



**W**hen automatic number-plate recognition (ANPR) was invented in 1976 by the UK's Police Scientific Development Branch, few could have predicted that it would still be so vital more than four decades later. Since then, it has become essential for policing, security and more recently logistics and operations. Now, thanks to advances in video analytics and data, ANPR has leapt ahead and adapted for the times.

Established across many industries, the technology has remained relevant because of its continuous iteration. It can now be divided into two main categories: automatic license plate recognition (ALPR) and automatic container code recognition (ACCR). Both meet different needs and enable various activities to be done.

ALPR, for example, can be used to control access to a site based on specific number plates. Visitors can submit their number plates for seamless entry once they visit

a new site, and those details can be stored for future visits. This helps to prevent trespassing and improves the visitor experience.

Shopping centres can also use ALPR to track customers parking in the on-site car park. Customers won't have to queue to collect a ticket or pay for their parking as the ALPR automatically recognises their vehicle's entry and exit times and a connected system charges them accordingly. Of course, this also has knock-on benefits with parking compliance and missed charges.

Milestone partner, Veertec, uses ALPR combined with Milestone's Xprotect software to provide such a solution for cashless parking management. Everything is automated by the system, including direct debits and issuing customers with an invoice once they drive off-site. It can detect license plates from different countries, along with automatic language detection and plates can be analysed at speeds of up to 150mph.

#### Make and model recognition can be analysed to quickly identify a stolen vehicle or number plate fraud

Vehicles can be tracked within a specific area based on their number plates and delays or traffic jams can be pre-empted. Toll payments can be charged automatically. Public safety is also improved through the use of ALPR. The UK's Driver and Vehicle Standards Agency (DVSA) uses it to automatically flag drivers who break the law – either by having outdated MOTs, driving without a proper license and tachograph manipulation.

Coastal police forces have found another use for ALPR, in tracking vehicles that aren't local to their area, and that, therefore, could be breaking the UK's social distancing measures that are in place during the COVID-19 crisis. Sussex Police has issued over 100 fixed-penalty notices so far for non-essential journeys.

Automatic container code recognition (ACCR), meanwhile, targets specific codes on shipping containers, which makes it particularly valuable in logistics and operations. Shipments can be tracked to ensure they are on-track and aren't delayed. Given the dominance of the

just-in-time supply chain, predicting and mitigating possible delays can make or break a bottom line. A security team can also be alerted when a container enters or exits a port or storage area. They can take immediate action if an exit is unauthorised.

Unlike warden patrol, ANPR camera systems operate 24-hours a day, seven days a week. This strengthens a site's security, without the need for personnel to be on-site. A team can be located in a central control room and safely monitor activities across multiple sites.

When combined with advanced video data analytics (powered by machine learning), the current versions of ANPR hold even more opportunities. Vehicle make and model recognition can be analysed and compared

#### LICENSE PLATES FROM DIFFERENT COUNTRIES CAN BE ANALYSED AT SPEEDS OF UP TO 150MPH

with the make and model on record for a certain license plate. This can quickly identify a stolen vehicle or number plate fraud and alert the relevant authorities. A vehicle or container that's left in the wrong place can be automatically flagged for investigation. Likewise, red-light violations, unsafe driving (such as driving the wrong way up a street) and vehicles using an incorrect lane (like a bus lane) can be surfaced to the transport police for follow-up. In this way, ANPR moves beyond its early days of tracking to becoming a value-added, time-saving and cost-effective solution.

Video analytics is making *Minority Report*-style actions a possibility of today. Now, artificial intelligence-based products are enabling security teams, city planners, retail and logistics leaders and transport chiefs to better understand the on-the-ground happenings from their video streams. As Jean Wehbe – Principal CEO of video analytics company Veertec, a Milestone Gold Technology Partner – explains: "Computer vision can help to analyse video streams from multiple sources to generate greater value and insights. ANPR video streams can be complemented with information from IP (Internet Protocol) cameras, mobile phone footage, body-worn cameras and more."

