

NURA: The AI – based Traffic Management system

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Nura Innovations Pvt Ltd

Proposed to

IITM - Research Park: Incubation Cell



About

Nura Innovations: Translate and accelerate innovations from lab into viable real-world projects that make a difference, sooner.

NURA - AI TMS: “Using deep learning-based algorithms to manage traffic, enhance flow and road safety, while creating sustainable cities”.

Core Team:

Arun S Kanniah - Founder Director, Innovator & CEO.

Mihir Gandhi - Co-founder & Chief Technical Officer.

Varun Raj - AI / ML Developer.

Shailee Yadav - AI / ML Developer.

Mentors: **Dr Lelitha Devi** IITM Transport Engineering division & Center of excellence in Urban Transportation.

Resource Mapping

Arun S Kanniah: With his skills in project management, Arun will act as a project lead carrying out day to day activities as instructed by the mentors. Full-time on the project, visiting the IITMRP.

Mihir Gandi: Mihir is an exceptional talent who has strong skills in Computer vision, ML and Data Science. While holding a M.Tech degree from Georgia Tech University, he has worked with top companies like Jio, developing their 5G technology and done projects in adaptive traffic signal controlling.

Varun and Shailee: Have worked extensively with computer vision and AI/ML modelling. Interning with us, they will develop the entire product end-to-end with the support of the Chief Technical Officer.

Conventional traffic control system:

- Urban congestion management is a critical issue
- Extra delays
- Stressed drivers
- Increased fuel consumption
- Increased carbon emissions
- Pollution

“Traffic lights play a critical role in traffic flow, fuel consumption, reducing fuel costs, travel times and pollution”.



Why NURA AI-TMS?

Conventional traffic system:

1. Manual control - Requires lot of manpower, not efficient.
2. Automatic control - Pre-set timer value. Does not account peak hours and real-time traffic.
3. Electronic sensor - Data about proximity and traffic but not connected to traffic signals. Less accurate.
4. Current system is fixed and does not reduce empty signal times.



What can NURA – AI based Traffic Control System do?

- ✓ Leverage the power of deep learning: Real-time traffic data is collected, computed, traffic signals are adjusted according to traffic density, direction and timing, using AI and ML models.
- ✓ Easily implemented: Into the already available infrastructure with minimal set up costs.
- ✓ Better and sustainable cities: Reduce unwanted delays, reduce congestion and improve flow, reduce fuel consumptions and pollution.



Technology behind AI-TMS:

Continuous image capture using YOLO V8.



Detection of vehicle type, direction of movement and density.

