

Technologies in Infrastructure: Role of AI and IoT in Traffic Safety Monitoring

International Road Federation – India Chapter
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ITD: Indian Traffic Dataset

Traffic Flow and Vehicular Trajectories



Anurag
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Kabir
Kedia



Ritesh
Singh



Lalit
Dumka



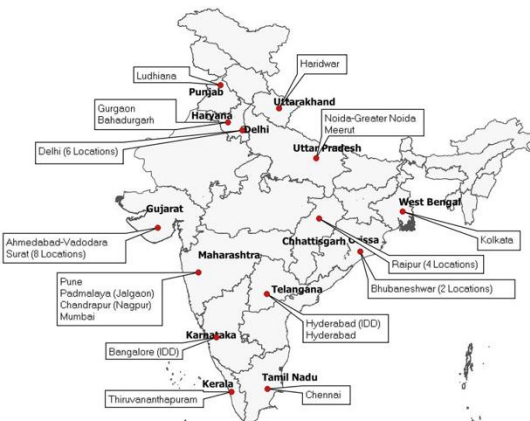
Karthik
Krishnan O



1. Thombre, Anurag, Lalit Dumka, Avinash Kumar Rai and Amit Agarwal (2024). "Object Distance Estimation from a Single Moving Camera for Advanced Driver Assistance System". In **IEEE CONECCT 2024** at IISc Bangalore. DOI:10.1109/CONECCT62155.2024.10677218
2. Agarwal, A., A. Thombre, K. Kedia and I. Ghosh (2024). "ITD: Indian Traffic Dataset for Intelligent Transportation Systems". Accepted in 16th **IEEE COMSNETS**
3. Thombre, A., J. Bhandari, A. Agarwal and I. Ghosh (2023). Prediction of Unknown Striking Vehicles in Motorized Two-Wheeler Hit-and-Run Crashes in Delhi. Accepted in **EASTS 2023**
4. Thombre, Anurag, Indrajit Ghosh, and Amit Agarwal (2023). "Examining Factors Influencing the Severity of Motorized Two-Wheeler Crashes in Delhi". In **International Journal of Injury Control and Safety Promotion**. DOI: 10.1080/17457300.2023.2267040

Diverse Traffic Conditions

Structured and un-structured road environments

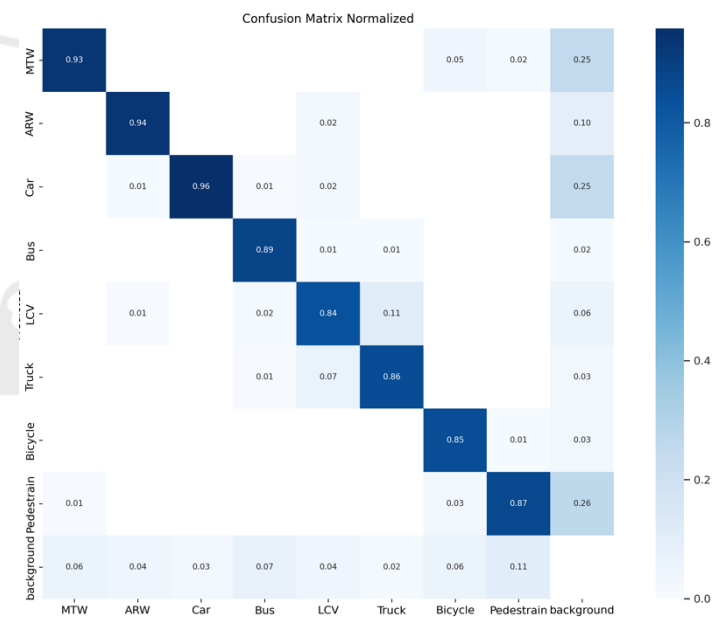
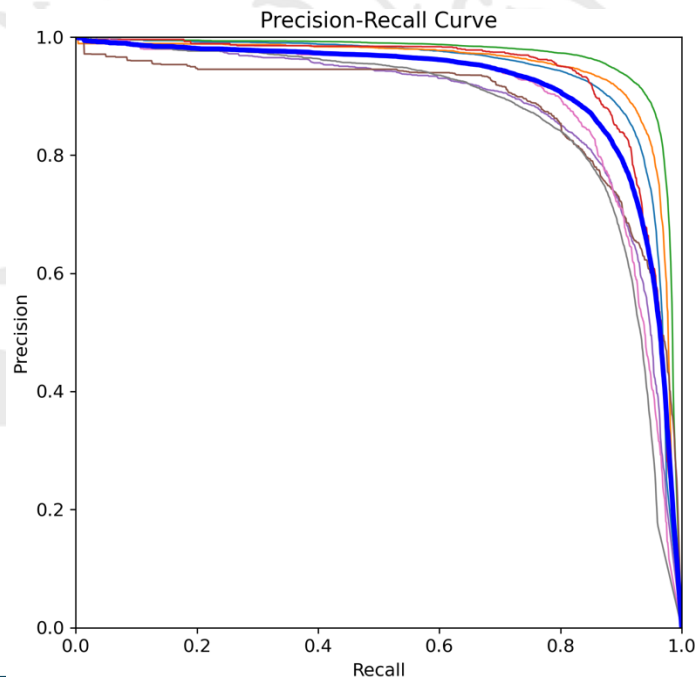


~11,000 Novel images

- 300,000 + labelled objects
- 91.4% detected accuracy

INDO-HCM

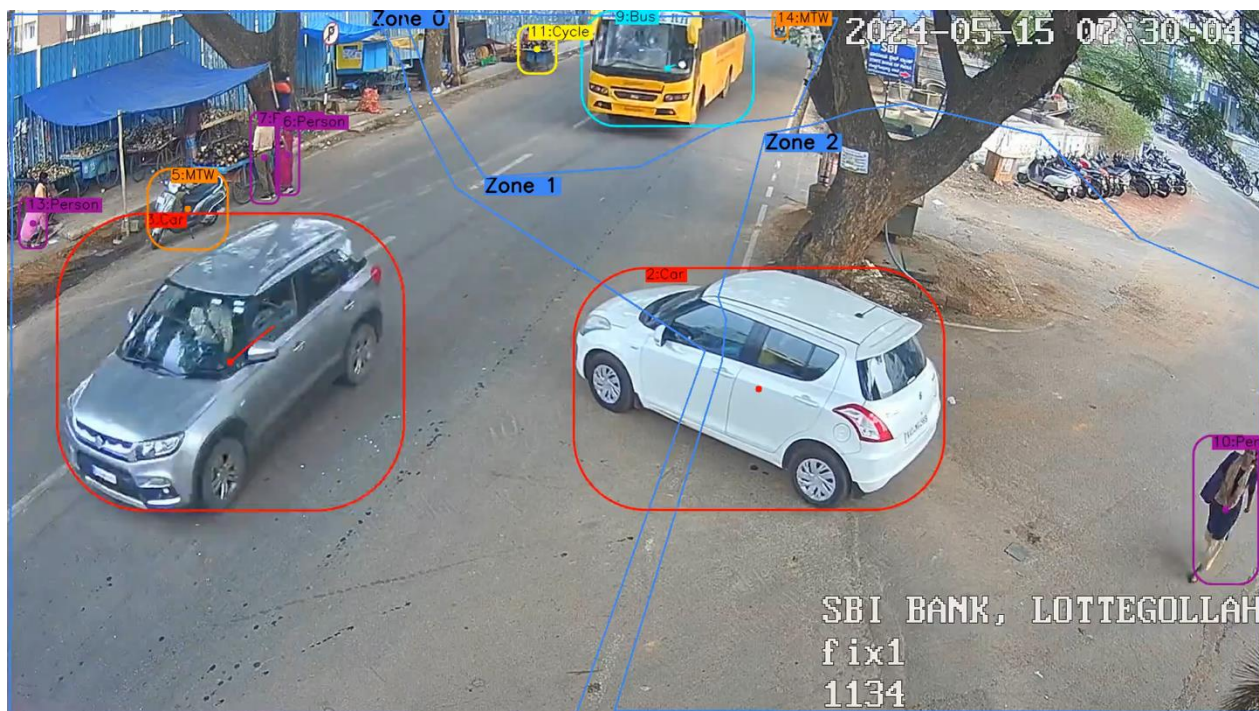
- Autorickshaw
- Bus
- Car
- Cycle
- Light Commercial vehicle
- Motorized-two wheeler
- Truck
- Pedestrian



