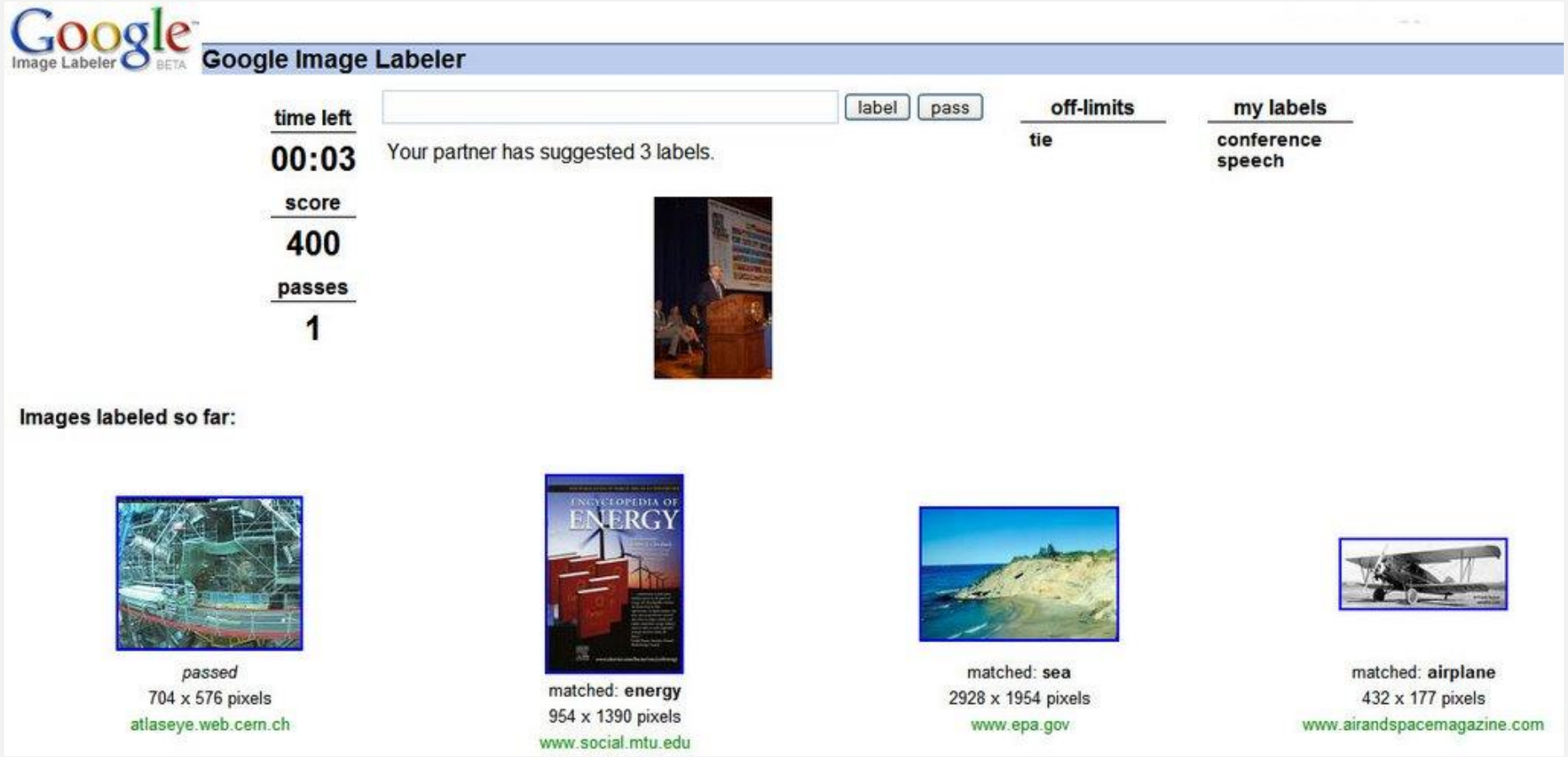
Machine Learning for TSMO

MacAdam Consulting

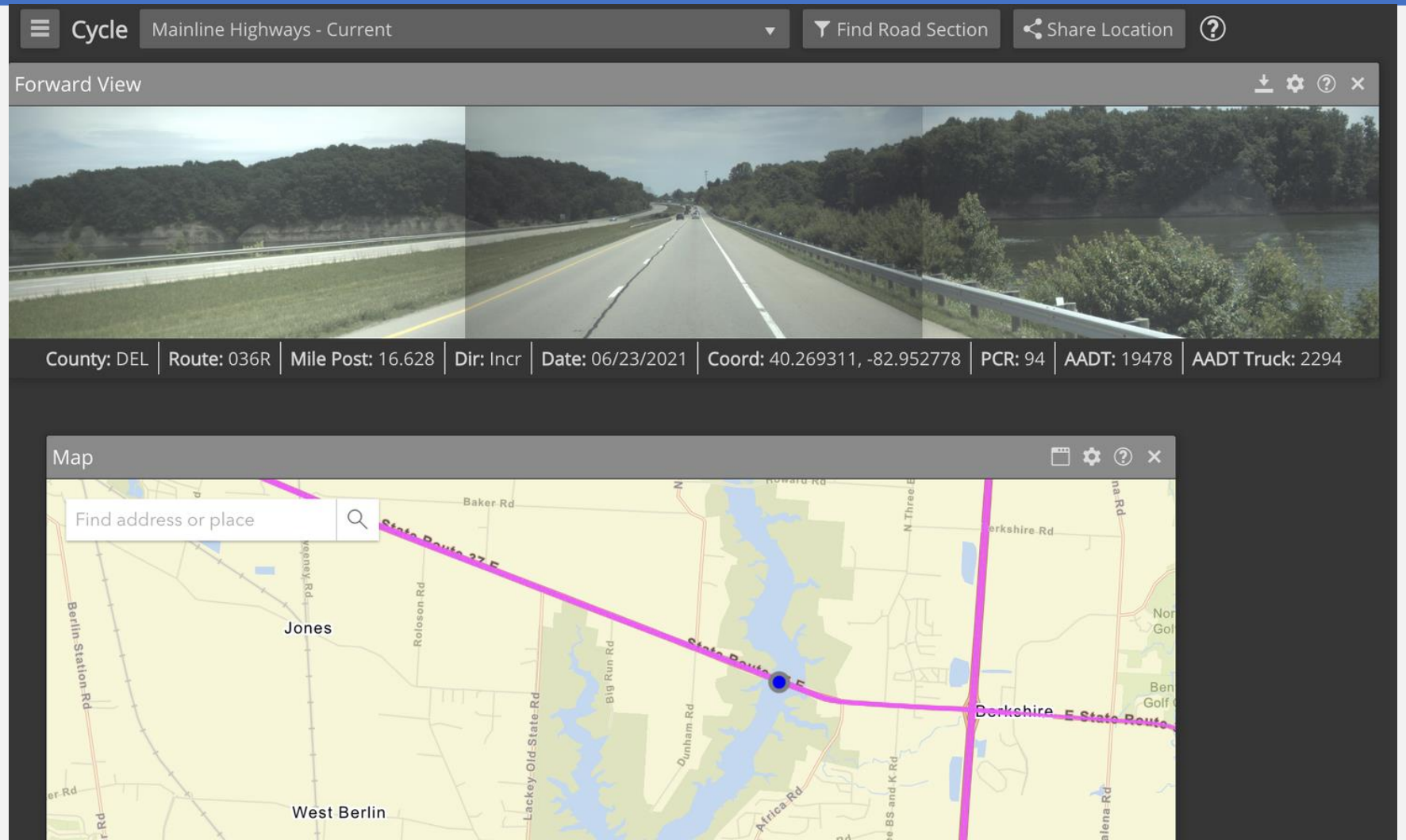
Outline

1. Personal Experiences
2. How Machine Learning Works
3. Video Analytics State of the Industry

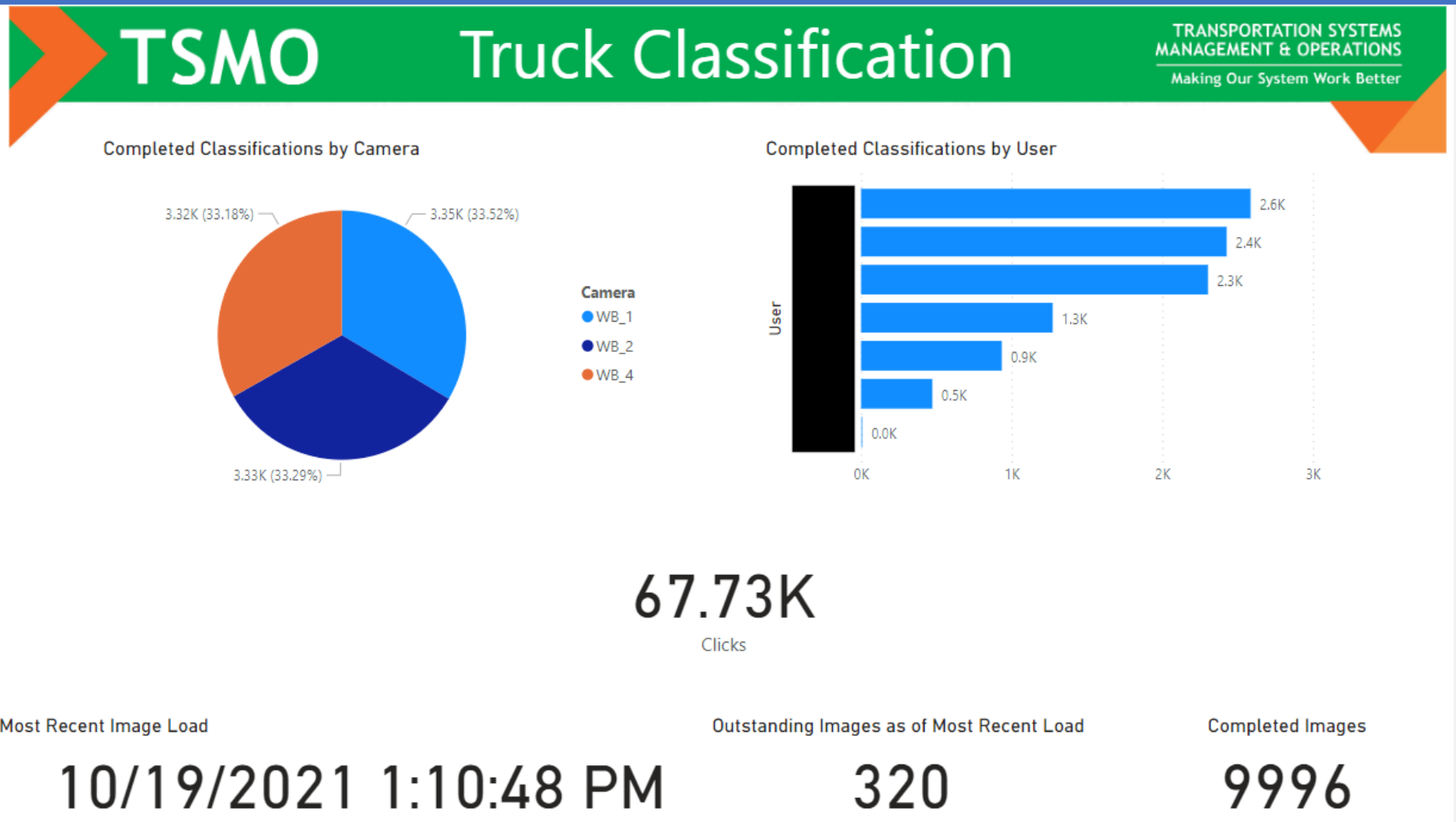
Personal ML Experiences



Personal ML Experiences

