PETRAS

LANDSCAPE BRIEFING

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COVID-19: The Internet of Things and Transport

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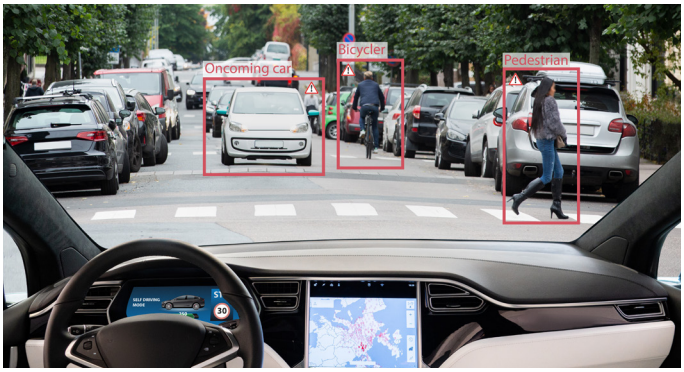


The COVID-19 pandemic has inspired a range of Internet of Things (IoT) innovations to help stop the spread of the virus. This is a sector-specific edition of COVID-19: IoT and Cybersecurity looking at the Transport and Mobility sector.

Past editions are found on the PETRAS website.

Overview:

- Reports suggest that micromobility will emerge stronger in the post-pandemic world. In the UK, the Department of Transport began national e-scooter trials in June.
- Public transport operators are adapting innovative technologies to control the spread of the virus and enable social distancing measures
- Transport for London (TfL) installed machines to beam UV light onto handrails at stations to stop virus spread
- Transport for Greater Manchester (TfGM) are using behavioural AI to understand social distancing at the transport hubs and to assess how passenger behaviour is affected by the pandemic
- Uber introduced boat services in London this month, in partnership with Thames Clipper
- Highway England staff are using devices tied to their waists that set off a buzzer in their safety helmets if someone gets close to 2m

Micromobility and Electric vehicles

Micromobility continues to increase as a result of the pandemic – making it the new normal

An article by global consulting firm McKinsey published in last month highlighted that micromobility will thrive and emerge stronger in the post-pandemic world, with more people willing to use this option as their regular commute in order to avoid public transport and maintain social distancing. While the average trip distance and revenues per trip will increase, the time to destination will be the main concern of the users [1].

A survey conducted in June by Venson Automative Solutions, shows that two-thirds of consumers in the UK said that they would consider using e-scooter as an alternative to the public transport and welcome the acceleration of plans to adapt electric vehicles[2].

Micromobility firm Lime, has released new data that shows more than 4,000 new users joined Lime in a single day in London in last month. When comparing the months before lockdown with the months after, Lime highlighted that there is a 34% increase in the duration of average rides and 18% increase to the distance travelled. Rush hours are seeing less use, with more than 50% people riding in the afternoon[3].

Race to roll out e-scooters across the UK

As part of the Department of Transport's (DfT) national e-scooter trials which began in June[4], the Swedish company Voi, in association with Cambridgeshire and Peterborough Combined Authority, became the first ever operator to be chosen to deploy e-scooters in Cambridge from next month. With this exclusive contract win, the Swedish e-scooter provider is now live in more than 45 cities in 11 countries.[5]

Milton Keynes Council has chosen Spin, the micromobility unit of Ford Motor Company, to provide e-scooters for public hire across the

town.[6] The vehicles will be available to hire in the upcoming weeks. Meanwhile Lime, the other selected provider, will have an initial fleet of 250 e-scooters alongside its current e-bike service in the city.[7]

A first of its kind transport model introduced to anticipate and map EV uptake

The Scottish Power Energy Networks (SPEN) has introduced a transport model called the Charge Project[8] which can anticipate and map electric vehicle (EV) uptake. This innovative model will be deployed across the northwest of England and north Wales in partnership with EA Technology, Smarter Grid Solutions and PTV Group.[9]

The Charge Project will run trials on the best locations for EV chargepoints, focussing first on areas with limited on-street parking. The trials will inform how the chargepoints can be connected at lowest costs to the user. Information will be shared via the ConnectMore tool, a public-facing web application that will help councils and communities know the location of demand for EV charging, and where there is the capacity to support new installations of chargepoints.[10]

Public transport operators are trialling innovative technologies to control the spread of the Coronavirus and help in social distancing