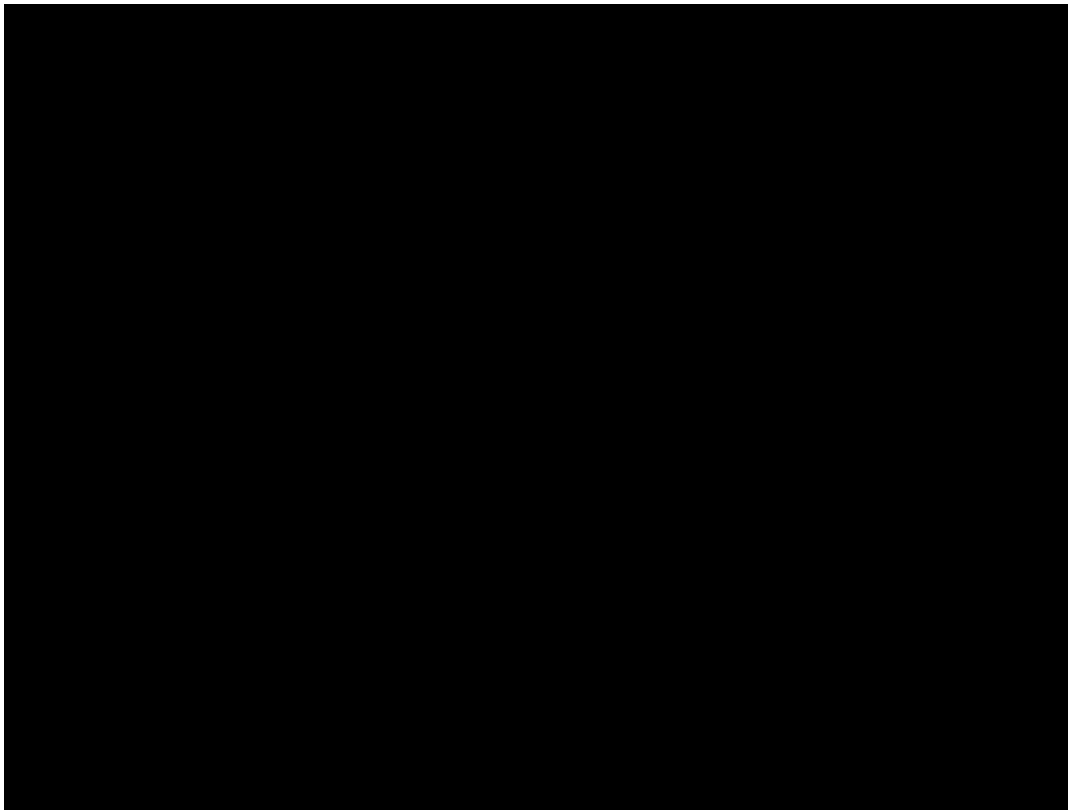


Computing green signal time based using algorithm and data from all signals in the junction.



Real time scheduling of signal, enhancing flow.

Real-world simulation and computation:



What next?

Phase 1: Implementation and testing in Chennai traffic conditions ~3 months.

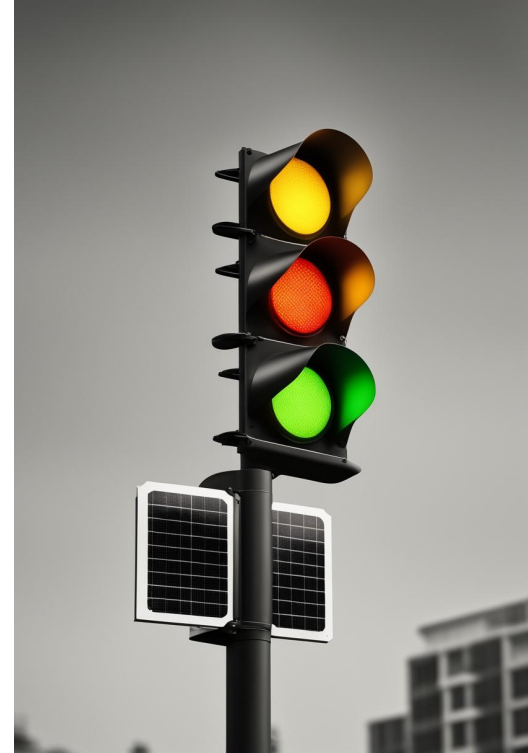
Phase 2: Development of additional features:

- Siren detection: Allow ambulances / siren vehicles / convoy to move faster ~ 1 month.
- Number plate recognition: To detect traffic rule outliers. Can fine people based on vehicle number plate same day < 1 month.
- Central notification: To the control unit when there is flouting of rules - Helmet / Speed / No indicator / Wrong side / No seat belt etc < 1 month.

Solar and Autonomous signals:

Signal system developed with chips and solar powered to function without intervention.