The data derived from this is stored in a database and relevant insights can be surfaced through graphics, visualisations and interactive dashboards. Instead of poring over reams of data, senior decision-makers can tailor what they see to only the most useful insights.

The main areas for video analytics today tend to fall into three main categories: Transport: improving passenger experiences, safety and efficiency across a transport network. Retail and logistics: monitoring in-store movements to plan layout, detect potential bottlenecks and inform logistics, marketing and sales strategies. Also for securing a site and tracking shipments and vehicles across a supply chain. Public sector: to ensure citizen safety, detect unsafe behaviour or trespassing and (more recently) check adherence to public health measures.

Where license plates are partially covered, hidden or totally removed, video analytics can identify vehicles by their make and model. This will also detect when a vehicle has had its number plates swapped.

Likewise, license plate recognition (LPR) can be used to categorise the type of vehicle in an area or driving along a road. "Depending on the type of vehicle, for example, a bus versus a car, access to certain lanes can be controlled. Transport leaders can better keep drivers and passengers safe, by ensuring every vehicle is using the correct lane for their type," Jean elaborates. If unauthorised use is detected, warnings can either be issued to the driver (via email, if on file or through digital signage on the road) or the relevant authorities can be notified automatically.

Video analytics also helps with the life-or-death response of emergency vehicles. Just a one-minute improvement in response times for ambulances increases the likelihood of surviving a heart attack by as much as 24 percent.

"Analytics can detect an ambulance, fire engine, police car or other emergency vehicle and open up lanes of traffic so they can drive through quickly. In emergency situations, every second counts and video analytics can really make all the difference to outcomes by streamlining how vehicles move throughout a city," Jean adds.

ANPR and ACCR can be used in a continuous cycle to accurately track and match shipments across the supply chain. "There can be many applications at play in retail and logistics" Jean explains. "It begins with ACCR that can be matched with license plate recognition so you can understand if a vehicle leaving with a shipment is authorised to do so. This way, you can detect potential theft or update your records if a truck has been swapped for another."

The added benefit of this is a reduction in the human interface – people on the ground don't have to keep a manual check of vehicles and shipments as the system automatically does this. This type of automation reduces human error, can help with social distancing and drives efficiency.

Analytics can detect if people are wearing the correct protective equipment, such as helmets for a warehouse, or life jackets on ships. This is vital to improving site safety, with manufacturing coming in as the third-worst sector for workplace fatalities (a number that has increased over the past two years). It also improves security as the system can automatically issue alerts for people who aren't expected. If, for instance, they aren't wearing the correct equipment, are walking in a restricted area or are accessing a site at an unusual time. The system is accurate enough to detect emergency responders and their vehicles, like the police. When such personnel are detected, the system won't issue an alert to the security team to prevent false alerts.

City leaders have a huge challenge in keeping their citizens safe, detecting unsafe behaviour and securing restricted locations. "A significant benefit for public sector leaders in using video analytics comes when they use it to understand movements and volumes in certain spaces, and this informs their city planning. Where vehicles are building up, traffic lights can be switched to green to reduce numbers on a road, or they can be diverted to other routes. The same can be done with cyclists. Plus, dangerous driving, trespassing or other delinquent behaviour (like violence or drunken antisocial activities) can be quickly flagged to authorities. Even gun and knife handling can be detected for immediate response," Jean states.

Combined with AI-powered video analytics, ANPR will continuously improve to meeting the changing needs of our businesses and society. "All it needs is the right data," Jean adds. "The technology can be bespoke – whatever an organisation requires to keep people safe."

He reflects on the role of video analytics and ANPR in making our world a better place to live in, "Technology is, ultimately, our responsibility – we must use it for good. To utilise video analytics and video streams to save lives and create a safer world" ●

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**Analytics can be used to differentiate between people and objects in order to keep them safe**