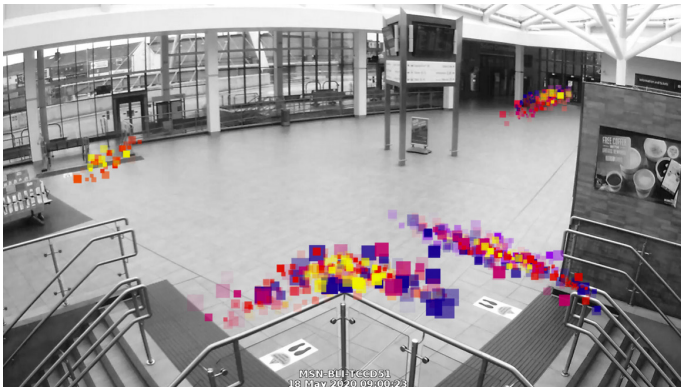
Last month, Transport for London (TfL), installed new machines beaming UV light rays to clean the handrails running along escalators, as these are considered to be a COVID-19 spreading ground.[11] A 2018 study by researchers at Columbia University 'showed for the first time' that 'far-UVC efficiently inactivates airborne aerosolized viruses' and that 'continuous very low dose-rate far-UVC light in indoor public locations is a promising, safe and inexpensive tool to reduce the spread of airborne-mediated microbial diseases'.[12]

Air cleaning devices installed on busses in Northwest England – a first on the world

Warrington's Own Buses, became the first bus company in the world to install air cleaning devices, a total of 86 AirLabs AirBubbl, in the driver cabins across its entire operational bus fleet. This decision came in order to best protect its drivers from the risk of airborne transmission of COVID-19. AirBubbl filters more than 95 per cent of airborne viruses and contaminated particulate matter and fills the vehicle with over 30,000 litres of clean air every hour.[13]

Predictive AI technology and CCTV to improve safety at transport interchanges

Transport for Greater Manchester (TfGM) have partnered with Humanising Autonomy, a predictive AI company in the mobility sector to aid TfGM 'in understanding social distancing implications, enable assessment of how passenger behaviour is affected by the pandemic, and understand how infrastructure is used'. CCTV footage at transport interchanges will be overlaid by predictive AI software to provide an analysis dashboard, providing insight to TfGM to understand areas where social distancing adherence is difficult.[14]



Humanising Authonomy have also developed 'Intent Prediction' technology which they have integrated into driver assistance software for driverless cars and buses. A camera system, based on AI, will be able to help bus drivers avoid hitting cyclists and pedestrians in their blind spot, and can spot hazards 'two seconds faster' than humans. This is particularly useful as the number of cyclists on the roads has increased drastically during the pandemic.[15]

Transport for London (TfL) launches new multimodal trip-planning app to help enable social distancing

TfL Go[16] will help Londoners to 'not only plan real-time multimodal trips more effectively, but also be confident of social distancing and accurately assess active travel alternatives'.[17]

The new app provides information to enable travel at quieter times and also shows alternative routes and walking and cycling options. Users can get accessibility information by including a 'step-free' mode to access easy-to-navigate views of all stations with street-to-platform accessibility. Built

PETRAS is funded by the UKRI via the Security of Digital Technologies at the Periphery (SDTaP) programme.
Image: © Humanising Autonomy heat map indicating hotspots for social distancing at Bolton interchange. Yellow = high interaction point.

and designed in-house by TfL, the app uses the open data feeds freely provided to third party app developers and will develop further based on customer feedback.[18]

Data platform that can help with social distancing receives £1.8m extra funding

CitySwift, an Ireland-based transport data company, has recently received funding for its data platform which includes products to deliver bus network analytics and to generate optimised bus timetables.[19] The platform has been rolled out by National Express West Midlands across their entire network. The platform has allowed a rapid response to changes in demand during lockdown easing and to determine optimum capacity to allow key workers to catch the bus and not be left behind.[20]

CitySwift's solution also involves a passenger-facing bus capacity checker, 'When2Travel', which uses AI to 'predict how many people will use a bus service at a specific date and time' in order to inform journey choice during physical distancing restrictions.[21]