TrafficEye: Data Analytic using ITD in Edge



TrafficEye: Data Analytic using ITD in Edge



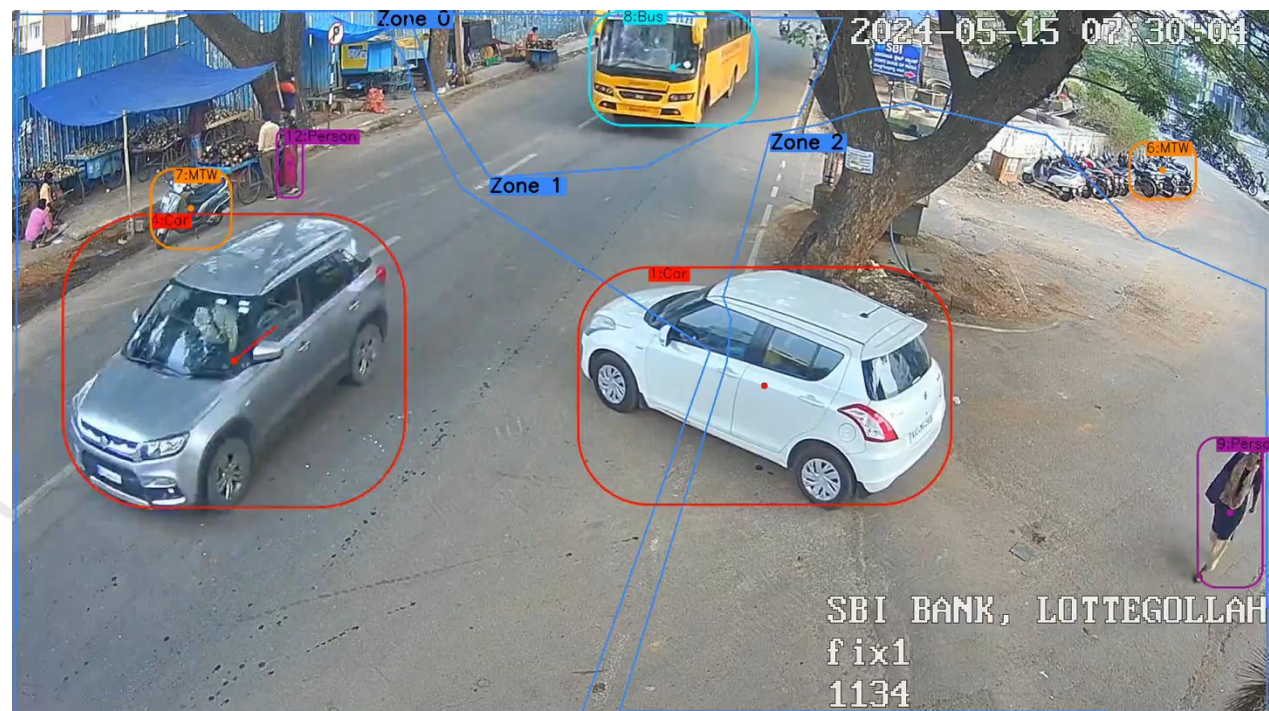
Large architecture

Hardware:

- RTX 4090, AMD Ryzen 9, 128 GB RAM

Performance:

- **35 ms inference time**
- 91% detection accuracy



Nano architecture

Hardware:

- Raspberry Pi 5, Arm Cortex-A76, 4 GB RAM

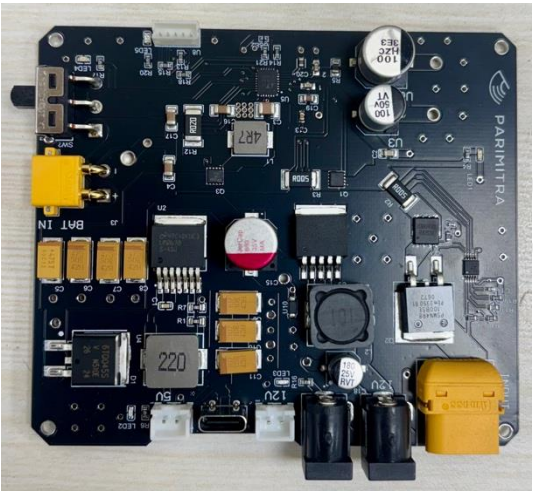
Performance:

- **53 ms inference time**
- 88% detection accuracy

TrafficEye: Data Analytic using ITD in Edge



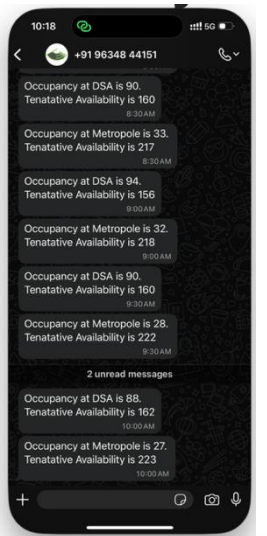
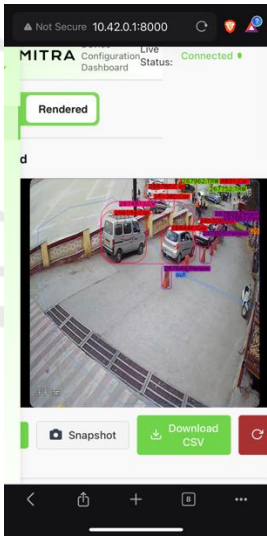
TrafficEye: Data Analytic using ITD in Edge