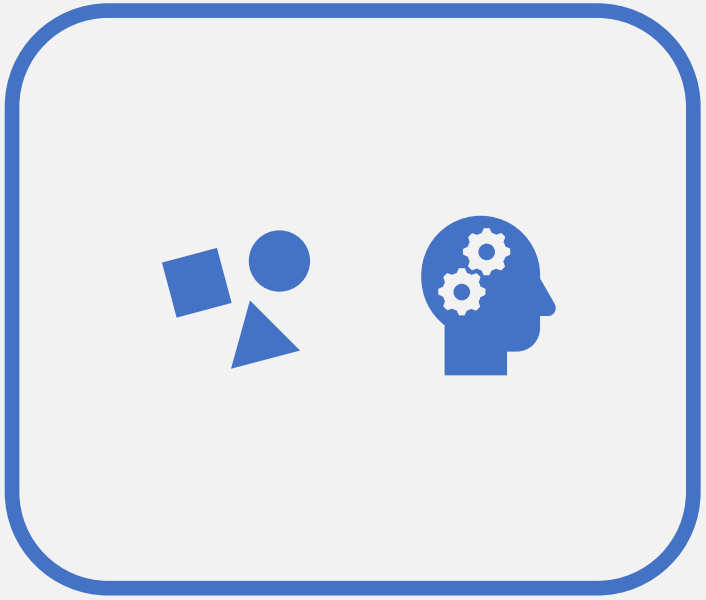


Personal ML Experiences

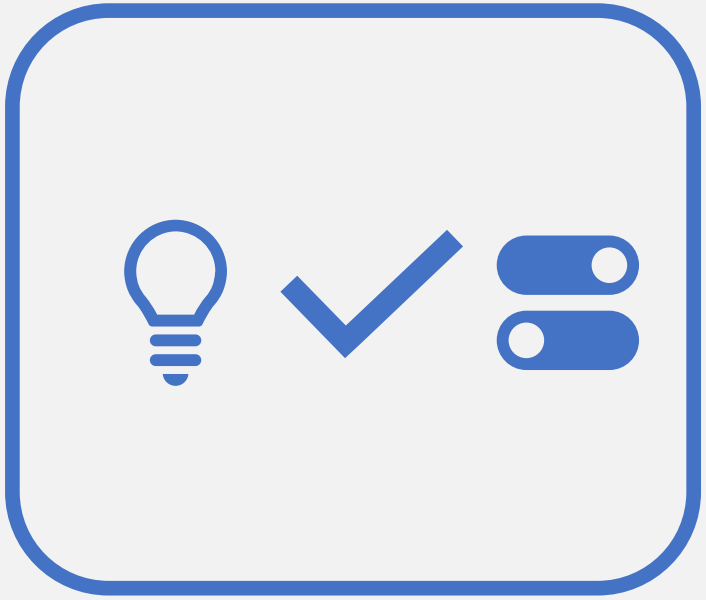


How Machine Learning Works

PARSE DATA



LEARN



DECISIONS

How Machine Learning Works

Basic ML

Advanced ML

How Machine Learning Works

Basic ML

Advanced ML

AI & ML for TSMO