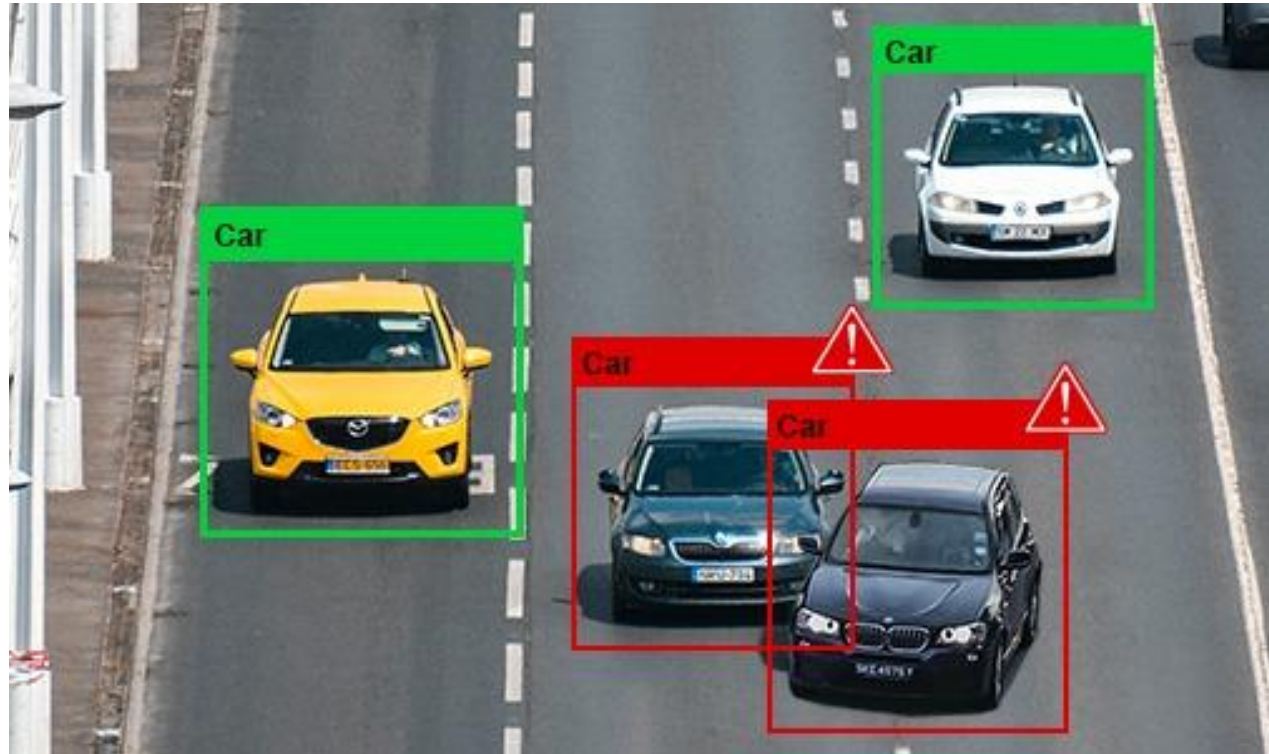
This will involve 5G and wireless cloud based data collection and computation locally within the signal box.



Accident detection system:

Automatic accident detection system that will notify nearby traffic police and control room regarding the accident along with the video clips and images in real time.

This will also detect bad driving behavior and warns drivers to help prevent road accident related deaths.



Stolen vehicle tracing:

Stolen vehicle traced by sending an SMS from registered mobile number to the cloud.

Use of both GPS + camera tracking system to find the stolen vehicle number plate (*Paid feature - revenue generation opportunity!*).

Identity of thieves and last seen location shared in real time with police and owner.



Automatic fine collection system:

Traffic rules violators given warning through SMS sent on the law that was not obeyed thrice and then fine collected from Rs.3. Avoid escaping traffic police!

Bad driving behavior be warned and corrected on spot or same day.



Image - Patrika

Road regulatory officers:

Current traffic police manpower - capacity development into Road Regulatory officers (RRO's) and trained to manage and operate the new system.