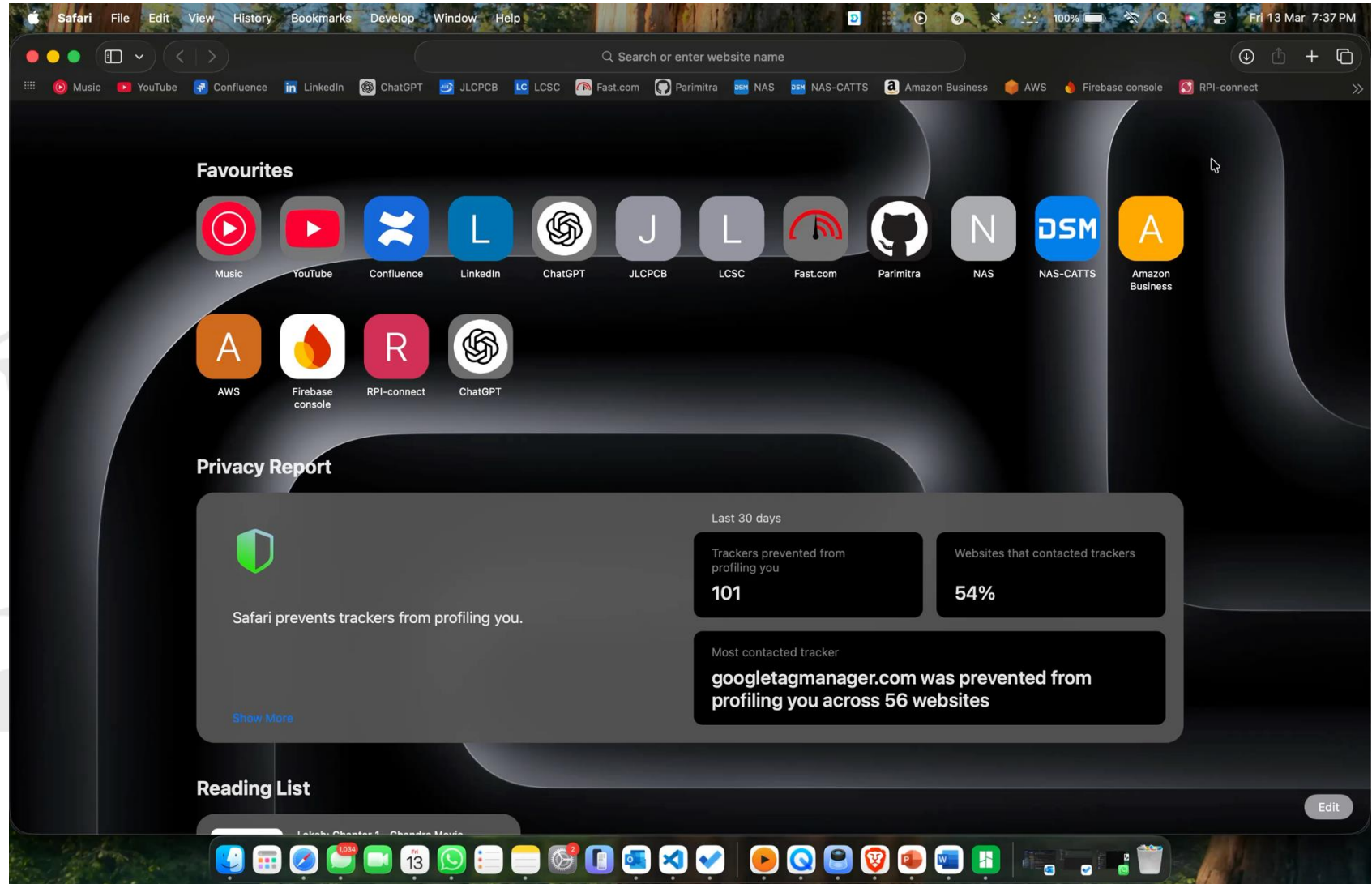
Solar



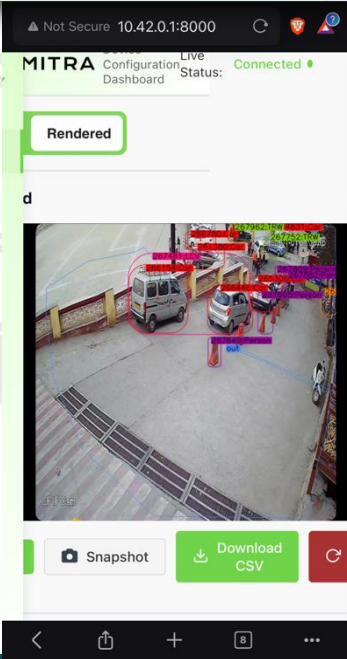
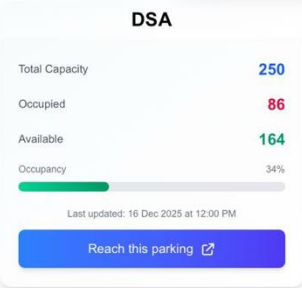
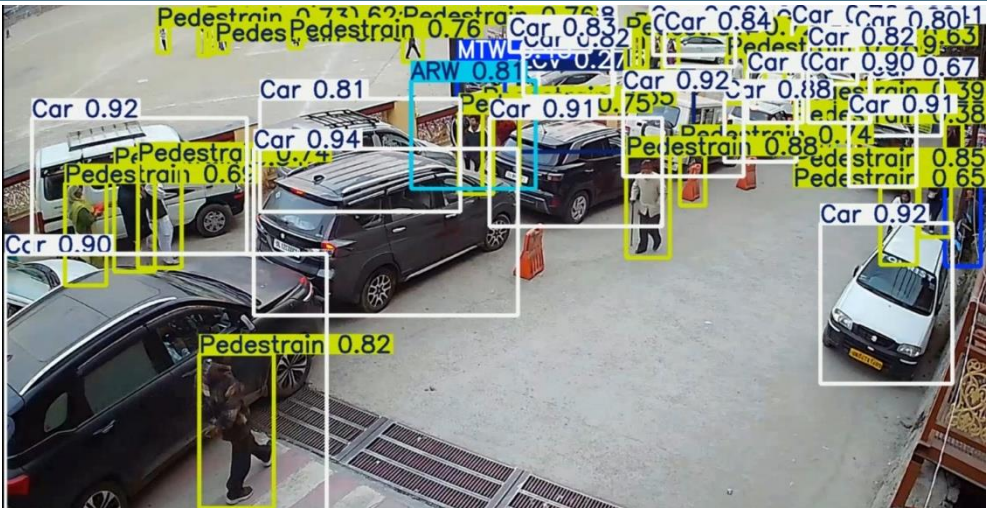
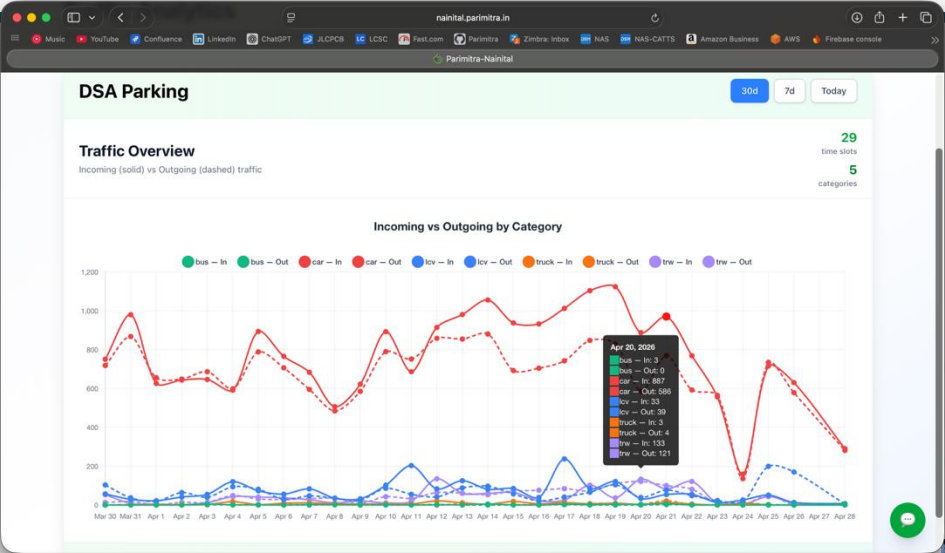
GSM



