



AI for Automotive

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AI for Automotive

Content

- Key Drivers of Transformational changes
- The Landscape of Autonomous Vehicles
- Market Demand
- GL Capabilities in ML/CV
- GL contributors
- Summary

A person is shown from the chest up, wearing a white shirt, looking down at a tablet computer. The tablet screen displays a complex data dashboard with various charts and graphs. A smartphone is placed on the desk next to the tablet. The entire scene is overlaid with a semi-transparent teal color. The text 'Key drivers of industry transformation' is written in white, bold, sans-serif font on the left side of the image.

Key drivers of industry transformation

Drivers of industry transformation

Top 5 Trends

- Electrification
- Autonomous vehicles
- Shared
- Connectivity
- Yearly updated with new mobility services



Drivers of industry transformation

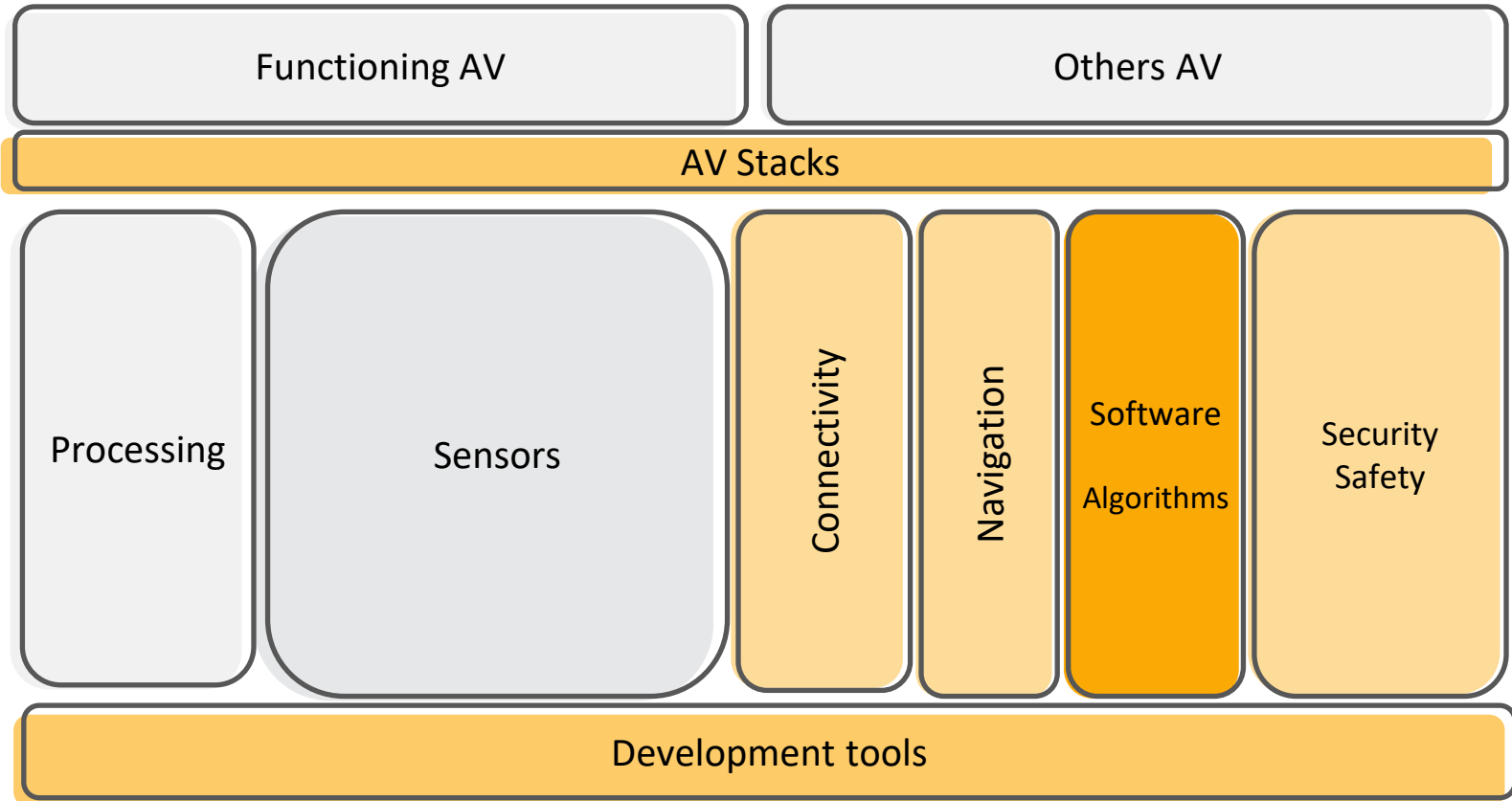
Top 5 Trends

- Electrification
- **Autonomous vehicles**
- Shared
- Connectivity
- Yearly updated with new mobility services

