



Challenges and Opportunities of Safe City and Leveraging IoT Sensors and AI for Traffic

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Transportation Scenario in India - Snapshot



Conflict between man and machine



Inadequate Mass Transportation



Poor Road Conditions



High Degree of pollution

Transportation- Snapshot – Impact on GDP

Factor	India	International Market
Accidents	3.14% impact on GDP	2-3% impact on GDP
Congestion	2.5% impact on GDP	1-3% impact on GDP
Road Repair Expenditure	0.5% impact on GDP	0.3-0.7% impact on GDP
Logistics Inefficiency	Up to 4% impact on GDP	1-3% impact on GDP

Transportation Scenario in India

- **Traffic -Travel worst gifts of Urbanization**
- **Mismatch between vehicle population and road capacity**
 - In the last 70 years - motor vehicle population recorded **CAGR growth of 10.9% compared to 3.6% in road length**
- **Travel becoming more expensive for poor with elimination of pedestrians / bicycles**
- **Travel becoming risky:~4.8 lakh Road accidents/ ~1.68 lakh deaths per year**
- **Every hour in road accidents 17 deaths and 55 accidents**
 - Major casualties- Two wheelers/ cyclists/ pedestrians/ pavement dwellers
- **Vehicular congestion/traffic jams becoming order of day**

The transport sector constitutes the largest portion of infrastructure spending, at 11.29% of the budget 2024-25

- **Roads, Transport and Highways**

- The Ministry of Roads, Transport and Highways has been allocated **₹2.78 lakh crore** for 2024-25.

- **Railways outlay**

- The Railway outlay remains above 5%, with a record allocation of over **₹2.55 lakh crore**.
- Funding for signalling and telecom work, including the KAVACH automatic train protection system, has increased compared to FY2024.

- **Civil aviation and shipping**

- The Ministry of Civil Aviation's allocation : **₹2,357 crore**.
- The outlay for shipping : **₹2,377 crore**.

Diagnosis of Road Safety



India's Road Profile

- 2nd largest road network across the world - 6.2 million Km
- 5% of the total road network are highways

- Transports >60% of all goods
- Transports 85% of total passenger traffic.

Categorization of reasons for road crashes

>80%

Human errors

- Over-speeding, overloading, wrong lane driving, signal jumping,
- Stress, fatigue, Poor driving skills, non-awareness of rules
- No Helmet, Seatbelt

Road design errors

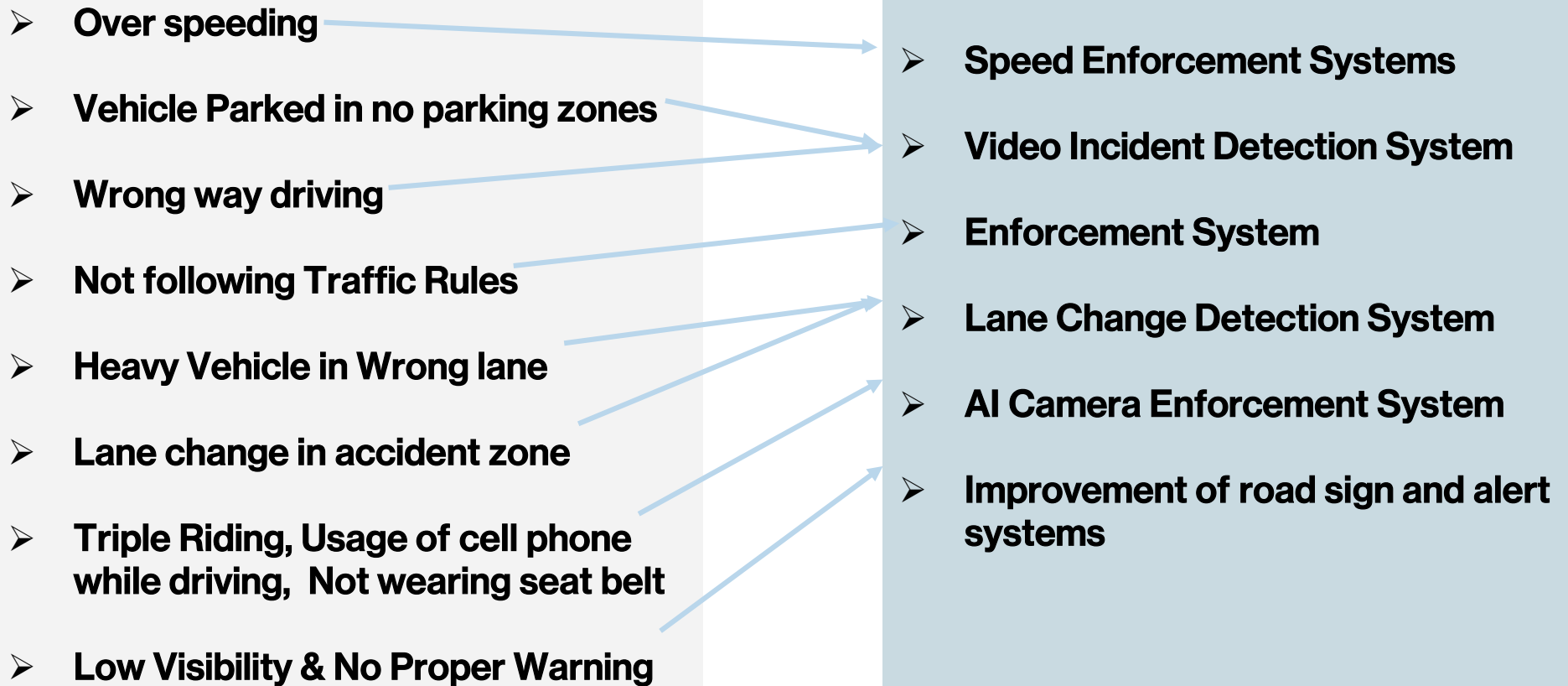
- Black spots due to poor engineering
- improper entry-exit to highways
- lack of signals, road markings, zebra crossing

Vehicle issues

- Vehicle manufacturing
- Lack of safety features in vehicles

Good post-accident care along the highways would also have a high impact on saving lives.