TrafficEye – Local Dashboard

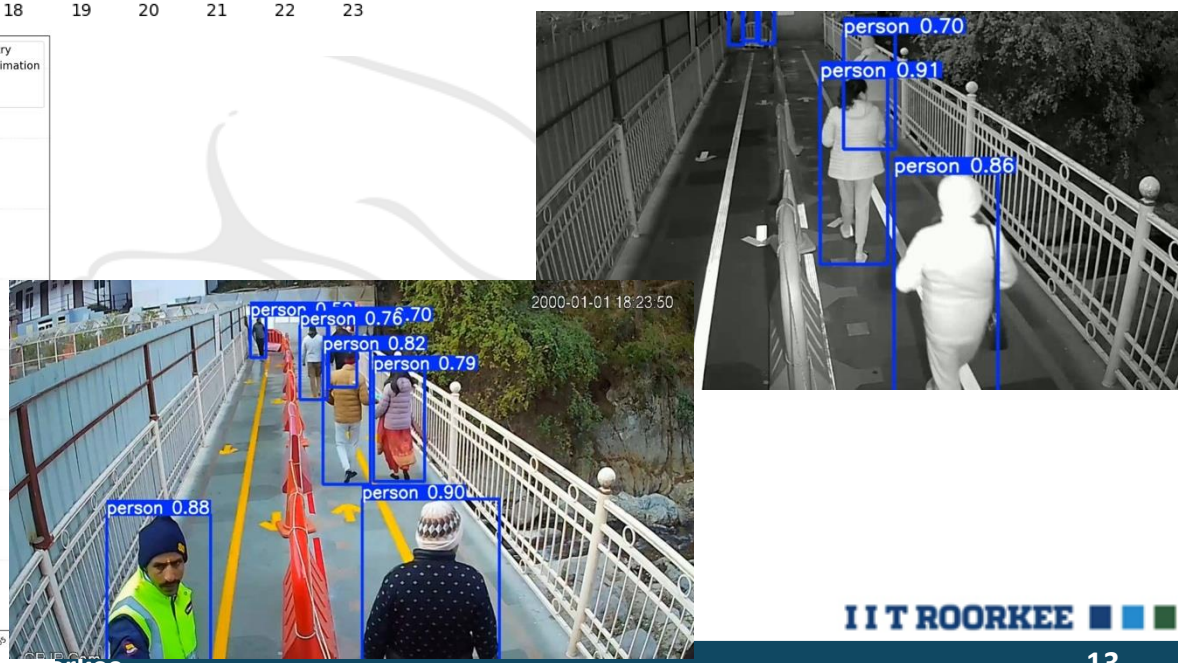
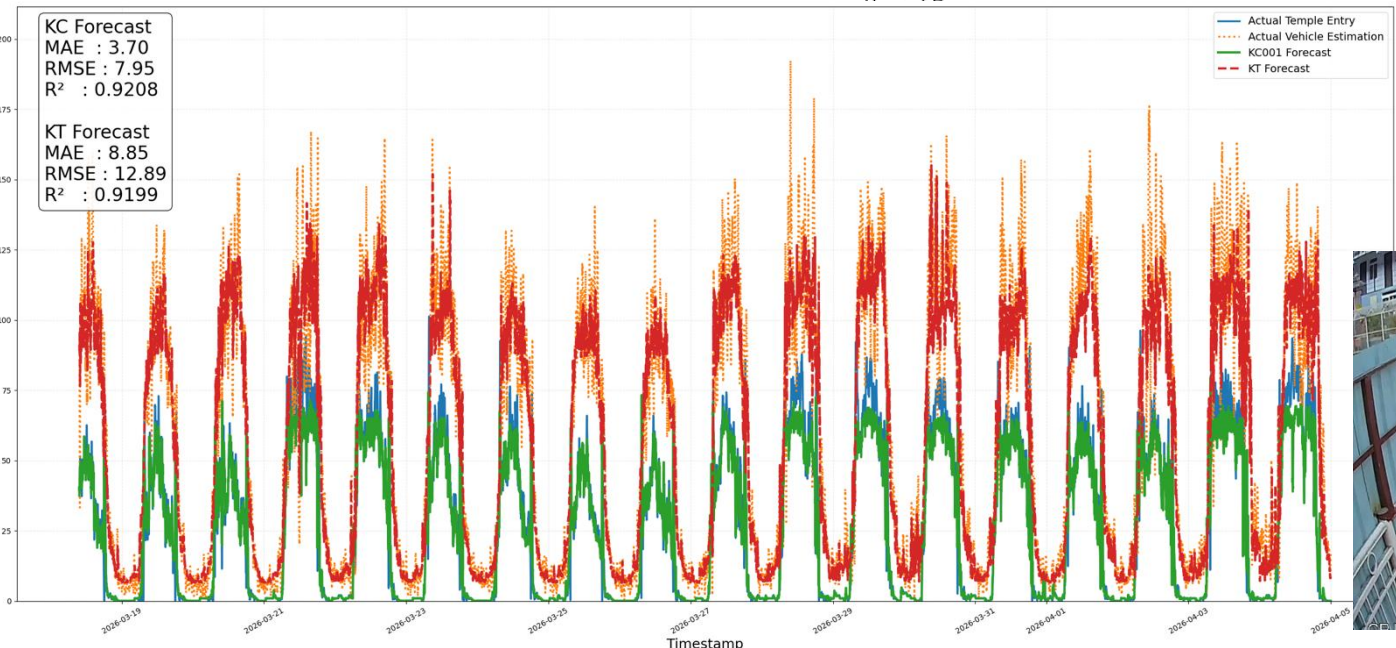
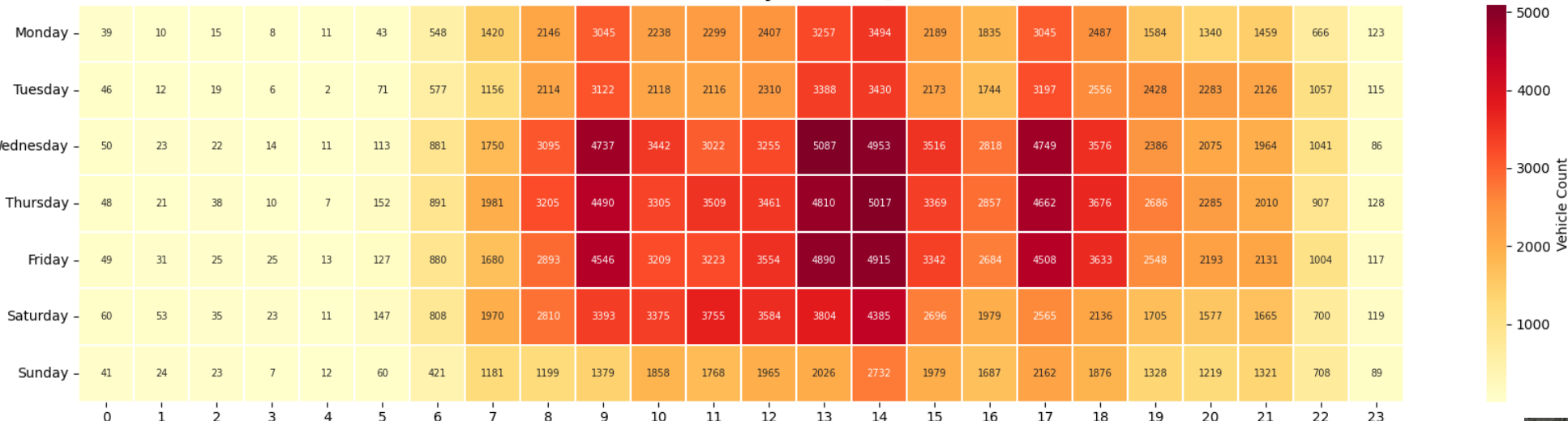