- Traffic signal optimization
- Demand forecasting
- Predictive maintenance
- Incident detection and response
- Ramp metering
- Video analytics

Video Analytics basics

- Object detection
- Image classification
- Localization
- Object tracking
- Anomaly detection
- Activity recognition
- Segmentation

State of the Industry

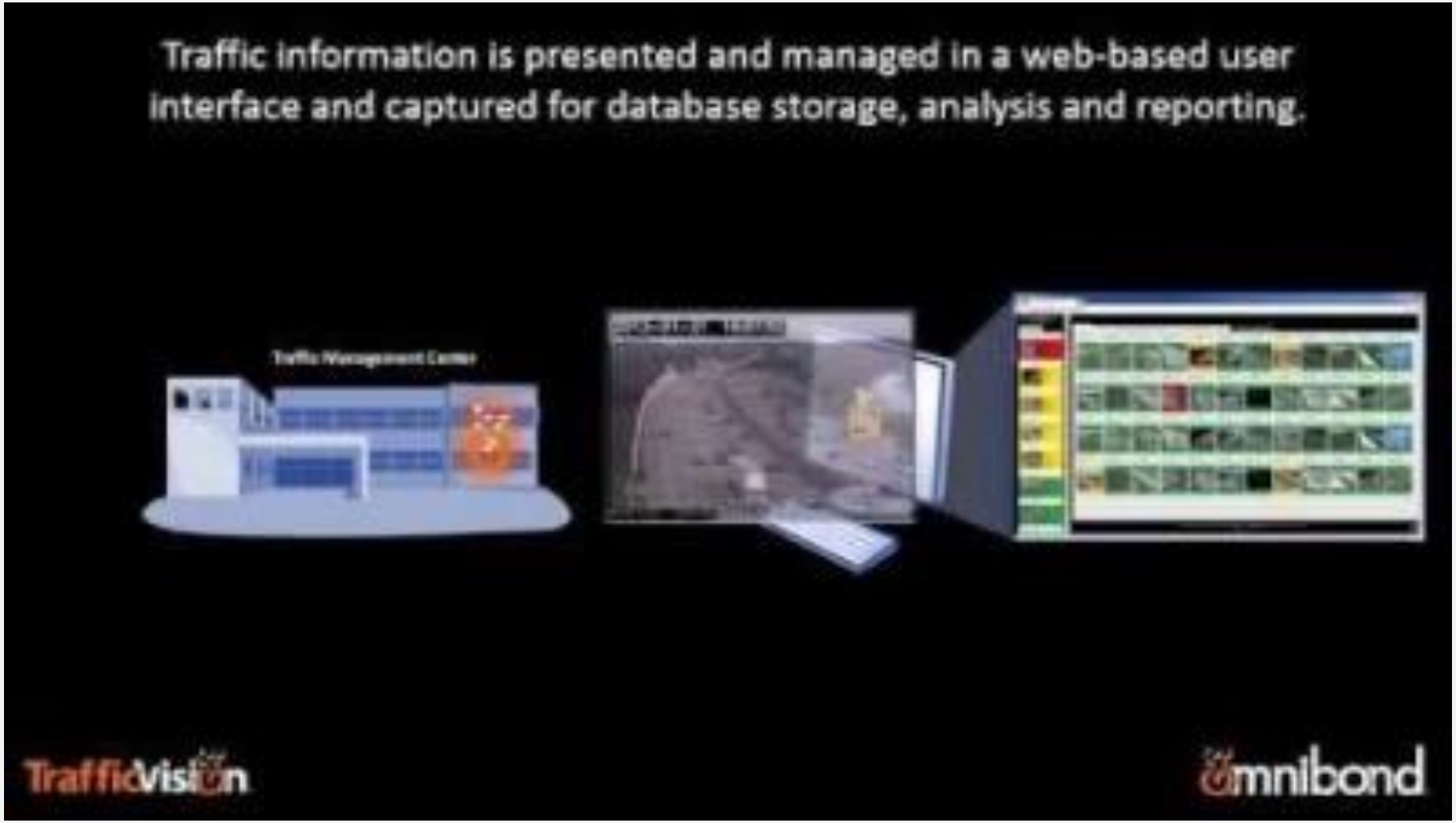
- Traffic Queues
- Wrong Way Drivers
- Volume / Occupancy
- Vehicle Classification
- Pedestrians
- Traffic Crashes
- High Speeds
- Rest Area Parking
- Stopped Vehicles
- Origin-Destination
- Objects on Roadway
- Average Traffic Speeds
- Low Visibility
- Cross-line Detection