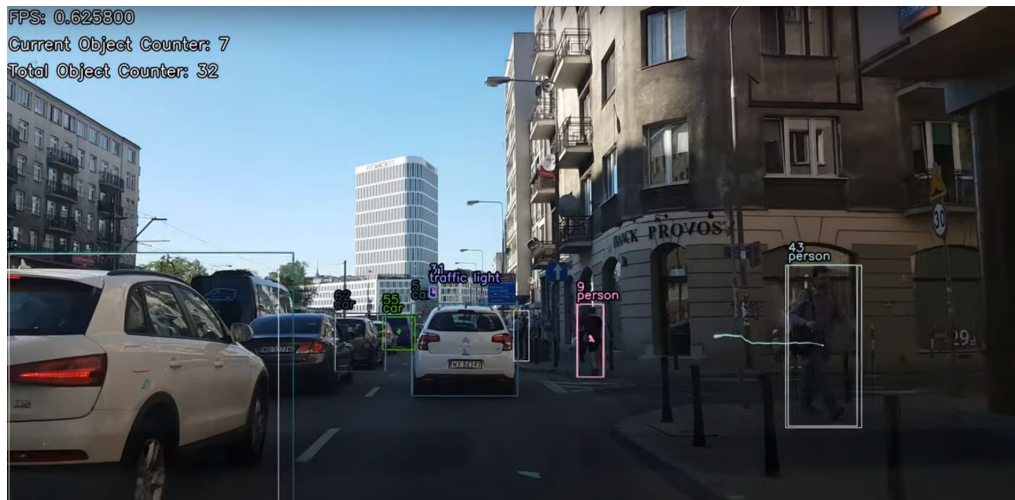
Along with collecting manual fine when the vehicles escape the automated system and carriage of non-documented vehicles.



Public-private partnership model:

For illegal parking and enhanced driving behavior change. Front dash cam in vehicles *detecting illegal parking* + spot fine.

These cameras will act as police in patrol, continuously relaying data to control center.



Overall impact:

- ✓ Improved traffic stream
- ✓ Improved driver behavior
- ✓ Improved vehicle security
- ✓ Improved road safety
- ✓ Improved air quality

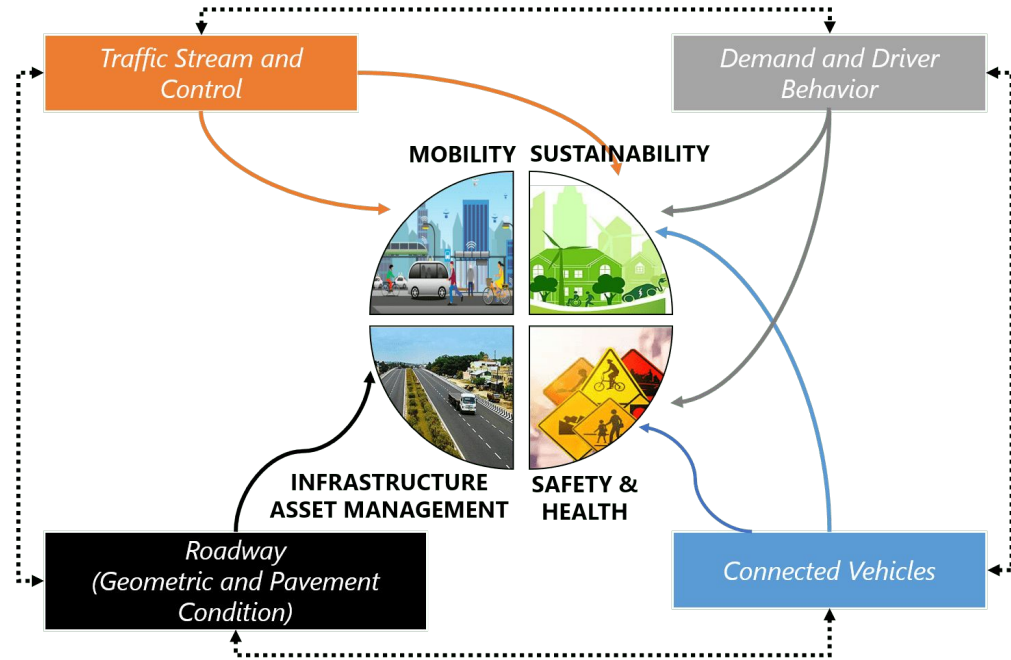


Figure 1: Interactions across subsystems and impacts



**THANK
YOU**