VIVACITY LABS SENSOR TECHNOLOGY

WHY IS IT UNIQUE?

Our technology

The Vivacity Labs vehicle sensor is based on camera technology that can provide real-time classified data on how vehicles use a road space. It uses cutting-edge machine learning techniques, which allow it to be more flexible and accurate in detecting and classifying transportation modes. The sensors use extremely powerful local processors, which can be updated remotely with the latest software as machine learning techniques improve.

Privacy-by-design

Data privacy is central to our vision and design philosophy. Our technology meets the highest data protection standards, and our sensors do not, and will never, collect personal data.

Capability

Vivacity's sensors provide real time data, streamed to the cloud, on how a road space is being used. The following outputs are offered, all from the same sensor:

Classified counts of vehicles within the field of view, covering multiple lanes.

- Pedestrian
- Cyclist
- Motorbike
- Car (a vehicle with up to 7 passengers with glass windows in the back – Van shaped & sized cars will be correctly classified as cars)
- Taxi (black cab only)
- Van/LGV (a vehicle with a built-in driver compartment with no rear windows – car shaped vans will be correctly classified as vans)
- OGV 1 – HGVs with a separate driver cab, but no articulation
- OGV 2 – HGVs with a separated driver cab, and with either an articulation or 4 or more axles
- Public Service Vehicles/ Buses

Vehicle path across the road space between the sensor and 50m-75m away – used to understand how different vehicles interact and to assess turning counts at a junction.

Social distancing - the number of pedestrian/pedestrian interactions < 2m.

Median journey time of road users with number plates between any two sensors within the network.

Speed – capture travel behaviour, stopped vehicle detection and identify queue formation.

Sensor image - on request, a blurred image or low-resolution video of the road space can be sent to a control room to help understand why a live data feed is showing abnormal behaviour.

Dashboard for easy data access

All of this data is accessible via our cloud-based intuitive dashboard which allows users to log-in from anywhere and view live and historic data generated by each sensor.

Why choose Vivacity?

Other automatic traffic counting technologies exist, however none of these are able to offer:

Data on the path that transport modes take across a road space.

Data on pedestrians, cyclists and other vehicle classifications from a single sensor type.

The ability to request a visual image from the sensors in the event that the data indicates abnormal traffic behaviour.

Despite these additional capabilities, Vivacity technology is priced so that it is competitive with more basic incumbent sensor types, and substantially less expensive than more complex sensor types that have attempted to offer some of these enhanced capabilities.

How does Vivacity technology compare to other solutions?

VIVACITY

Induction Loops and other in-ground technology

Each sensor only covers one lane.

Only provides data on the position of vehicles in one discrete location on the road.

Loops can provide basic classifications, but as standard do not count pedestrians and cyclists and do not classify car vs van. If set-up to count cyclists, they are then typically less accurate for other vehicle types, and also fail with certain types of bicycle.

Intrusive ground works are required to install, with all lanes of traffic being counted must be shut.

No visual output is possible.

Light Gates

Light gates require a 'single lane' of usage, cannot classify between pedestrians and cyclists, and do not work if multiple road users cross simultaneously.

Thermal and LIDAR

Thermal Cameras and LIDAR are able to provide some transport mode classifications, but due to limited feature resolution cannot classify between cars and vans, or between different types of HGV.

Vehicle tracking capabilities are also reduced.

More expensive than Vivacity system.

No visual output is possible.

Crowd Sourced (Connected Device) Data

Typically, either mobile phone network data or App GPS data. This is good at providing journey times between different locations and along different routes; however, it has some significant limitations:

- Poor assessment of traffic flow volume - it only covers a sample of the population, and this sample changes with time of day and location, making it impossible to accurately scale traffic flow volumes.
- Skewed data set - propensity to have a connected device broadcasting data varies with age, profession and other demographic factors, increasing the risk of potentially discriminatory policy decisions being made from this data.
- No classification – connected devices do not broadcast what mode of transport they are using.
- Data latency – data provided is typically between 10 and 30 minutes out of date.

ANPR only

Needs to see the number plate on a vehicle to count it, whereas Vivacity sensors only need to see part of the vehicle. This means ANPR on its own is less accurate at counting volume of vehicles, especially when queueing.

More susceptible to poor light conditions and dirty number plates, meaning vehicles are only detected in the image foreground, making vehicle path tracking within field of view impossible.

Cannot detect pedestrians or cyclists.

Typically, not able to cover more than 1-2 lanes from a single unit, so more expensive to cover larger roads.

In addition to greater coverage, Vivacity sensors are typically less expensive than ANPR cameras per-unit.

Radar

Non-scanning radar will not be able to determine which lane a vehicle is in. Scanning radar is able to determine the position of an object within the road space at greatly increased cost and complexity, typically far in excess of Vivacity sensors.

Due to insufficient feature detail to understand where one vehicle starts and another stops, car counting in queueing traffic is difficult.

Insufficient detail to provide classifications between pedestrians and cyclists, cars and vans, or buses and HGVs.

No visual output is possible.

Traditional Computer Vision

Most vision-based sensors make use of traditional computer vision techniques. The two main techniques available are Background Subtraction and HOG detection.

- Background Subtraction is unable to cope with changing lighting conditions and due to position sensitivity, is not suitable for mounting to street lighting with exposure to bad weather conditions without robust pylon/gantry, dramatically increasing costs.
- HOG detection cannot identify items when they become overlapped, therefore only works in non-crowded fields of view.
- Neither techniques offer effective transport mode classification.

Using neural networks as our underlying computer vision detection, Vivacity has solved all these issues.

Please contact us for more information or to organise a demonstration