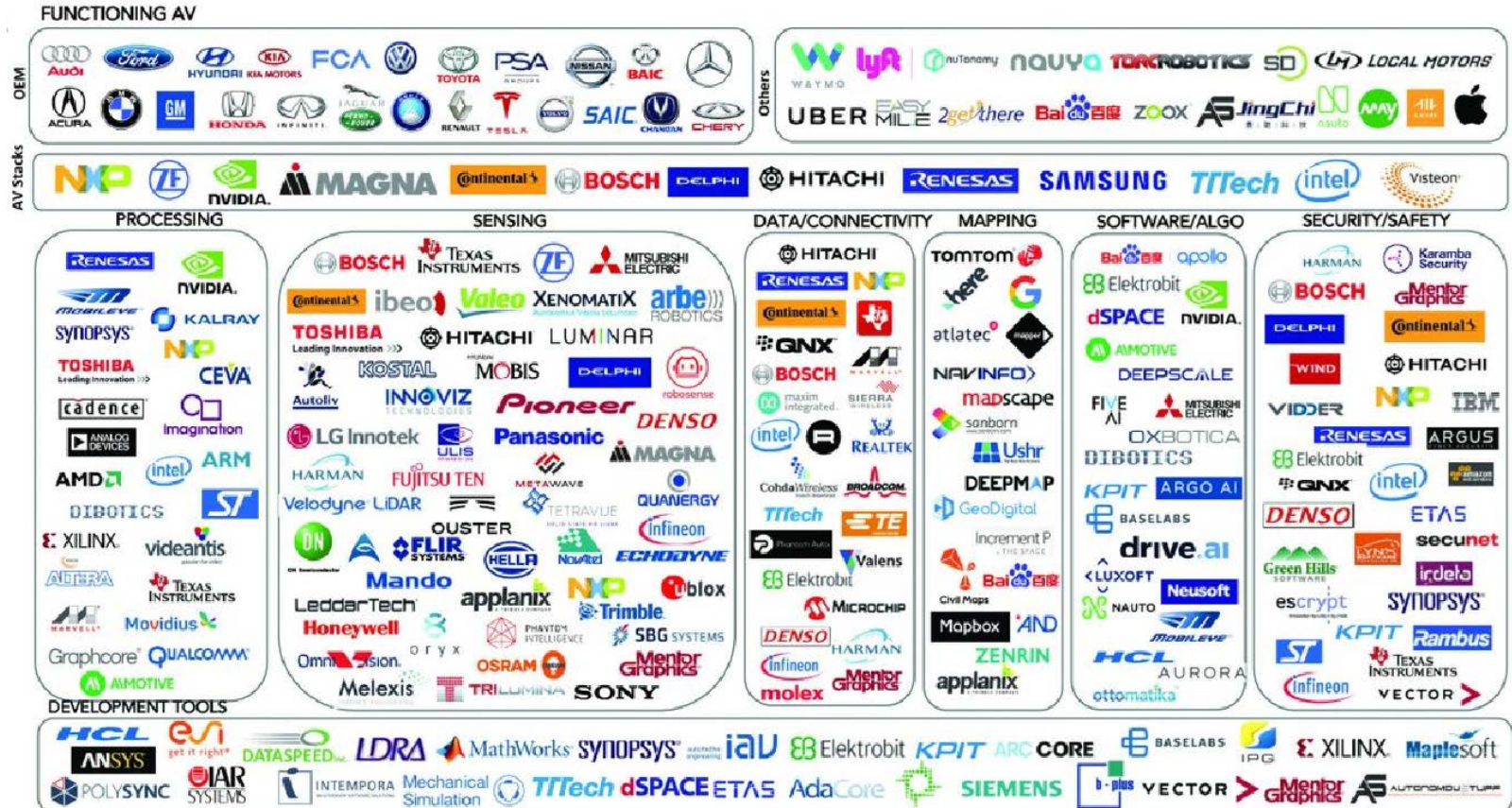
GL capabilities in ML/CV

- Object detection
- Deep Learning
- Multi-view geometry
- Facial Recognition
- Sensor fusion
- Data quality control
- DMS
- ADAS
- V2X
- Collision avoidance

The Landscape of Autonomous Vehicles



The Landscape of Autonomous Vehicles



A person is shown from the chest down, wearing a light-colored shirt, sitting at a desk. They are using a tablet computer. The desk also has a smartphone and some papers. The entire image is overlaid with a semi-transparent teal color. The text 'Market demand' is written in white, bold, sans-serif font on the left side of the image.

Market demand

Market Demand: Mandatory Safety Features 2022

- Intelligent speed assistance
- Driver drowsiness and attention warning
- Advanced driver distraction warning

- Alcohol interlock installation facilitation
- Emergency stop signals
- Reversing detection systems
- Event data recorders
- Accurate tyre pressure monitoring

- Intelligent speed assistance
- Advanced emergency braking systems
- Emergency lane-keeping systems

- Enlarged head impact protection zones capable of mitigating injuries in collisions with vulnerable road users, such as pedestrians and cyclists

Detecting pedestrians and cyclists located in close proximity to the vehicle



Market Demand: Autonomous vehicles

Computer Vision

- Object Detection
- Object Classification
- Traffic Sign Recognition
- Lane Detection
- Free-Space Detection
- Pixel level Semantic Segmentation

Predictive Control