Traffic eye for real-time Parking management



TrafficEye – Local Dashboard

Traffic Volume — Hour × Day of Week [All Classes]

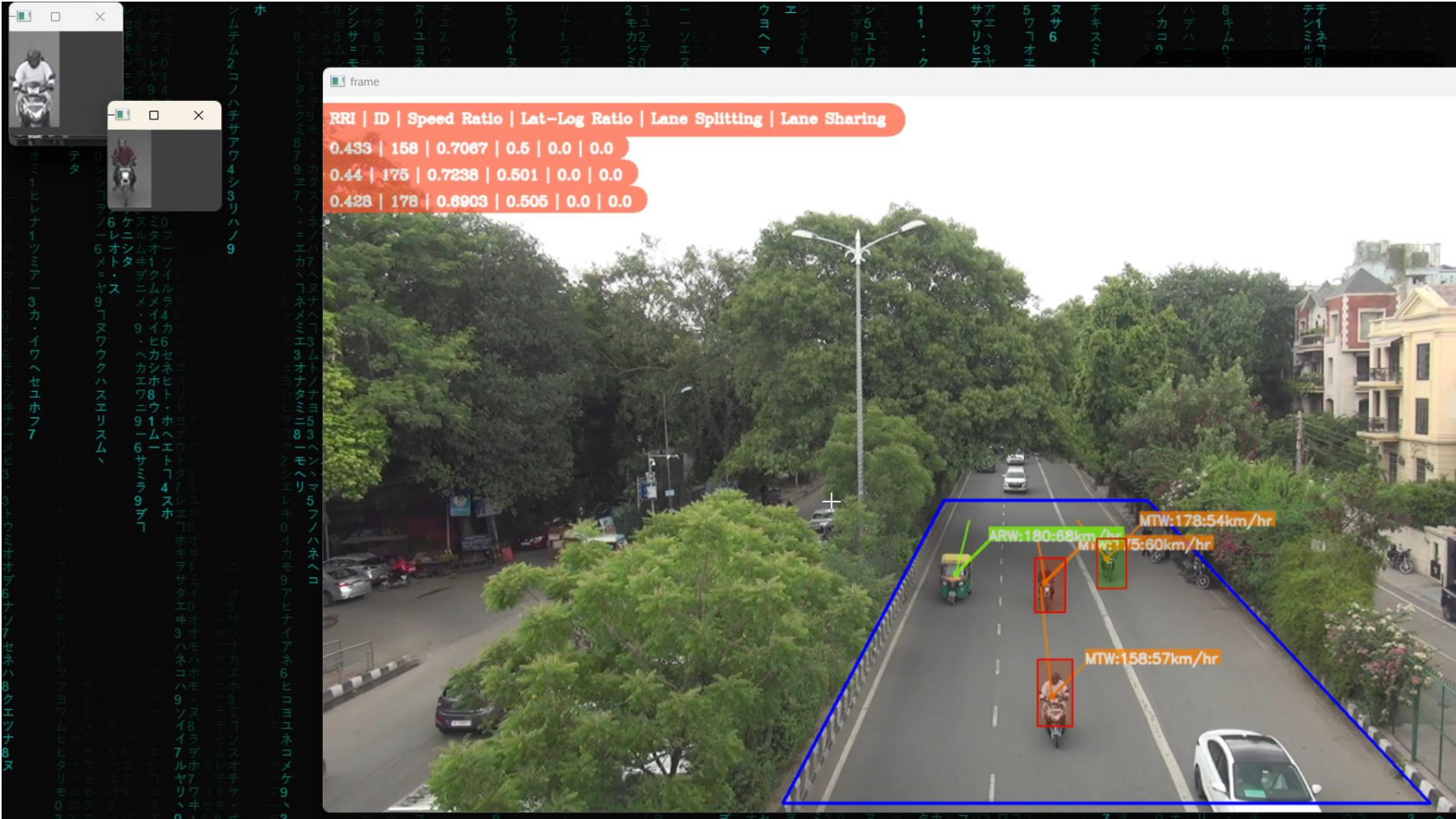


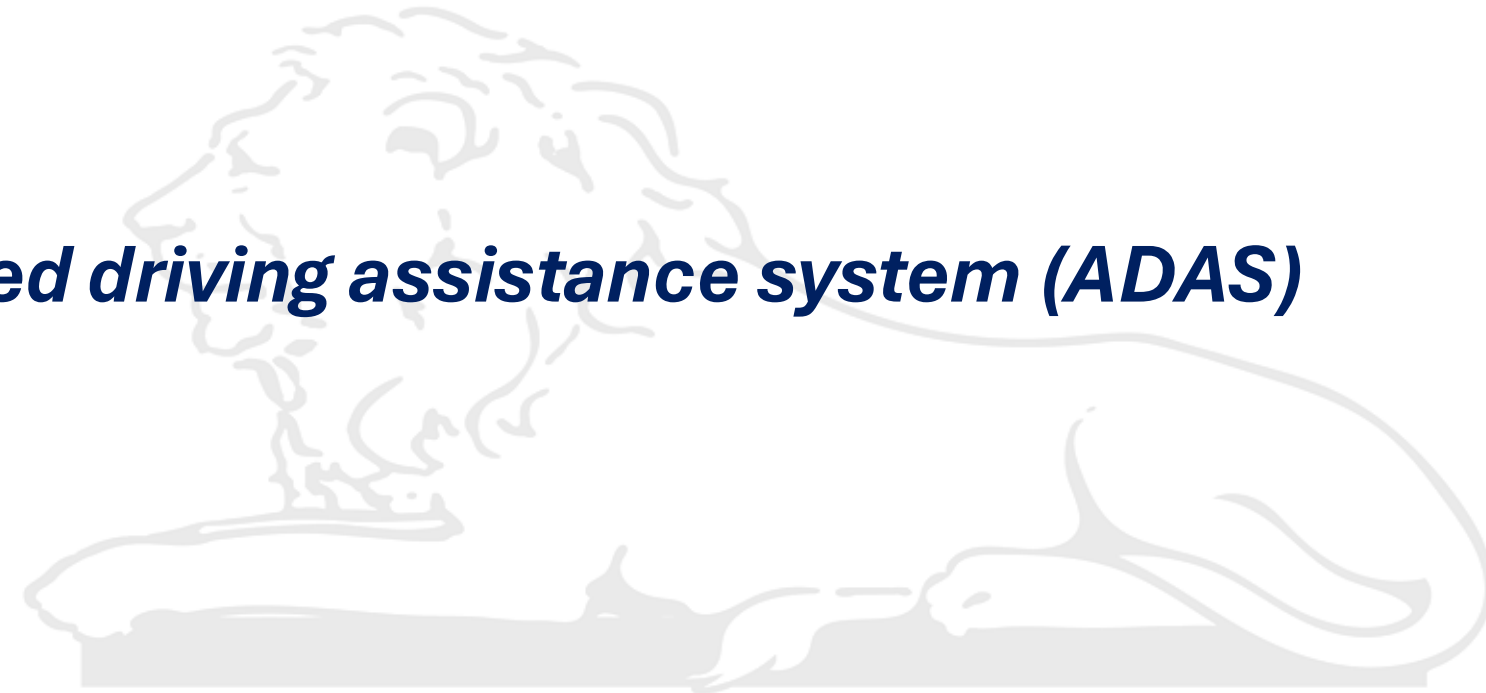
Video Analytics Platform



ITS: *Road safety*