Reasons for Road Accidents & ITS Solution



Four measurable factors

Among many factors contributing to road injuries and deaths four risk factors have a significantly measurable effect

1.4 million people die each year, and up to 50 million are injured by RTIs.

Road accidents reduce countries' annual GDP by a range of 1–3%

As per the WHO report *04 measurable risk factors*

- Speeding,
- Drunk driving, careless driving
- Non-use of Helmet, and
- Non-use of Seatbelt or child restraint.

According to a study published in “The Lancet Health Journal”

At least 30,000 lives in India could have been saved just by the implementation of simple road safety measures to prevent these four.

- 20,554 lives - by checking the speed,
- 5,683 lives - by wearing helmets and
- 3,204 lives - by use of seatbelts
- No data for Drunk & careless driving

Good post-accident care along the highways would also have a high impact on saving lives.

Current Transportation Challenges

- ❖ **Increasing road accidents and fatalities**
- ❖ **Traffic congestion**
- ❖ **Environmental impact**
- ❖ **Urbanisation- Infrastructure limitations**

Key Challenges and Considerations

- ❖ **Comprehensive Policy on Intelligent Transportation System**
- ❖ **Technical and regulatory challenges**
- ❖ **Data privacy and security concerns**
- ❖ **Infrastructure requirements**

Enhancements and Opportunities in Public Transport Management 1/2

1. Optimized Route Planning and Scheduling

- Dynamic Route Adjustments:
- Predictive Analytics

2. Improved Passenger Experience

- Real-Time Information:
- Personalized Notifications:

3. Enhanced Fleet Management

- Vehicle Tracking:
- Predictive Maintenance

4. Efficient Resource Allocation

- Demand Forecasting
- Capacity Management

5. Improved Safety and Security

- Surveillance and Incident Detection
- Emergency Response Systems

Enhancements and Opportunities in Public Transport Management 2/2

6. Integration with Other Transportation Modes

- Multimodal Transport Solutions
- Last-Mile Connectivity

7. Environmental Impact Reduction

- Energy Efficiency
- Eco-Friendly Routes

8. Enhanced Customer Service

- Automated Assistance
- Feedback Mechanisms

9. Data-Driven Decision Making

- Analytics Platforms
- Policy Formulation

10. Cost Efficiency

- Operational Savings
- Revenue Optimization

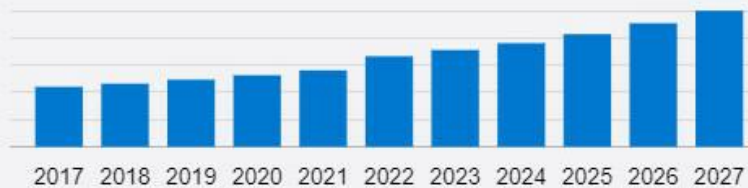
Intelligent Transport Systems-a meta-system view



Opportunities in ITS

Global Intelligent Transport System (ITS) Market 2023-2027

Market Size Outlook (USD Billion)



2017 : 44.00

6.89%

Year-over-Year growth rate of 2023

8.49%

CAGR 2022-2027

ACCELERATING

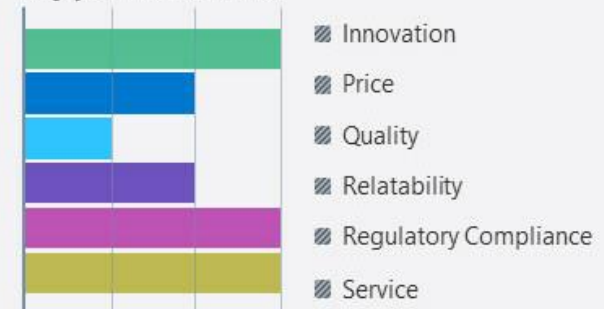
Growth Momentum



CUSTOMER LANDSCAPE

- Drivers of price sensitivity
- Adoption lifecycle
- Importance in the customer purchase basket
- Adoption rates
- Key purchase criteria

Key purchase criteria



Drivers of price sensitivity

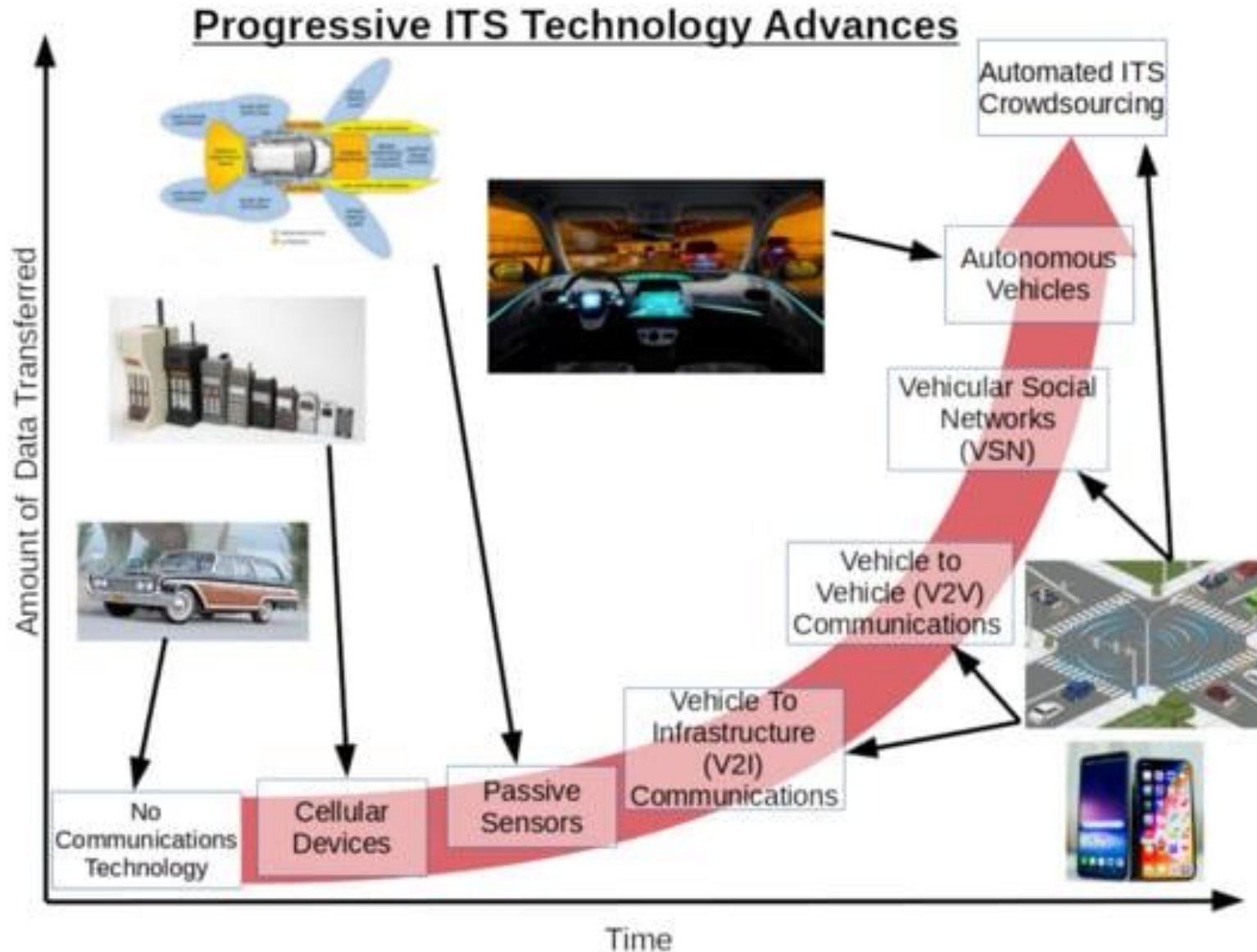
Driver	Impact
Purchases are undifferentiated	Low
Purchase is a key cost to the buyer	Low
Quality is not important	Low
Price Sensitivity	High