- Deep Reinforcement Learning
- Object Trajectory/Prediction
- End-to-End Automation
- Driver Monitoring Applications

AV

- Lane Keeping
- Lane Changing & Post-processing



<https://vsi-labs.com/products/topical-report-ai-in-automotive>

A person is shown from the chest down, wearing a light-colored shirt, interacting with a tablet. The tablet screen displays a complex data visualization with various charts and graphs. A smartphone is placed on the desk next to the tablet. The entire scene is overlaid with a semi-transparent teal color. The text 'GL Capabilities in ML/CV' is written in white, bold, sans-serif font on the left side of the image.

GL Capabilities in ML/CV

1. Intelligent speed assistance



Intelligent speed assistance

Market Demand

Driver to be made aware that the applicable speed limit is exceeded. Speed limit information is obtained through the **observation of road signs and signals**, based on infrastructure signals or electronic map data, or both



<https://www.youtube.com/watch?v=stb-Xo1LADU>

Intelligent speed assistance

Market offerings: Computer Vision



BOSCH

Continental 



<https://www.youtube.com/watch?v=Uz5mIdRtdeA>

Intelligent speed assistance

Market offerings: Navigation & V2X



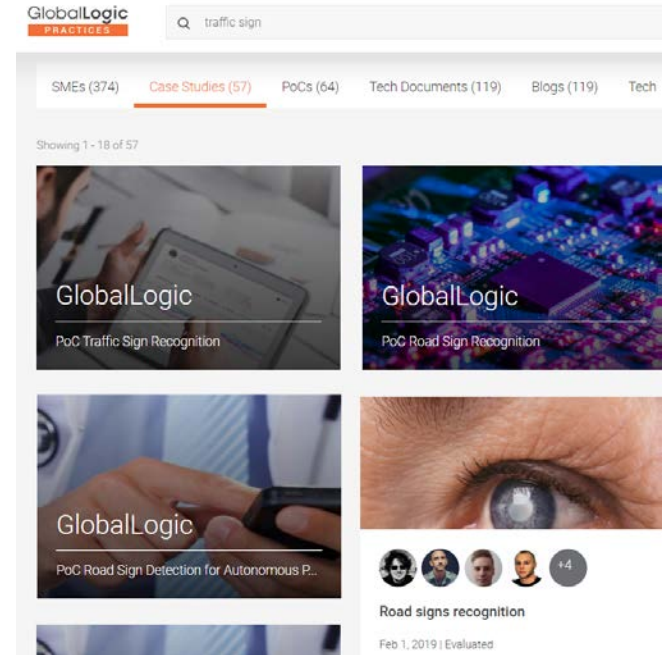
Any Speed Limit Information Function, be it camera or map based or a combination of both, is eligible for Euro NCAP scoring points. With **HERE Road Signs**, speed limits **get updated on a daily basis**, enabling OEMs to achieve higher Euro NCAP scores.