Uber Boat begins first services on River Thames in London

Last week, Uber began its first boat service [22] in London which allow commuters to use the Uber app to purchase tickets which will be available to scan as a QR code to board on existing river taxi services. The service will run across 23 piers in London, from Putney to Woolwich Arsenal, and contactless cards and Oyster are also accepted so users can board using contactless technology. Uber has partnered with Thames Clippers and Masabi to introduce this service for the first time, creating a multi-modal service to help enable social distancing.[23]

Uber's contact tracing service

Last month in the US, Uber launched a contact tracing service that will share data on riders, passengers, and drivers, with public health officials for free. The information can be made available within a few hours, as the company considers COVID-19 an emergency. The company will also block users if they test positive for COVID-19.[24]

Increasing use of Vehicle-to-everything (V2X) Communication technology

Vehicle-to-everything (V2X) communication, which means the passing of information from a vehicle to any entity that may affect the vehicle, and vice versa, is being increasingly used in connected and intelligent transport systems to increase the safety of pedestrians and cyclists.[25]

On August 5, The Hawaii Department of Transportation (HDOT) in the US, announced a new connected vehicle technology pilot[26] that will operate on a live highway with connected devices installed on a total of 34 signals. As part of a research project with the University of Hawaii (UH) and Econolite, V2X technologies by Qualcomm will be used to provide alerts and other information in order to protect the increasing number of motorists, bicyclists, and pedestrians from accidents due to pandemic.[27]

V2X technology, provided by Cohda Wireless, was also deployed in Germany's Ludwigsburg city on August 11, to help emergency services get to accidents faster. Traffic lights are fitted with technology that allows the exchange of information between the signal and an approaching emergency vehicle via standardised radio. The 'intelligent transport system' switches the traffic light controller system into a prioritisation programme while the emergency vehicle travels through, before switching back to a normal programme. Cohda also installed V2X software and hardware in Estonia and Finland, in a smart pedestrian crosswalk solution which alerts pedestrians and other road-users to danger.[28]

Covid-19 has accelerated automation

Reports suggests that companies all over the world are reducing their reliance on human interaction in the workplace due to the ongoing pandemic and are instead rapidly automating processes. Recently, FedEx, in its North Carolina site (US), has started using autonomous carts to unload packages from conveyor belt. Geodis is also using robots to haul goods and minimize human tasks at its plant in Texas.[29]

These technologies are being provided by US based firm, Vecna Robotics[30], whose self-driving pallet trucks automate material handling while its AI platform is used to improve fleet management. However, as more workers return from lockdown, there are concerns that humans might face

unemployment due to the increased adoption of automation.[31]

Traffic and Highway Management are deploying AI and Cloud Based technologies

On July 31, Siemens Mobility introduced a new AI system known as EventFlow[32], that can see otherwise 'hidden' special events, including protests and very small events, to help enable social distancing. The cloud-based visualization tool is an intelligent response plan, that can also predict how popular the events are likely to be, to empower traffic managers and transit agencies with a whole new level of data and planning.[33]

Highway England using innovative ways to put COVID-19 measures in place

Highway England (HE) is performing virtual inspections and safety checks on work sites and depots through a virtual tour, which has avoided the need for additional people to travel. They also use this to check that COVID-19 measures such as wash stations and vehicle sanitisation are all in place, with managers wearing cameras on a headset streaming footage to a supervisor on Microsoft Teams. HE personnel are also using devices tied to their waists that set off a buzzer in their safety helmets if someone gets close to 2m away.[34]

In July, Centracs Mobility, a next generation cloud-based platform, was launched by the US firm, Econolite. It augments traffic management toolsets with actionable information and address the dynamic traffic control needs like real-time signal control and signal timing optimization.[35]

Radar technology employed in Manchester's traffic signs

Last month, Manchester deployed new COVID-19 signage from TWM Traffic Control on its temporary bicycle lanes, with built-in cycle counters, to monitor usage of the new infrastructure.[36]

The signage monitors road usage via inbuilt radar technology that records traffic counts, speed and volume of cyclists and also alert road users about the need for social distancing. The data is monitored via TWM CMS cloud-based system, thereby, removing the need for site visits.[37]