Adoption lifecycle



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ITS Technology Journey

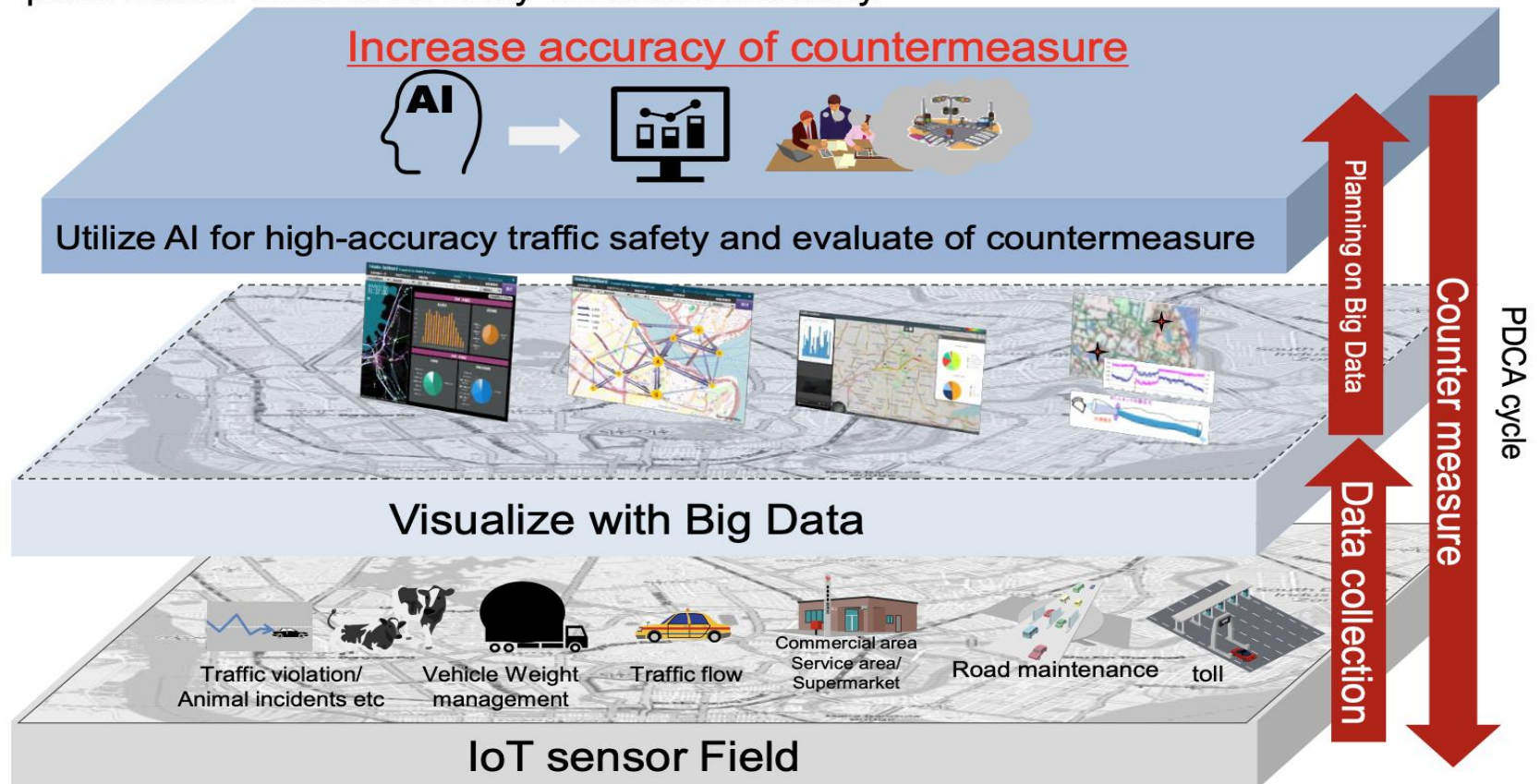


Next Generation Technologies in ITS

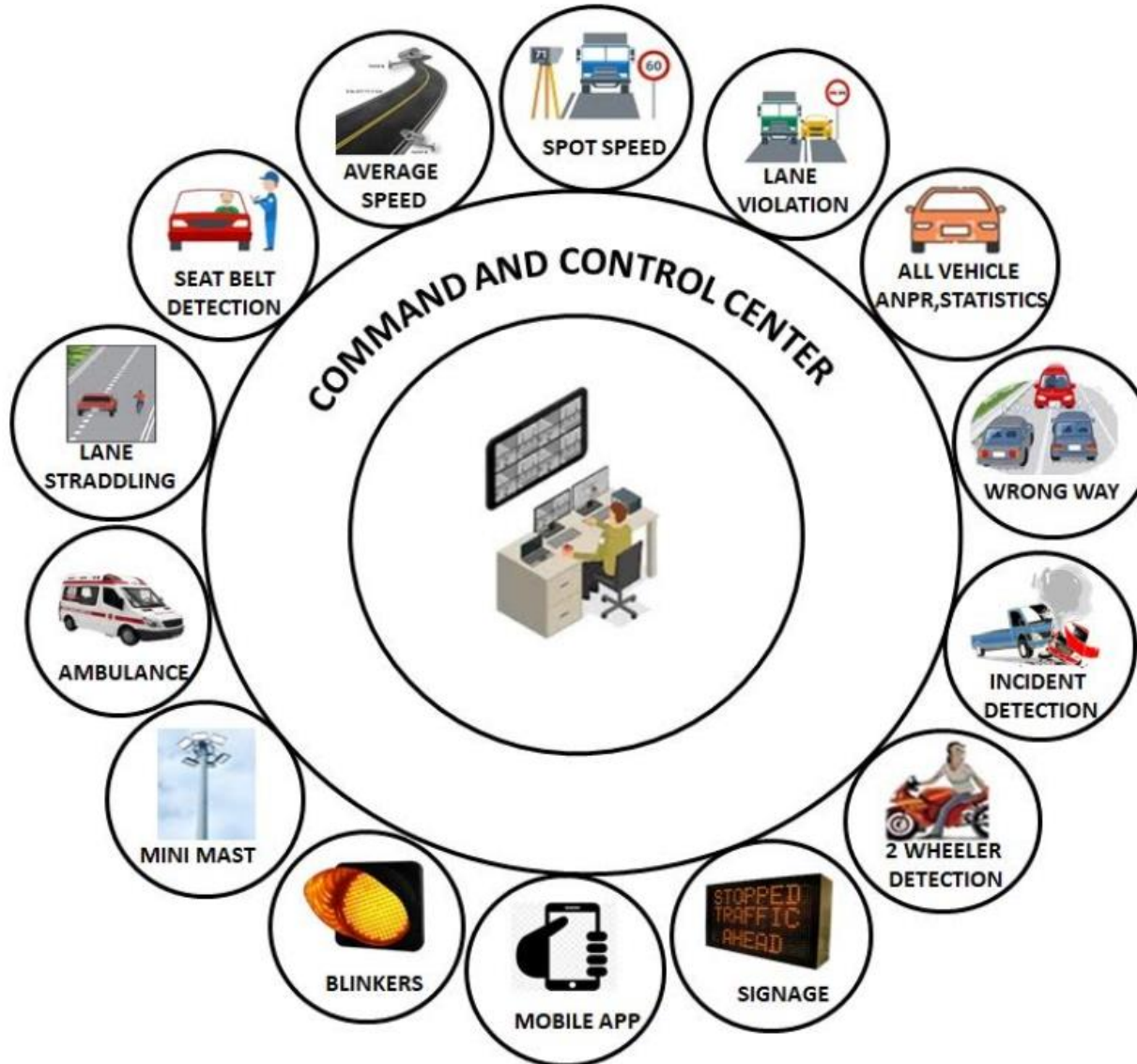
- ❖ **Artificial Intelligence (AI) in ITS**
- ❖ **Vehicle-to-Everything (V2X)**
- ❖ **Advanced Driver Assistance Systems (ADAS)**
- ❖ **Internet of Things (IoT) in ITS**
- ❖ **GIS in ITS**
- ❖ **Telematics and Edge computing in ITS**

Next Generation ITS....

- Visualization and centralized-management big data from IoT sensor. Support to plan real-time and speedy countermeasure.
- Accumulating and analyzing results of countermeasures to drastically improve the its performance which is currently conducted manually.