ITS: Advanced driving assistance system (ADAS)

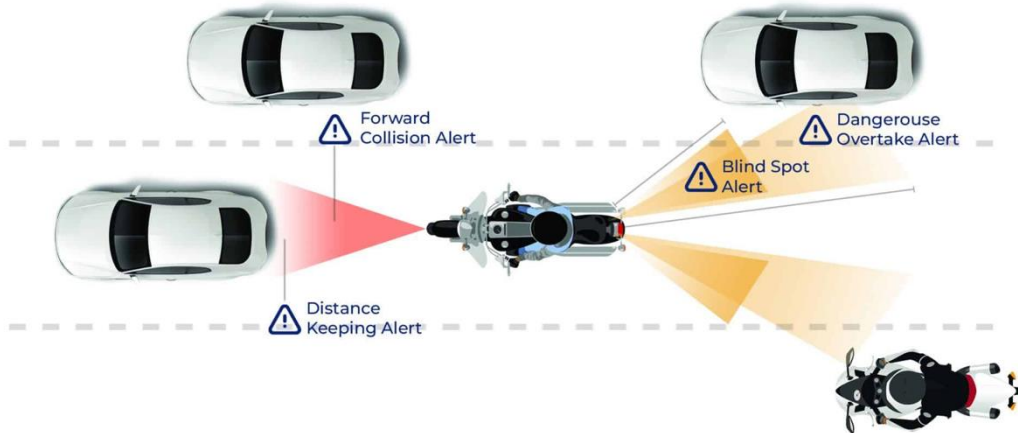
Advanced Driver Assistance System

Distance
Keeping
Alerts

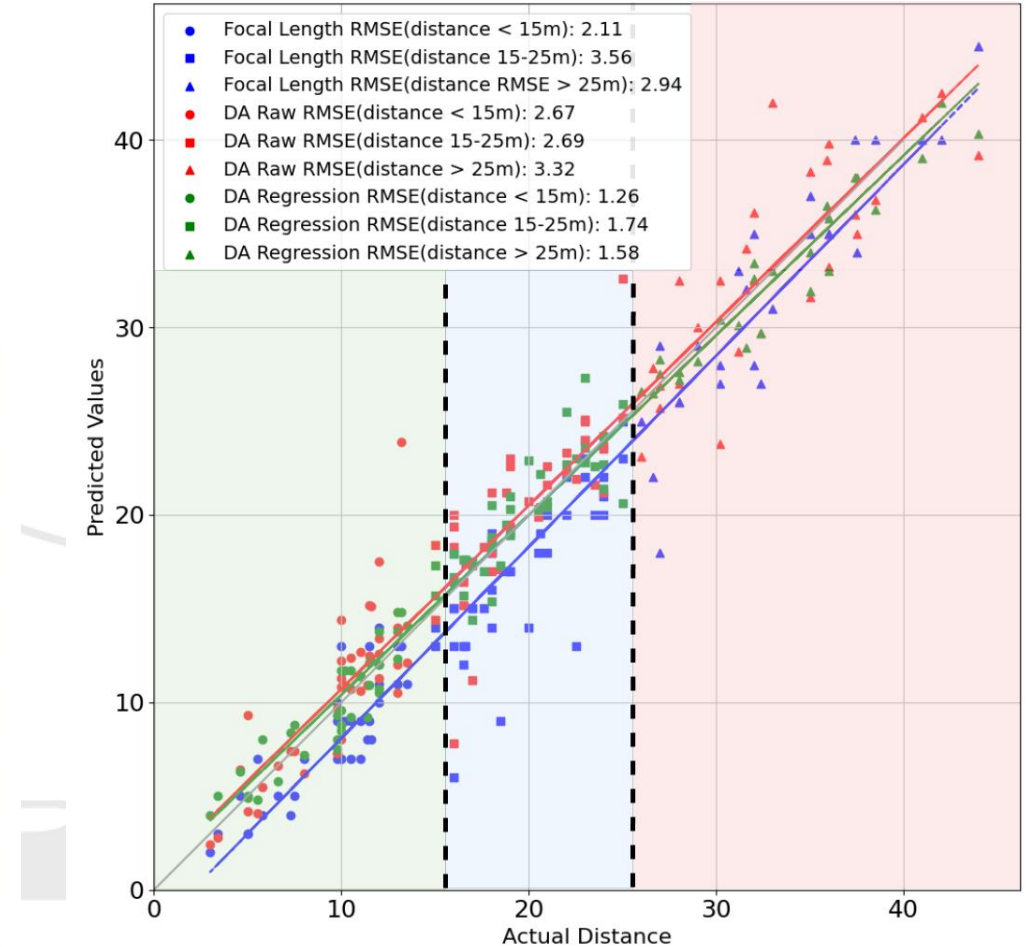
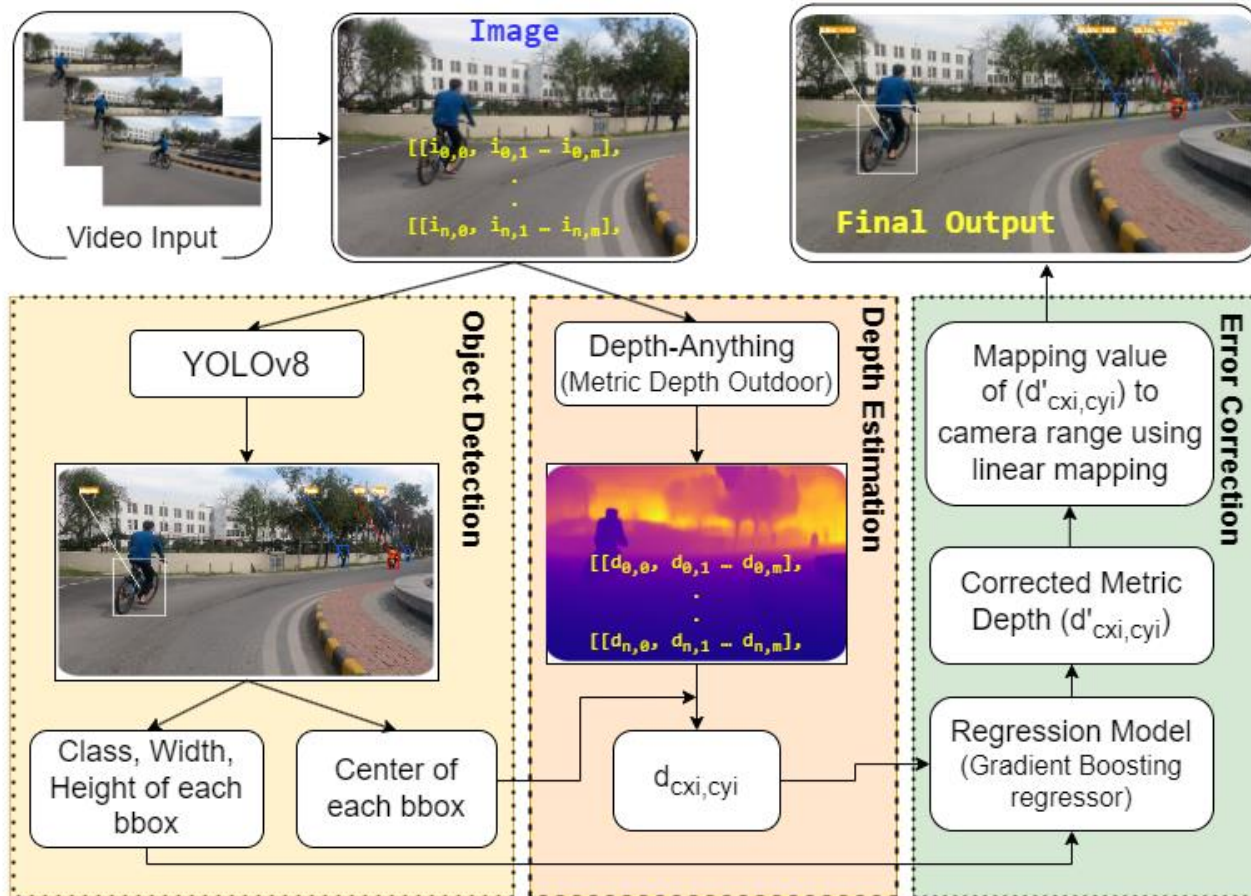
Safety
Space

