WHY IS OUR SENSOR TECHNOLOGY UNIQUE?

At VivaCity, our vision is to make cities smarter, safer and more sustainable. Our AI sensors and 'Smart Junctions' signal control gather accurate, detailed and anonymous data 24/7 on transport modes, traffic flow and travel patterns, supporting strategic decisions to help optimise the transport network and improve urban infrastructure.

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 up to 32 classes, including Pedestrian, Cyclist, Motorbike, Car, Taxi, Van/LGV, OGV 1, OGV 2, Buses, E-scooters and Cargo Bikes.
- Vehicle Path across the road space to understand how different vehicles interact and to assess junction turning counts.
- Median Journey Time of road users with number plates (hashed) between any two sensors within the network.
- Speed to capture travel behaviour, stopped vehicle detection and identify queue formation.
- Sensor Image on request, a blurred image of the road space to help understand abnormal behaviour on a live data feed.

Using cutting-edge machine learning techniques and working with extremely powerful local processors, our sensor platform can be updated remotely with the latest software as machine learning technology continues to evolve.

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Why choose VivaCity?

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

- Path data of multiple transport modes.
- Vehicle and active travel classifications from a single sensor type.
- Anonymised visual images in the event of sensor data indicating abnormal traffic behaviour.

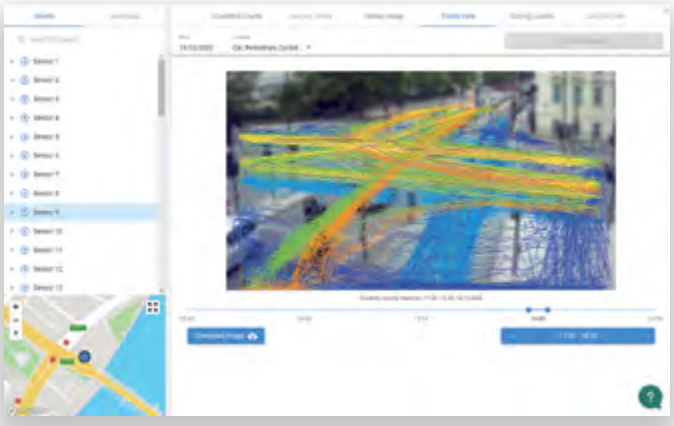
Despite these additional capabilities, VivaCity technology is competitively priced against basic incumbent sensor types, and substantially less expensive than more complex sensors that have attempted to offer some of these enhanced features.

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.

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.



How our technology compares to other solutions

INDUCTION LOOPS AND OTHER IN-GROUND TECHNOLOGY

Induction loops detect the presence of an object as it passes over them and can provide basic traffic classifications based on the changes recorded.

As standard they do not count pedestrians and cyclists and cannot differentiate between a car and a van. If set-up to count cyclists this lessens their ability to classify other vehicle types. Installing induction loops requires intrusive ground works and considerable traffic disruption. They're also unable to produce visual output.

THERMAL AND LIDAR

Thermal Cameras and LIDAR (Light Detection and Radiation) are temperature-sensitive sensors. Due to limited feature resolution they cannot classify between cars and vans, or between different types of HGV, and have limited vehicle tracking capabilities without the possibility of visual output. Despite this, they are more expensive than VivaCity sensors.

LIGHT GATES

Light Gates have an infrared transmitter that detects passing objects.

They are limited to 'single lane' usage, cannot classify between pedestrians and cyclists, and are unable to work if multiple road users cross.

CROWDSOURCED (CONNECTED DEVICE) DATA

Crowdsourced data typically works by using mobile phone network or App GS data. This method is good at providing journey times between locations and along different routes.

However there are limitations for crowdsourced data, including poor assessment of traffic flow volume and skewed datasets due to the prevalence of connected devices varying depending on demographic factors, such as age and profession. Crowdsourced data also fails to provide vehicle classification and data latency is another issue – usually transmitted with a 10 – 30 minute delay.

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How our technology compares to other solutions

RADAR

By detecting radio waves, standard radar sensors can measure motion and speed but cannot determine exact locations of vehicles. Scanning radar is able to determine the position of an object within the road space at a greatly increased cost and complexity – typically far in excess of VivaCity sensors. A lack of feature detail makes it difficult for radar systems to identify where one vehicle starts and another ends, resulting in limited car counting ability, particularly for queuing traffic. This lack of detail also prevents radar making classifications between pedestrians and cyclists, cars and vans, or buses and HGVs.

ANPR ONLY

ANPR cameras can only identify road users with a number plate, and only when that number plate is in clear view. VivaCity AI sensors can identify up to 32 classes of road users, including pedestrians and cyclists, even when road users are only partially in view.

As well as being unable to detect pedestrians and cyclists, ANPR systems are inaccurate when it comes to traffic flow, especially when number plates are obscured by congestion and queues. Poor light conditions and dirty number plates also limit ANPR accuracy, and vehicle tracking is not possible. Typically only one or two lanes of traffic can be covered by a single ANPR unit. VivaCity AI sensors have greater coverage and are therefore a more economical option.

VIDEO SURVEYS

Many decisions for scheme evaluation or design focus on 1 or 2 week video surveys. This typically involves installing cameras for a specified period and manually processing the video. The data is then provided raw or in analysis format several weeks later.

Relying on traditional snapshot data does not provide any insight into behaviours and interactions of different traffic modes, which makes it difficult to assess the success of a scheme over time. Limited data accessibility also makes it difficult to communicate observations with stakeholders.

VivaCity's 24/7 continuous monitoring over a scheme's lifetime is more cost effective than traditional video surveys, and removes logistical and analytical complexity. Most importantly, our approach enables early identification of behavioural shifts and patterns - insight that facilitates pre-emptive interventions and underpins successful adaptations to traffic management, vital for road safety and traffic flow in the urban environment.

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, which both have their limitations.

Background Subtraction is unable to cope with bad weather and changing lighting conditions. Due to position sensitivity, these sensors cannot be mounted on street lighting without robust pylons or gantry, which dramatically increases installation costs.

HOG detection cannot identify objects that occupy the same line of vision and are therefore only effective in non-crowded fields of view. Neither of these techniques offer effective transport mode classification.
Using neural networks as our underlying computer vision detection, VivaCity provides a solution for all of these issues.