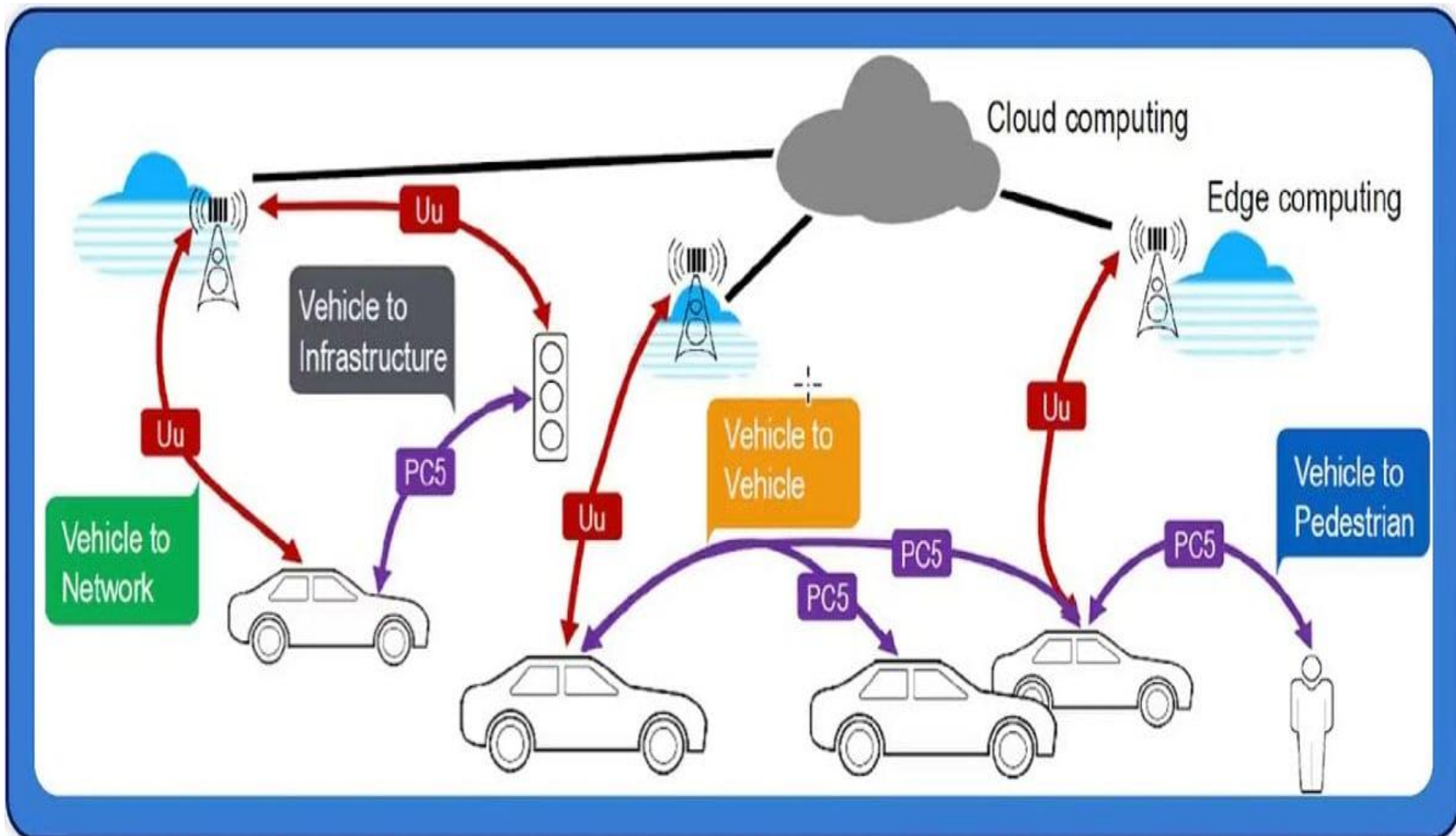
ITS offers a Gamut of solutions for Road Safety



CV2X – Vehicle to Everything



CV2X in ITS



Types of ITS applications

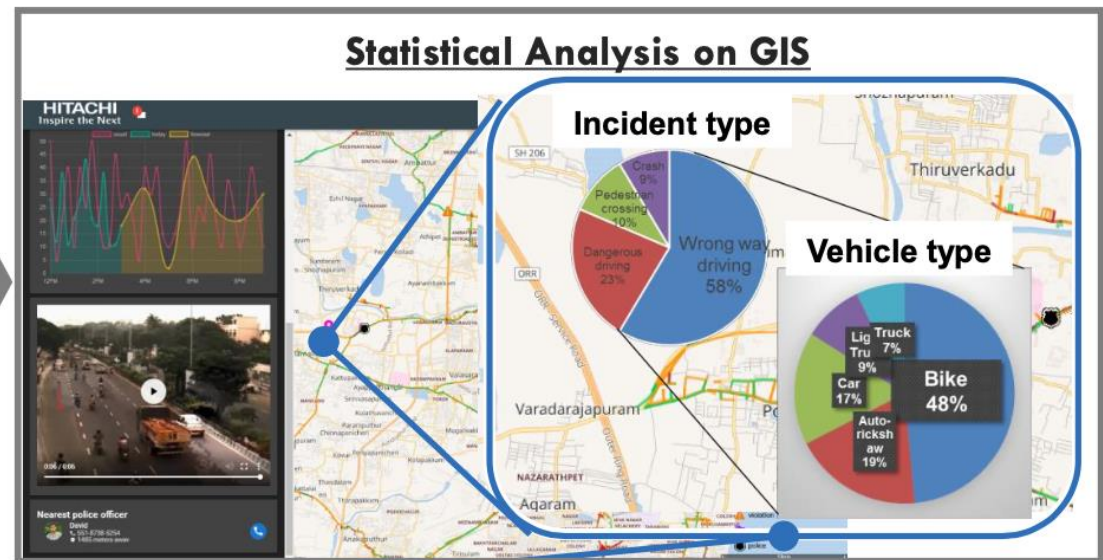
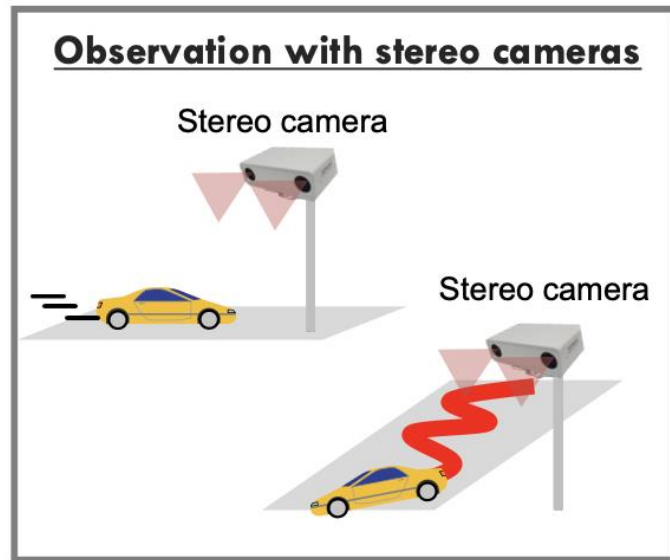
Broadly:

- **Within the vehicle**
- **Out of vehicle**

Out of vehicle ITS Applications

- **For Urban Area – ITS will focus on congestion & smooth traffic flow**
- **For Highways - Safety is paramount**

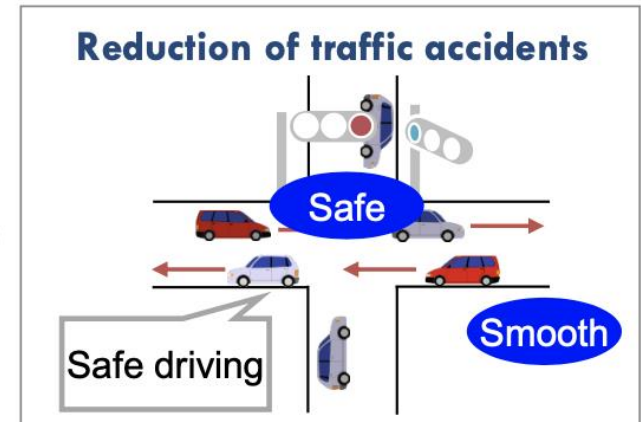
GIS in ITS....