Intelligent speed assistance

Value Proposition

- Road Signs Recognition
- V2X
- MCAS
- Lidar Free Space



<https://practices.globallogic.com/case-studies/14fD26KEYcDFKGOt3IYtkBgd0D7pGvnr1>

<https://practices.globallogic.com/case-studies/0B5nqAE1j6eQiRnkyQUE5TWNJb00>

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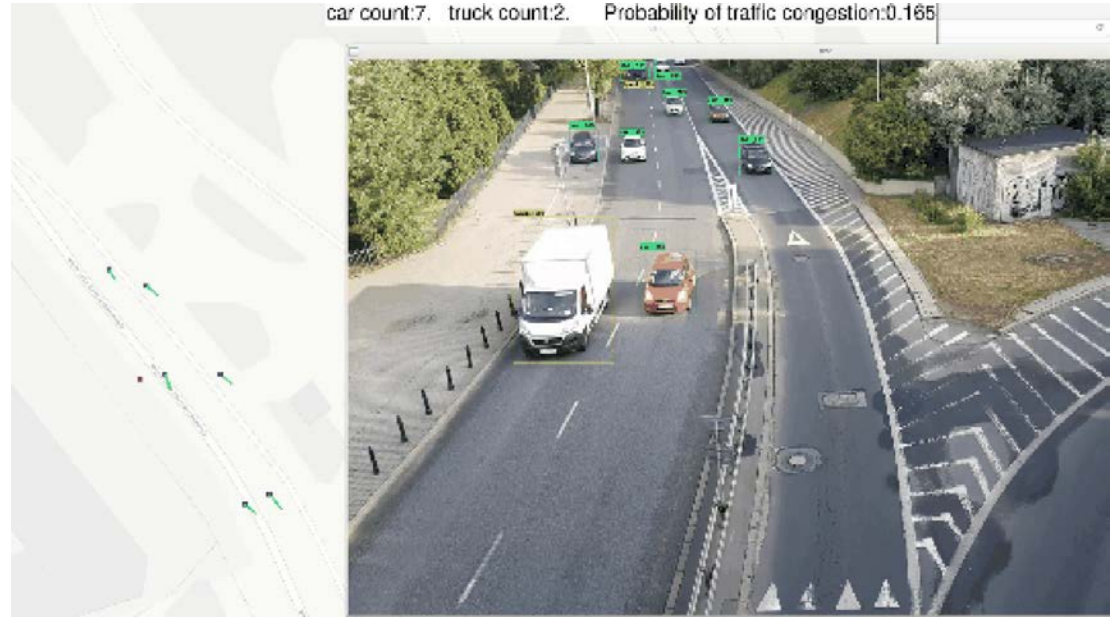
<https://docs.google.com/presentation/d/1yfypuqaU1YltzQBKyZ5MHCdbGTxrvJzgeOqymHnAypU/edit#slide=id.p1>

https://docs.google.com/presentation/d/1rgZvfmGVHX62cVylt5GynCcWk5eAhu_vNuGk_ocnIYw/edit#slide=id.g851d71d16b_2_9

Intelligent speed assistance

Value Proposition

- Road Signs Recognition
- V2X
- MCAS
- Lidar Free Space



<https://docs.google.com/presentation/d/1yfpuqaU1YltzQBKyZ5MHCdbGTxrvJzgeOqymHnAypU/edit>