State of the Industry

Current Approaches

1. Existing ITS CCTVs
2. Beyond existing CCTVs
3. Custom software

1. Using Existing CCTVs



1. Using Existing CCTVs

Different Approaches

Basic ML

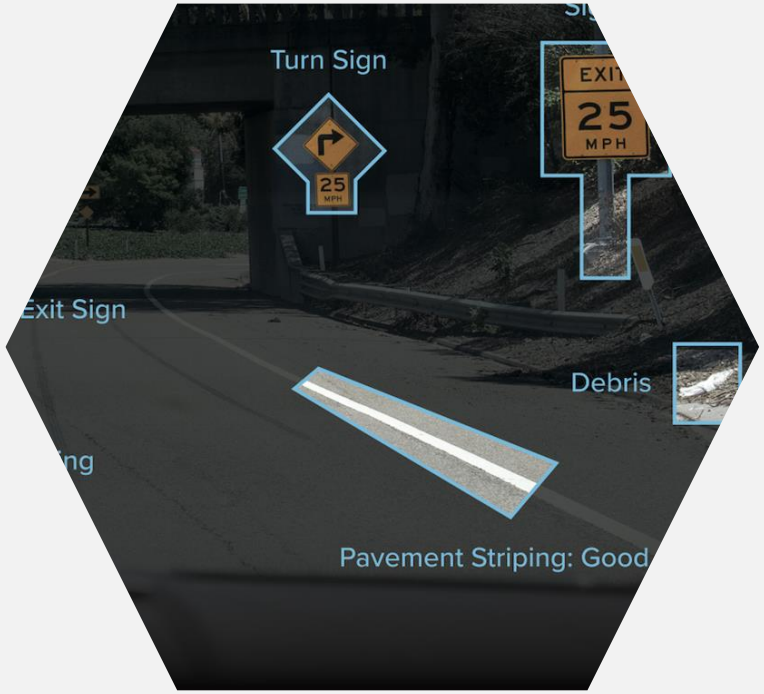
- Fixed CCTV position
- Perfect lighting
- High resolution
- Limited detection
- Frame rate
- Occlusion

Advanced ML

- Adaptive Learning

None of these limitations

2. Beyond Existing CCTVs



3. Custom Software

Current Approaches

	Pros	Cons
Existing CCTVs	Leverage existing ITS investments Out of the box insights	Limited application and footprint Some babysitting
Beyond Existing CCTVs	Fill in the gaps Additional insights	Not real-time
Software	Extendable beyond video Adaptive learning	Requires expertise to build and maintain models

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