Image: © HE workers socially distancing at the Chowns Mill scheme | HE, gov.uk

Endnotes

1 https://www.mckinsey.com/~/media/McKinsey/Industries/Automotive%20and%20Assembly/Our%20Insights/The%20future%20of%20micromobility%20Ridership%20and%20revenue%20after%20a%20crisis/The-future-of-micromobility-Ridership-and-revenue-after-a-crisis-vF.pd
2 https://totallyev.net/two-thirds-of-consumers-want-e-scooters-on-uk-roads/
3 https://www.li.me/second-street/rethink-your-ride-with-lime
4 https://www.gov.uk/government/publications/e-scooter-trials-guidance-for-local-areas-and-rental-operators/e-scooter-trials-guidance-for-local-areas-and-rental-operators" \l "eligibility-and-dft-trial-requirements
5 https://www.voiscooters.com/blog/voi-wins-exclusive-e-scooter-trial-in-cambridge/
6 https://blog.spin.pm/spin-selected-as-one-of-milton-keynes-first-public-hire-e-scooter-operators-68f4eea4da08
7 https://www.miltonkeynes.co.uk/news/people/milton-keynes-launch-e-scooter-hire-scheme-within-days-and-they-can-even-be-ridden-some-roads-2923601
8 https://www.spenergynetworks.co.uk/pages/charge.aspx
9 https://www.spenergynetworks.co.uk/news/pages/our_innovative_transport_model_is_driving_investment_in_electric_vehicle_infrastructure.aspx
10 https://www.spenergynetworks.co.uk/pages/charge.aspx
11 https://tfl.gov.uk/info-for/media/press-releases/2020/july/-ensuring-the-network-is-cleaner-than-ever-and-keeps-londoners-safe
12 https://www.nature.com/articles/s41598-018-21058-w
13 http://www.warrington-chamber.co.uk/news/world-first-for-warringtons-own-buses-in-fight-against-coronavirus/
14 https://www.humanisingautonomy.com/blog/https/wwwhumanisingautonomycom/blog-page-url/new-post-title
15 https://www.standard.co.uk/news/uk/cameras-to-warn-bus-drivers-when-cyclists-ride-into-their-blind-spots-a4175111.html
16 https://tfl.gov.uk/maps_/tfl-go
17 https://tfl.gov.uk/maps_/tfl-go
18 https://tfl.gov.uk/info-for/media/press-releases/2020/august/new-tfl-app-to-help-londoners-plan-ahead-and-travel-safely
19 https://cityswift.com/platform
20 https://cityswift.com/blog/national-express-west-midlands-deploys-swiftmetrics
21 https://cityswift.com/blog/when2travel-harnesses-the-power-of-data-to-reassure-bus-users
22 https://www.uber.com/gb/en/u/uberboat/
23 https://www.masabi.com/2020/08/02/uber-boat-by-thames-clippers-launches-in-london/
24 https://www.reuters.com/article/us-health-coronavirus-uber-focus/uber-offers-covid-19-contact-tracing-help-amid-chaotic-u-s-response-idUSKCN24L17X
25 https://en.wikipedia.org/wiki/Vehicle-to-everything
26 https://hidot.hawaii.gov/blog/2020/08/06/hdot-launches-connected-vehicle-pilot-on-ala-moana-boulevard-nimitz-highway
27 https://www.hawaii.edu/news/2020/08/04/project-preps-traffic-self-driving-cars/
28 https://cohdawireless.com/cohda-wireless-v2x-tech-gives-german-firefighters-the-green-light/
29 https://www.ft.com/content/f7b16d2e-907a-11ea-bc44-dbf6756c871a
30 https://www.vecnarobotics.com/vecna-robotics-and-geodis-partner-to-advance-autonomous-logistic-solutions/
31 https://www.vecnarobotics.com/human-focused-robots-help-warehouse-workers-stay-safe-amid-the-pandemic/
32 https://www.mobility.siemens.com/global/en/portfolio/road/digital-ai-solutions/digital-lab.html
33 https://www.traffictechnologytoday.com/news/traffic-management/exclusive-new-ai-from-siemens-mobility-can-see-otherwise-hidden-special-events-and-help-enable-social-distancing.html
34 https://www.gov.uk/government/news/creativity-keeping-road-workers-safe-and-the-country-moving
35 https://www.businesstelegraph.co.uk/econolite-launches-new-cloud-based-traffic-management-tool-traffic-technology-today/
36 https://www.twmtraffic.com/signs/covid-19-flashing-amber-sign/
37 https://www.traffictechnologytoday.com/news/covid-19-news/covid-19-new-social-distancing-road-signage-is-coupled-with-data-collection-in-bolton-uk.html