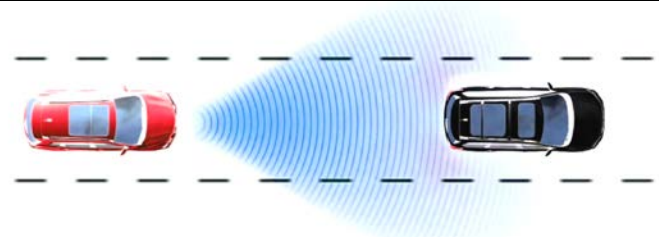
2. Advanced emergency braking system



Advanced emergency braking system

Market Demand

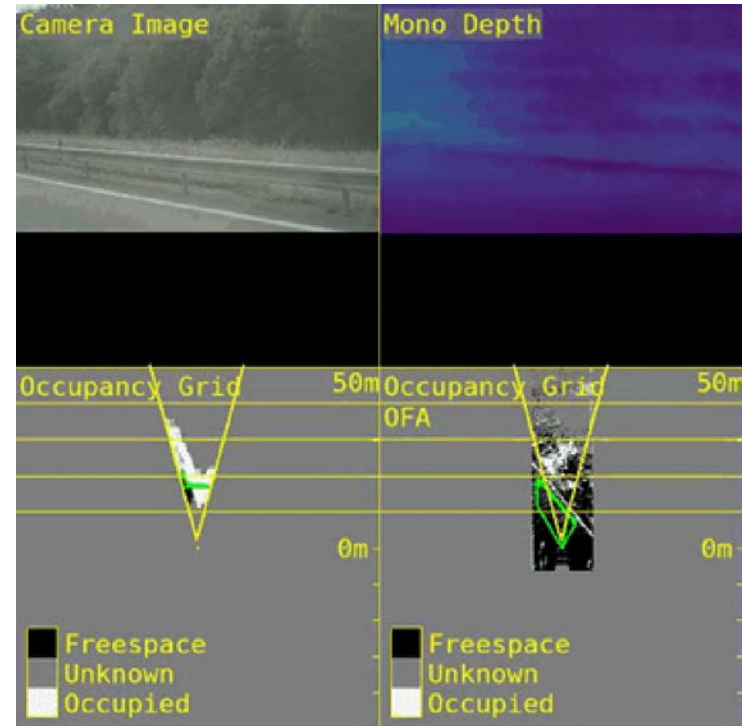
Automatically **detect a potential collision** and activate the vehicle braking system to decelerate the vehicle with the purpose of avoiding or mitigating a collision



Advanced emergency braking system

Value Proposition

- Reduce False positive alarms
- Handle corner cases where suddenly stopped traffic is not detected
- Handle low lighting / visibility cases (eg night driving, fog, etc)



3. Emergency lane-keeping systems



Emergency lane-keeping systems

Market Demand

Assists the driver in **keeping a safe position** of the vehicle with respect to the lane or road boundary, at least **when a lane departure occurs** or is about to occur and a collision might be imminent

LDW - Lane departure warning: alert the driver when the car is leaving its lane

LKA - Lane keep assists: works to keep the car from moving out of the lane



https://drive.google.com/file/d/12_T_vNPylbaUir5-PT0wuMdkR-2I3UK/view

Emergency lane-keeping systems

Consumer reports

- LDW systems **can help sleepy or distracted drivers** stay safe
- Good reminder to use turn signal when changing lanes
- Systems are too sensitive and have **lots of annoying false positives**
- When using LKA, giving a wide berth to a cyclist or pedestrian might cause the system to try to steer back toward the cyclist or walker, so always be alert.