Improvement Plan Study



Situation in roads after improvement



AI in ITS....

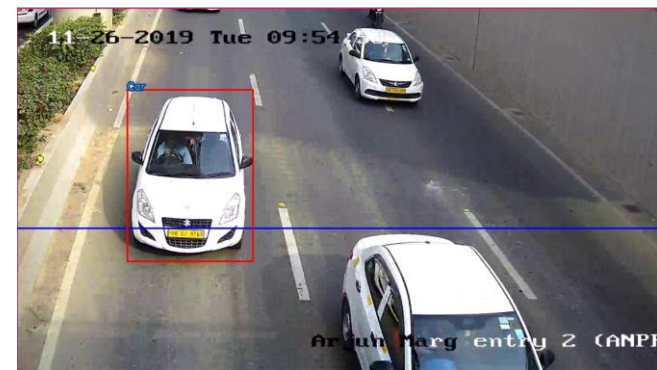
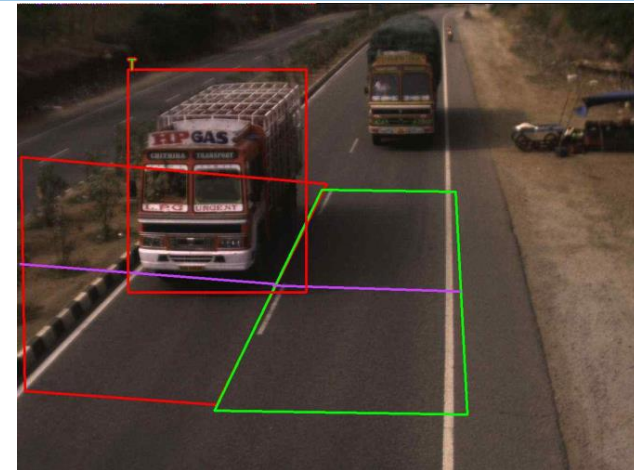
AI Camera – For City Implementation

- No Helmet Detection
- No Seat Belt Detection
- Mobile phone usage detection
- Triple Riding
- Other VAHAN DATA based violations



Video Incident Detection – Smart Area Surveillance

- Video Incident detection Systems allows to understand traffic violations which cause hindrance to proper vehicle movement and there by causing accidents
- The set of analytics include
 - Parking In no parking zone
 - Wrong way driving
 - Stopped Vehicle
 - Congestion alert
 - Heavy Vehicle on fast lane
 - Lane Straddling

