WM 5G

5G Case Study

5G Enabled Traffic Monitoring Sensors

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West Midlands Combined Authority

Department for Digital, Culture, Media & Sport

EUROPEAN UNION
European Regional Development Fund

MIDLANDS ENGINE

Greater Birmingham & Solihull
Local Enterprise Partnership

HM Government

Supported by the
Getting Building Fund (GBF)

Synopsis

West Midlands 5G (WM5G) partnered with smart sensor provider Vivacity Labs, to validate the application and use of 5G-enabled smart sensors to accurately identify and classify road usage in real-time.

Two roads near Solihull (Lode Lane and Damson Lane) that regularly receive high volumes of traffic were identified for the trial. Lamp posts were equipped with Vivacity smart sensors powered by 4G and 5G connectivity to compare the capability of each network generation.

By utilising 5G connectivity, the trial was able to provide a proof of concept for successfully collecting and transmitting highly granular – yet fully anonymised – information on all road users and vehicle types.

This kind of insight opens up the possibility to identify and solve congestion problems across all traffic settings, from hyperlocal to region-wide.

Over time, the data collected will help local authorities improve road safety, traffic flow and incident reporting, and build predictive models based on past data to intuitively manage traffic through smart insights.

Problem

The West Midlands is home to some of the UK's busiest, most congested roads – with Birmingham ranking second worst in the country for the time lost due to congestion.

Congestion is costing both local enterprise and communities time and money, having a negative impact on the environment and local air quality.

Many of the sensors on the market do not have the capability to provide reliable real-time data that enables the development of accurate predictive models to combat congestion.

Solution

Installing vehicle counting sensors with 5G connectivity on two roads with a high variety and density of traffic allowed the application of live-traffic tracking to be trialled.

By transmitting the sensor edge processing at different bit-rates on both 4G and 5G networks it was possible to identify the software requirements for maximising network capacity without compromising the quality of the data.

Thanks to 5G and it's much faster upload and download speeds, one network can sustain higher-quality processing or process a greater number of feeds – creating more comprehensive data sets than those currently possible with 4G.

Benefit

Thanks to the data gathered, state-of-the art prediction models can be developed to more accurately forecast traffic flow and reduce congestion in hot-spots.

This will inform local and national Government on current and future road capacity, enabling better planning, repairs and ongoing management.

In the longer term, intuitive changes to traffic flow would mean improved journey times, less noise pollution and better air quality.

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Data Privacy-by-Design

In the UK, one of the major concerns around the use of traffic monitoring has been whether the network could be used in ways that are invasive to privacy.
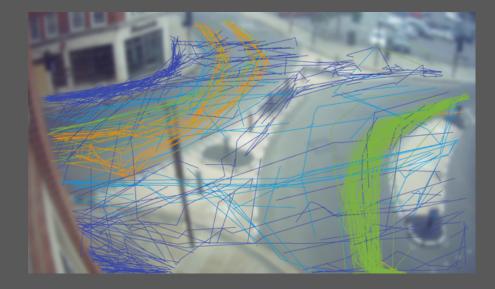
Vivacity is renowned for putting data privacy-by-design principles into action and take an ethical stance against using their software for any form of enforcement purposes.

The Vivacity Labs sensor product makes use of edge processing to produce anonymous data of road usage, without the need for video footage to ever leave the device.

To meet some of Transport for West Midlands (TfWM) use case requirements as part of this trial, a solution to allow secure real-time video streaming was created.

The solution applied involves Vivacity's edge processing used the majority of the time with video streaming only in use when a live incident is identified.

Vivacity algorithms automatically blur personal data from the footage to ensure the highest level of privacy to ensure TfWM can efficiently respond to traffic incidents while mitigating any potential data privacy risks.
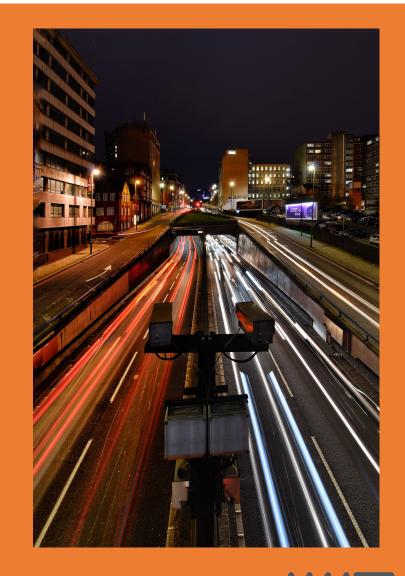
In action

At scale, 5G enabled traffic monitoring sensors would be capable of collecting and analysing comprehensive real-time data to optimise transport as we know it. In a future where sensors are part of our road infrastructure, journeys will be made more intuitive and efficient for all road users.

Traffic control centres and connected road infrastructure (such as smart traffic lights and motorways) will create a city-wide artificial intelligence network that will provide data that can be used to drastically reduce or even eliminate congestion.

Artificial intelligence will be able to predict how traffic patterns will develop, and re-route vehicles before bottlenecks occur.

This insight could help keep road users safe by prioritising access for emergency vehicles, safeguard pedestrians and cyclists, ultimately making journeys more efficient and sustainable, and transport of goods and services more affordable.

With improved traffic flows, businesses across the region would flourish, making the West Midlands a more attractive place to visit, live, work and invest.

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Working with Vivacity has shown the value 5G sensors offer to road management. At the moment sources of traffic data are often limited in value and focussed on specific tasks such as speed control or general congestion information.

The type of sensors shown in this trial sets a new benchmark. Intelligent sensors like these enable multiple uses including live incident management through to traffic control and even capturing detailed information about lane usage which will inform road designs of the future. 5G enabled sensors will provide fast and flexible deployment to assist with long term and temporary goals such as events or even road works assistance.

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Chris Holmes, Transport Programme Director,
West Midlands 5G

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Local and national governments are facing the monumental task of trying to ease congestion across the UK, improving safety, and readying our nation's roads for the future. Therefore, we've really benefited from working with West Midlands 5G, as their expertise and financial support has allowed us to explore how our 5G-enabled vehicle counting technology can aid the provision of data needed to solve the challenges our authorities face.

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Peter Mildon, COO, Vivacity Labs

Takeaways

Sustain

WM5G and Vivacity Labs have provided proof of concept for 5G-enabled vehicle counting sensors. The trial has confirmed the specific hardware and software requirements necessary for generating accurate and efficient implementation at scale.

Learnings

Although the 5G network showed more variation in speed performance throughout the day, it retained an average of 10 times faster download and five times faster upload speeds compared to 4G. This means higher-quality processing can be utilised while ensuring fast transfers with low latency.

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