Emergency lane-keeping systems

GL Value Proposition

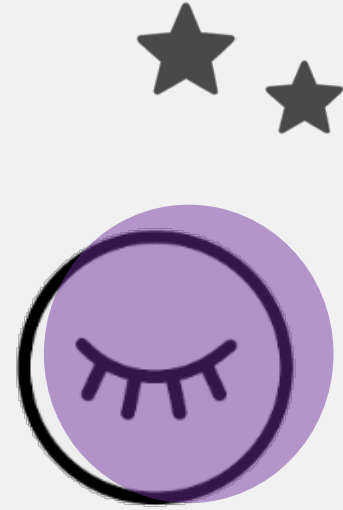
- Reduce False positive alarms
- Improving accuracy of lane detection for specific cases (curve on the highway, retaining wall)
- Handling low lighting / visibility cases (eg night driving, fog, etc)



SEP 12 10:08

<https://www.youtube.com/watch?v=cPMvQphJQIE>

4. Driver drowsiness and attention warning



Driver drowsiness and attention warning

Driver Experience

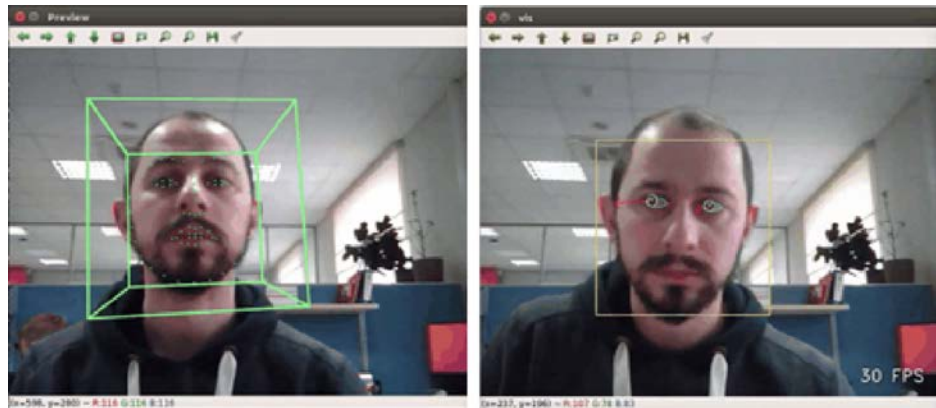


<https://www.youtube.com/watch?v=zF1lJx5lnV4>

Driver drowsiness and attention warning

GL Value Proposition

- Head pose estimation
- Gaze tracking
- Hands on wheel detection
- Driver and Passenger Mood and Emotion
- Child presence detection

