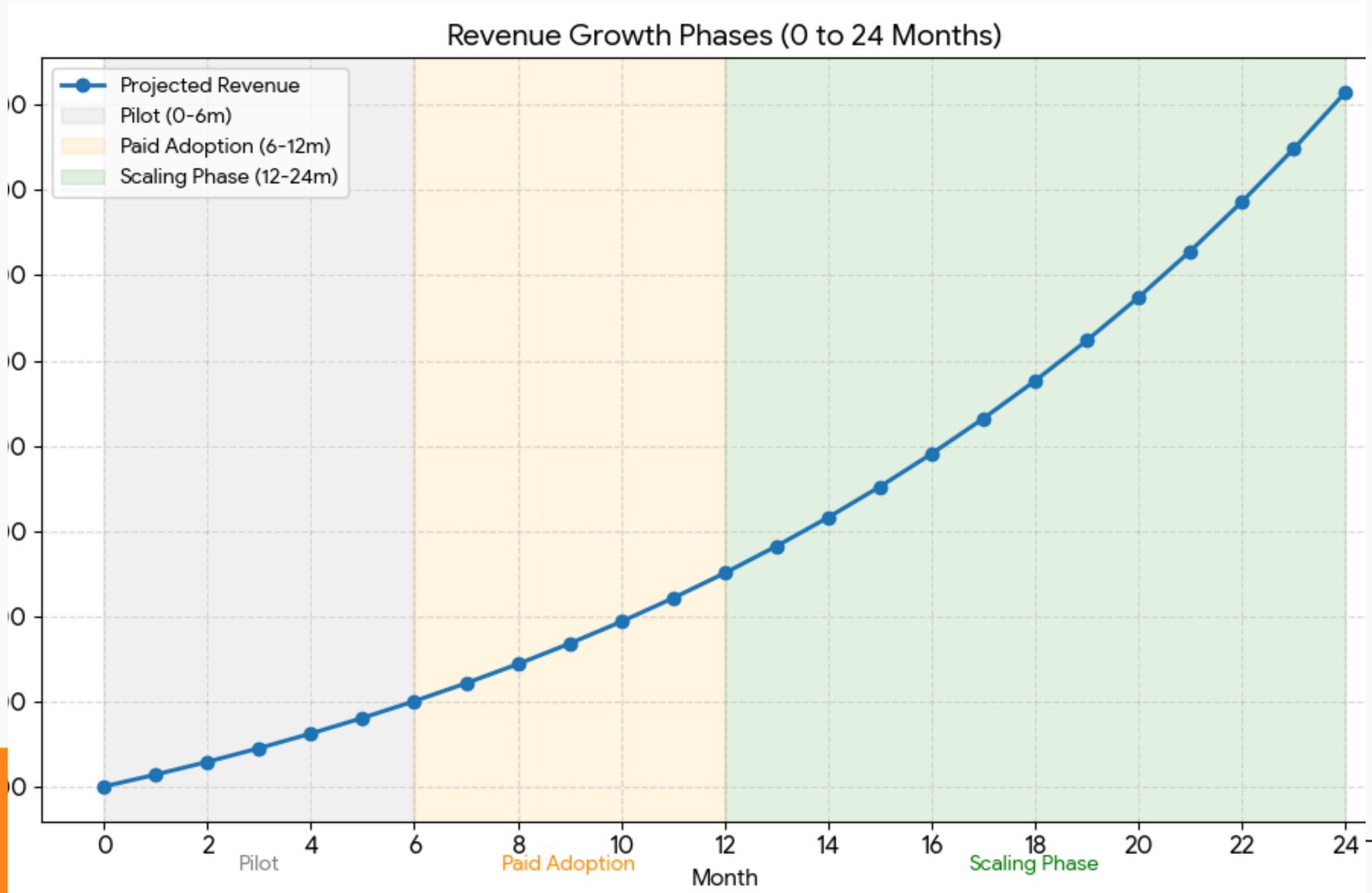
How can you monetize the solution?

🏛️ Govt Licensing Annual AI license	🏙️ Smart City Contracts Integration projects
☁️ SaaS Model Per intersection fee	📊 Data Analytics Traffic insights sales

What is your stability and growth plan?

🛡️ STABILITY PLAN	📈 GROWTH PLAN
Hybrid AI + Rules: Combines DQN flexibility with rigid safety logic.	**Phase 1: Pilot Deployment:** Testing at a single real-world intersection.
Emergency Override: Priority sensors for ambulances and fire trucks.	**Phase 2: Multi-Intersection:** Coordinating flow between adjacent signals.
Fail-safe Fallback: Reverts to a fixed timer if the AI sensor fails.	**Phase 3: City Integration:** Connecting to a centralized urban traffic grid.
Continuous Retraining: AI updates based on new seasonal traffic patterns.	**Phase 4: National Scaling:** Deploying the framework across multiple cities.

How can you generate revenue in the first 24 months?



Video links about your project:

Participants are requested to upload their **project explanation video, PDF** to **YouTube or Google Drive** and submit the shared link.

YouTube link (If any):-

Google drive link (If any) :-

Pdf Link(If any):-

Extra Link(If any):-https://github.com/MrinallSamal-byte/trafifc_trident

Team Details (with mail and phone number):

	Name	Gender (M/F)	Email id	Mobile no.
Team Leader				
Team Member				
Team Member				
Team Member				

Conclusion

🚦 Traffic-Mind

- ***AI-Powered Adaptive Control***
- ***Reduced Congestion & Emissions***
- ***Emergency Green Corridor***
- ***Scalable Smart City Solution***
- ***Sustainable Revenue Model***

“We are not predicting traffic we are solving it.”