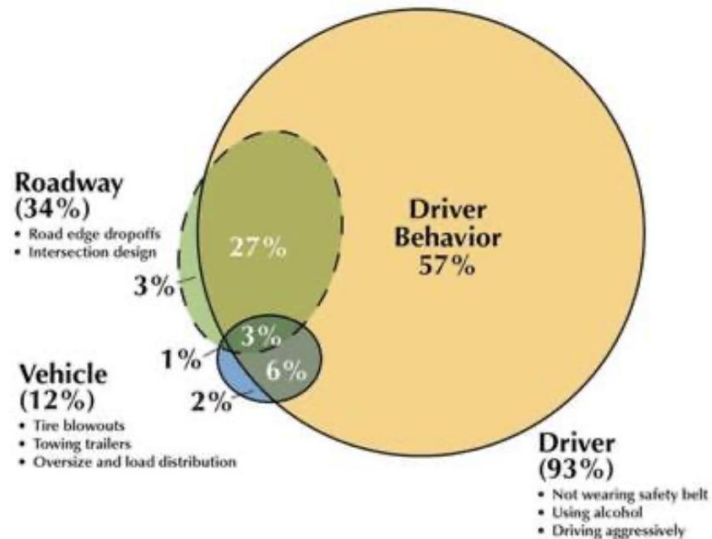


Zone 1 : Car Count (Top to Bottom) 2021
Jan 22, 2020, 8:54:12 PM

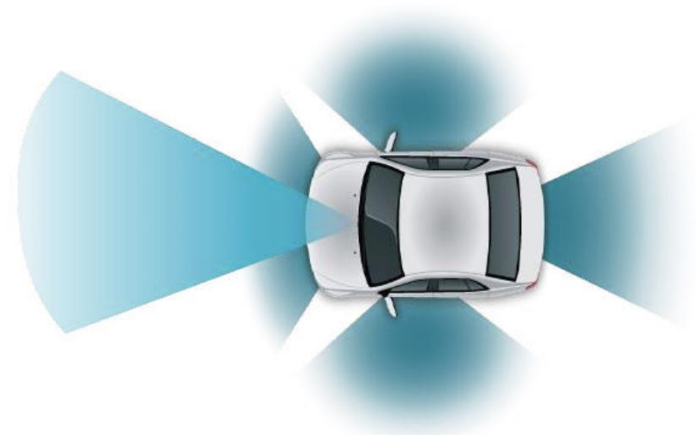
Low

TELEMATICS: Edge Based Camera Solution

MAJOR CAUSES OF ROAD ACCIDENTS

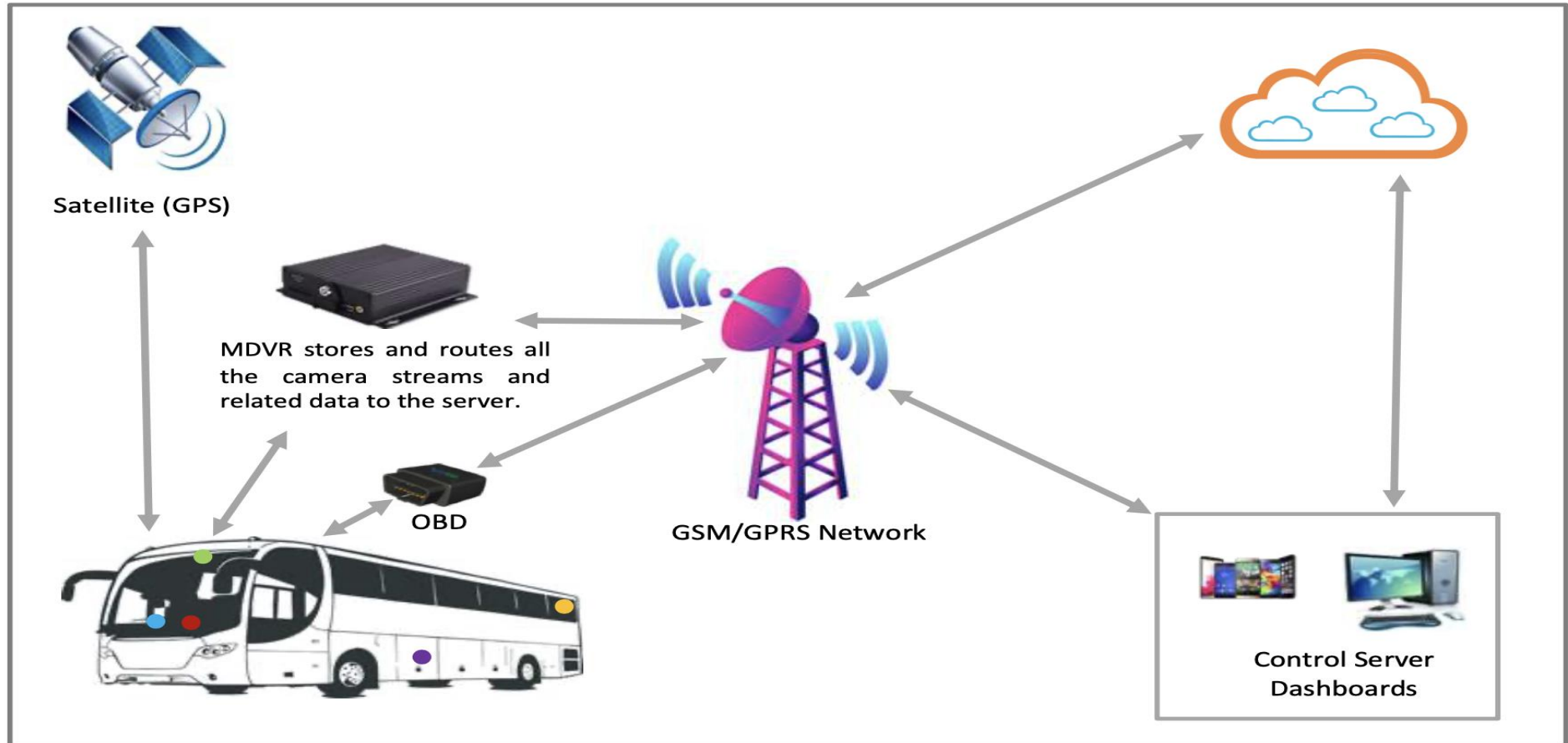


- *93% due to human error*
- *A third of these due to driver fatigue and/or distraction*