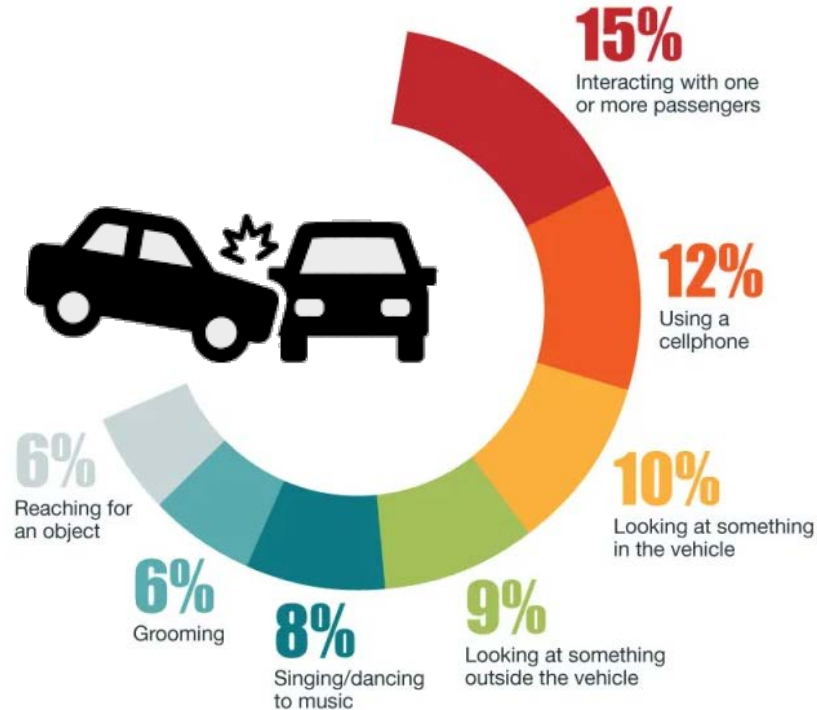


5. Advanced driver distraction warning



Advanced driver distraction warning

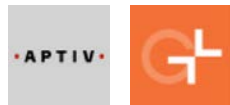
Distraction factors



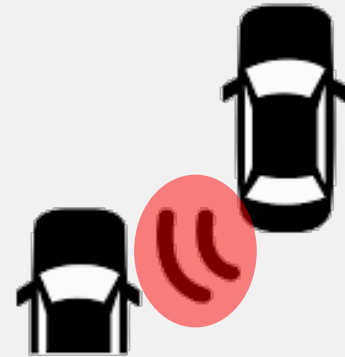
Advanced driver distraction warning

GL Value Proposition

- Pose estimation
- Gaze tracking
- Eye closing line estimation
- Handling cases when driver wears glasses



6. Collision avoidance



Collision Avoidance

M-City



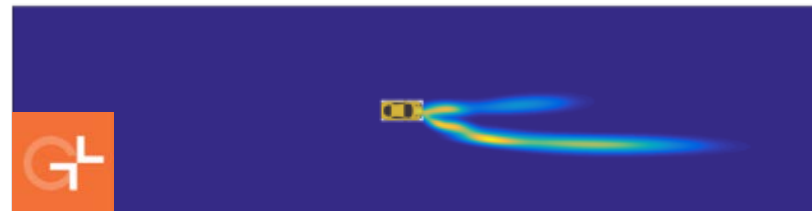
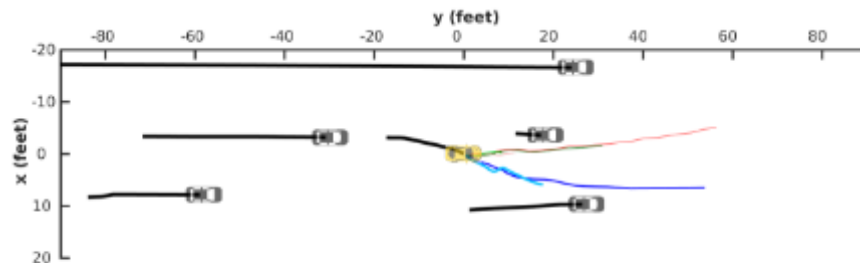
Collision Avoidance

GL Value Proposition

- Real time trajectory planning
- Object association
- Collision avoidance

.. upon a batch of telemetry data channels and HD map:

- HERE HD Map
- Data from Smart CCTV cameras
- IMU
- GPS/RTK data
- OBD data



Other Capabilities..



Other ML/CV Capabilities

GL Value Proposition

Sensor fusion

Object detection

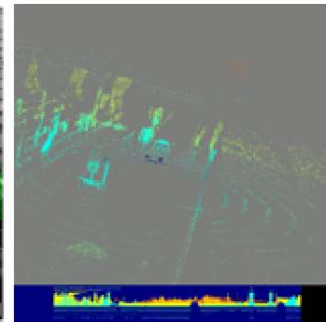
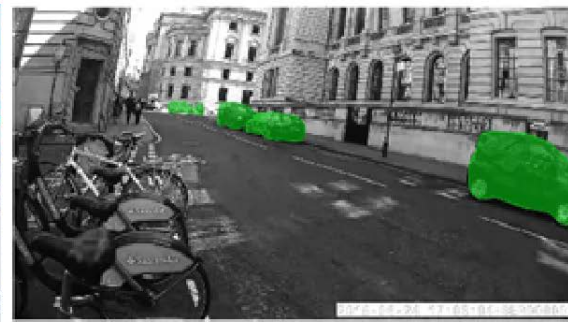
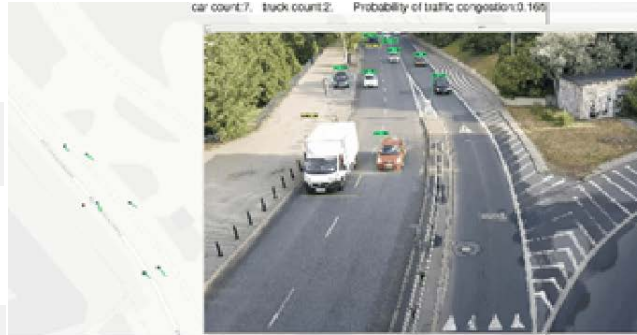
ADAS