Collision
Warning

Overtaking/
Lane Sharing
Alert

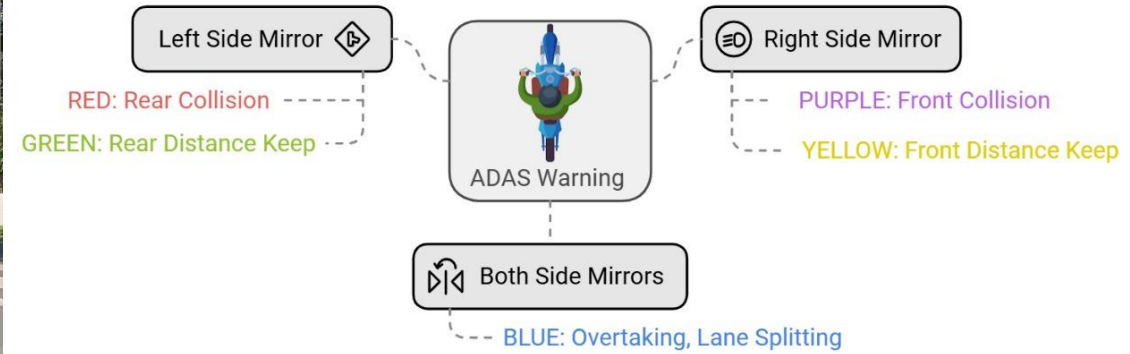
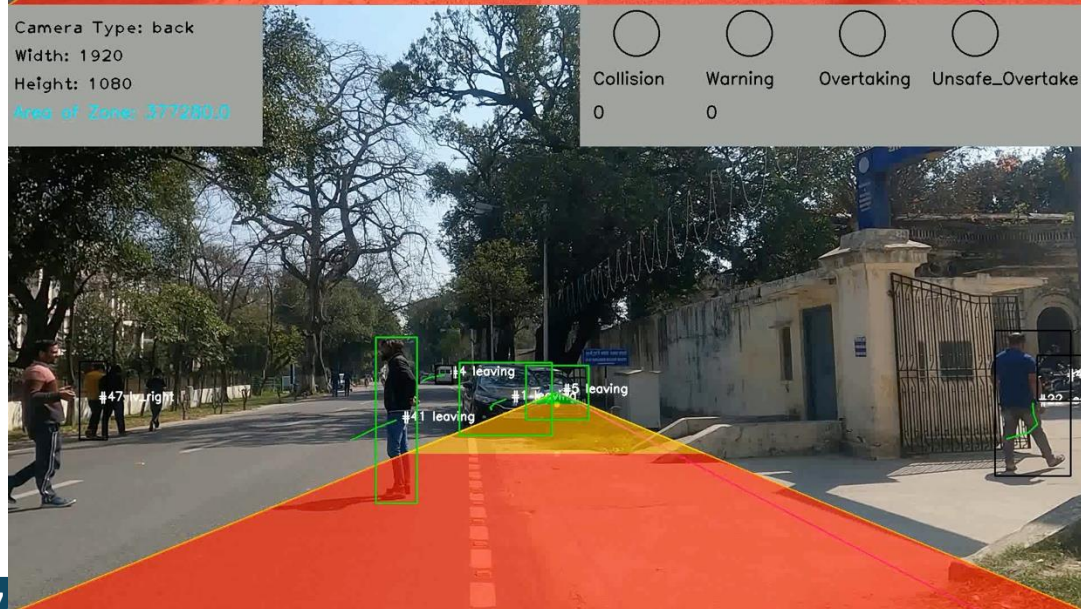
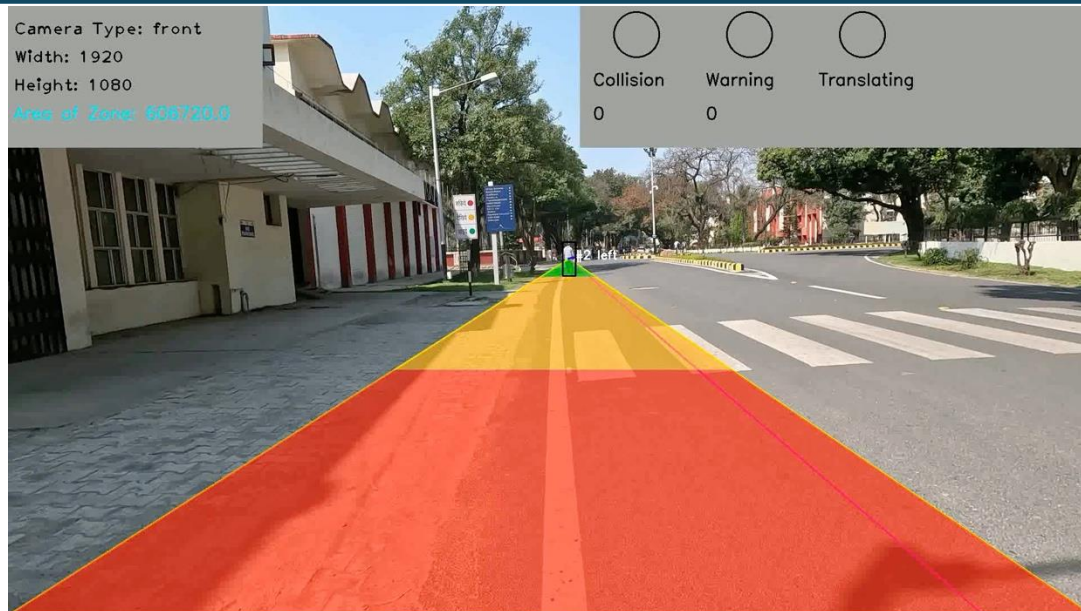