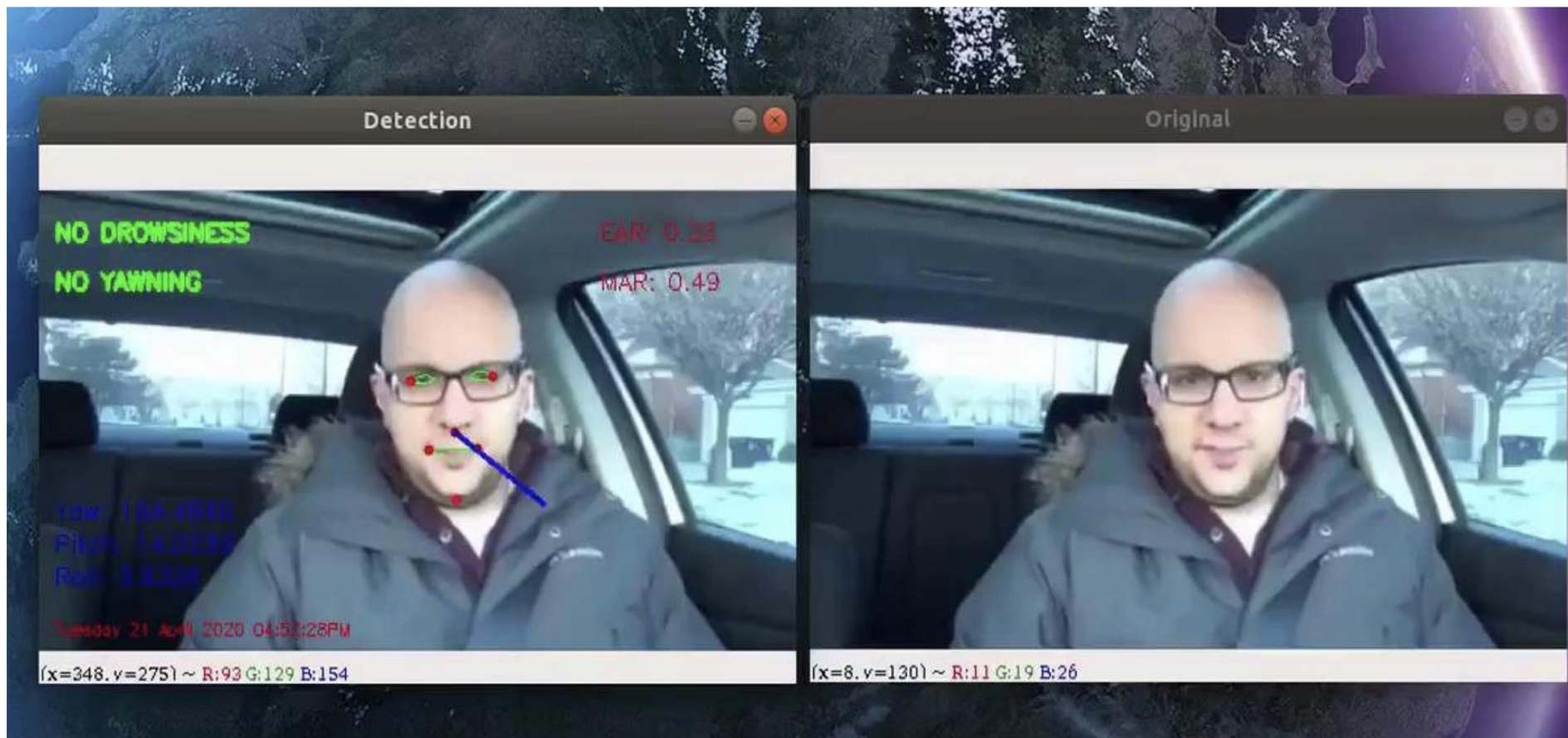


iSafetySolution uses **edge based high definition camera** to ensure safety of the passengers, the drivers, goods and the vehicle. The platform comes with facial recognition and object detection capabilities, powered by AI & ML system that analyses patterns and reports emergency situations

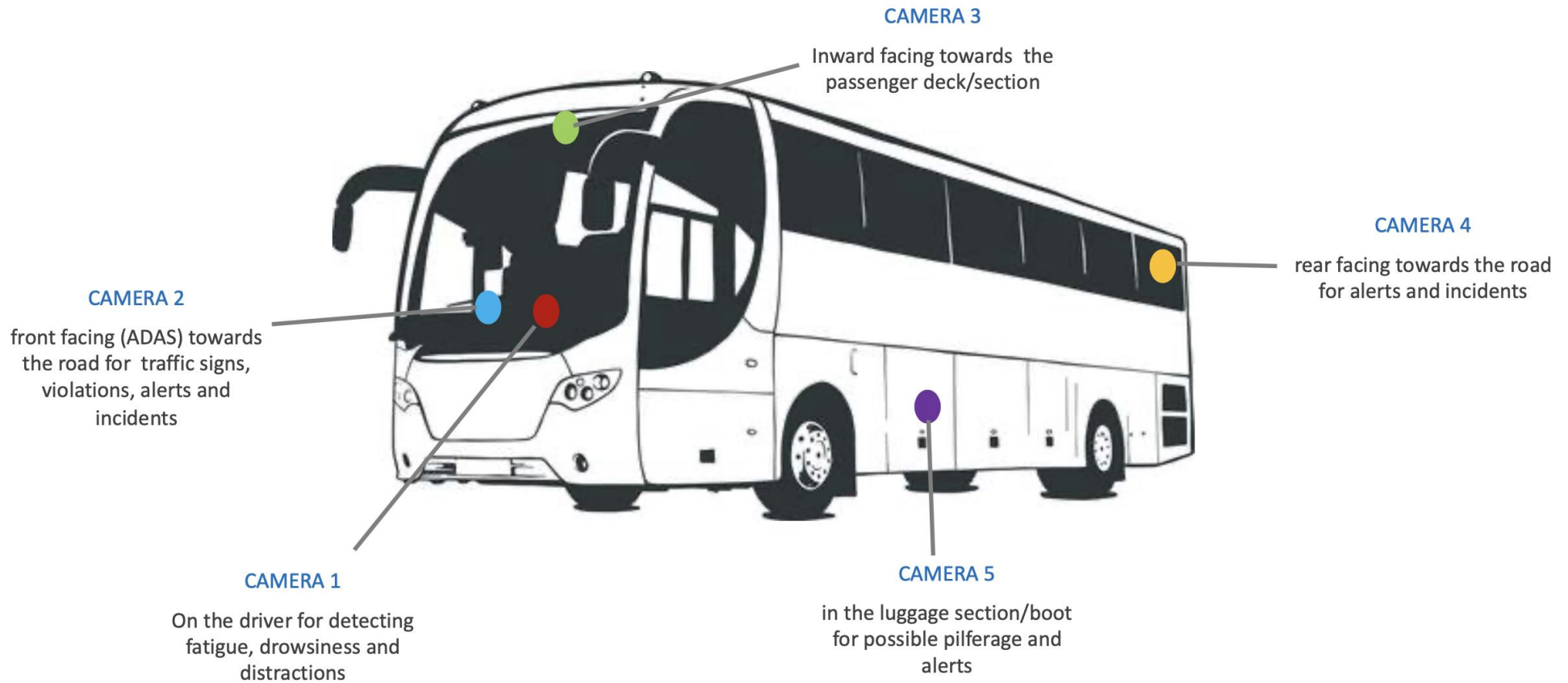
TELEMATICS: Edge Based Camera Solution



ADAS: Driver's Drowsiness Detection System



ADAS: Edge Based Camera Solution



**the number of cameras and configuration can be customized as per requirement*

IoT in Transportation and Logistics

IoT Trends In Transportation And Logistics



Future of Intelligent Transportation

- ❖ **Vision for the next decade**
- ❖ **Potential impact on urban mobility**
- ❖ **Emerging trends and innovations**

ITS India Forum: Key Focus Areas

ITS India Forum- A think-tank on Intelligent Transportation System



Policy Advocacy
and Awareness



Industry Collaboration
Global and local



Research Support &
Capacity Building



Technology Pilot- Green Corridor for Ambulance

Pilot in Bangalore...

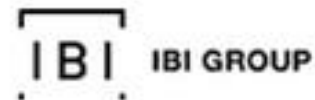
By ITS India Forum Partners

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- 3. DANLAW**
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- 5. IIT Hyderabad (Knowledge Partner)**

A Round Table Conference on Comprehensive National ITS Policy on 10th July, 2024 at New Delhi



ITS India Forum-A think tank on Intelligent Transportation System



IITs, Standards Bodies, International Communities and ITS Forums

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Join Hands! With Us
For
Sustainable Mobility, SAFE CITY through
Intelligent Transportation Systems
in India Region

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Thank You