DMS

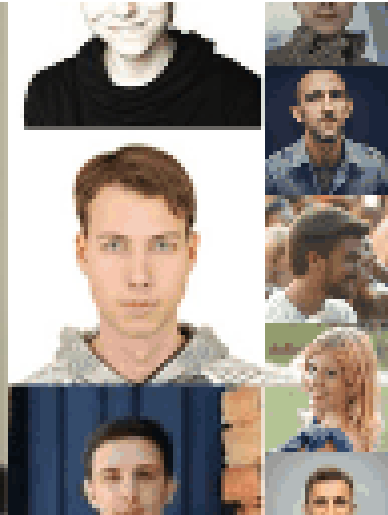
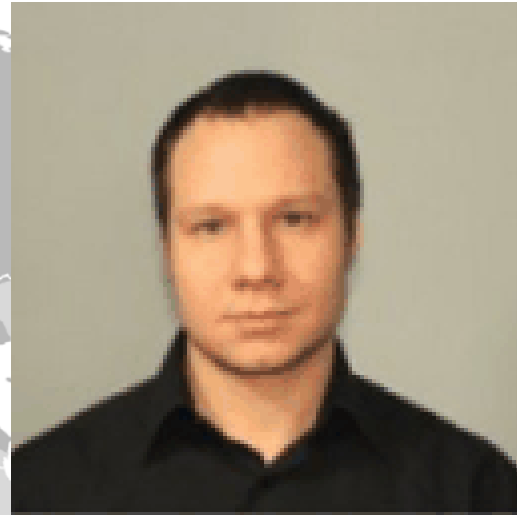
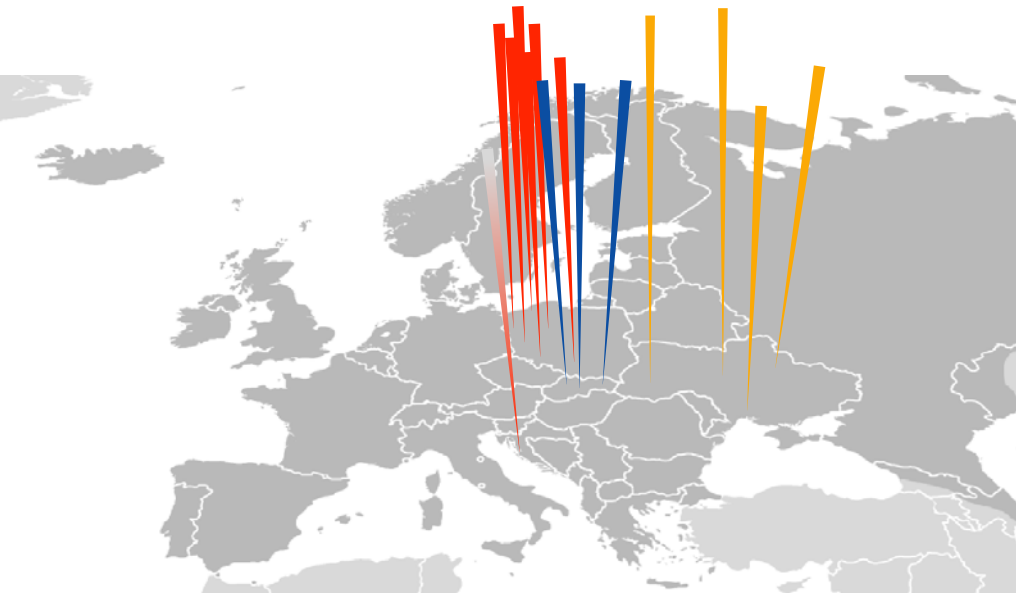
Collision avoidance

Facial Recognition

Data Quality control



Our Contributors



A grayscale background image showing a person's hands interacting with a tablet. The tablet screen displays a complex data dashboard with various charts, graphs, and tables. The person is looking down at the device. A thick orange horizontal bar is positioned below the text.

Thank you !