Advanced Driver Assistance System: distance estimation

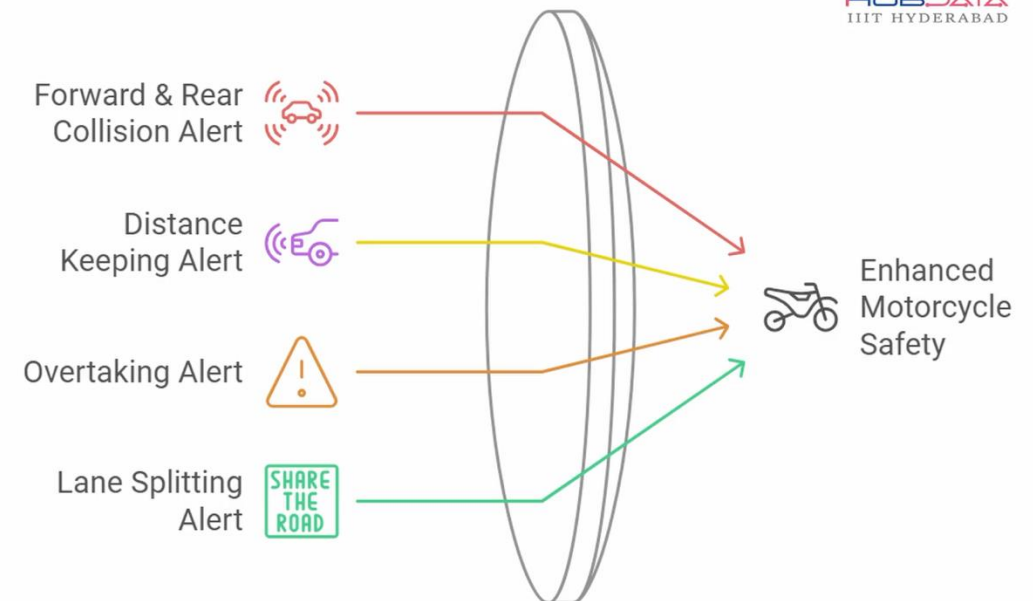


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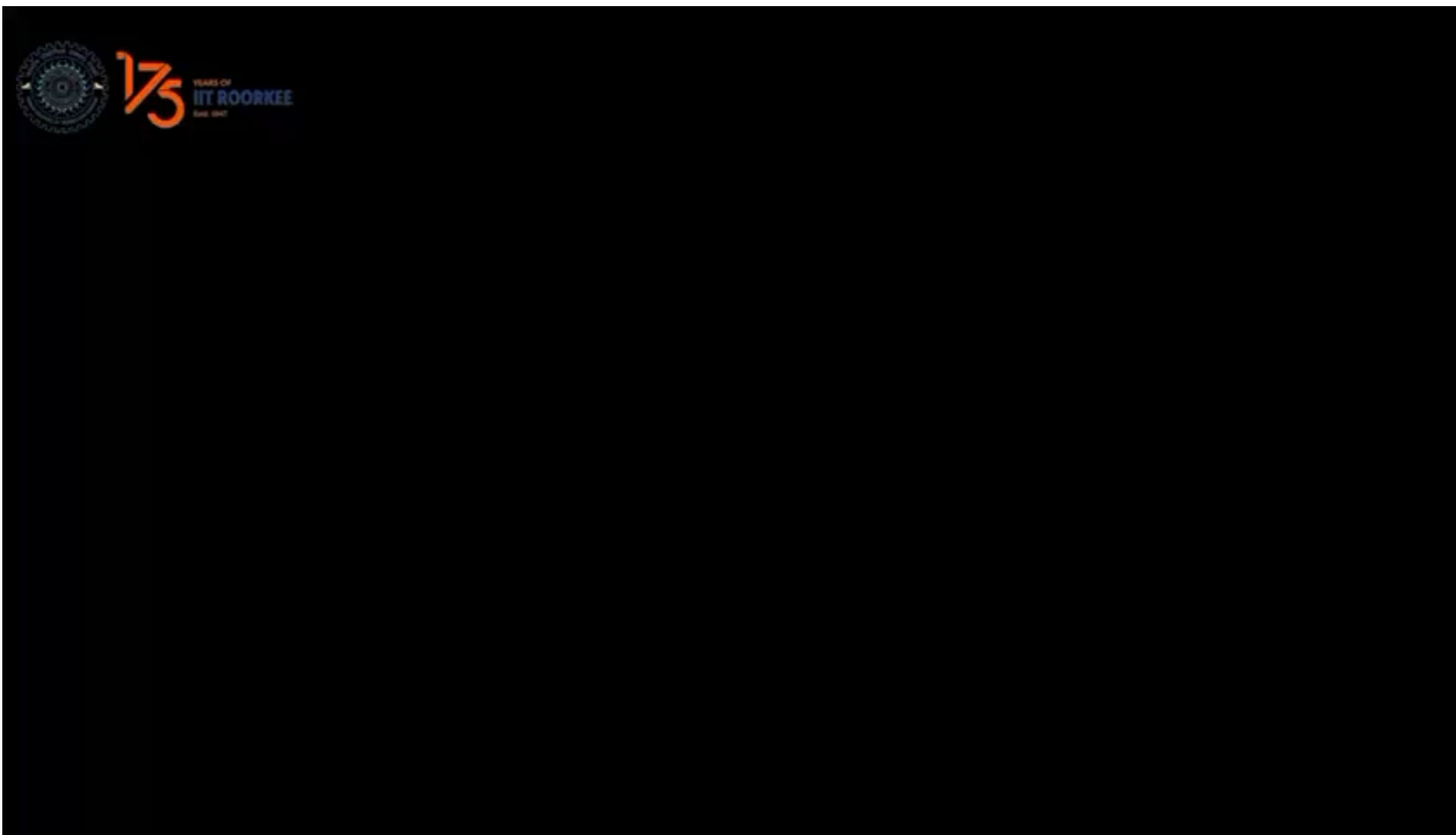
Advanced Driver Assistance System: distance estimation



KAVACH: Motorized Two-Wheeler Safety System



Advanced Driver Assistance System: distance estimation



Thanks...

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