

Safer and more efficient construction through video analytics and AI

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Tackling the need to adapt and find new and innovative ways to support communication, planning, and safety activities on construction sites, Costain is collaborating on a digital research and development project, partly funded by Innovate UK.

Using the latest research in artificial intelligence (AI) and machine learning for vision, Costain, the University of West England's Big Data Enterprise and Artificial Intelligence Laboratory, the Faculty of Business and Law and Zest Consult, are designing a leading-edge AI and machine learning platform for remote monitoring of sites called i-VSS (Intelligent – Video Site Services). It will help to improve productivity, reduce costs, and enhance the safety and security of all workers.

i-VSS is a desktop solution linked to an online portal and creates real-time scenario data and collates information to enhance camera-based monitoring. It is a multi-functional system using video analytics and AI linked to site CCTV, cameras worn by projects teams and technical data for the remote monitoring of multiple complex delivery projects. It can be operated from the comfort of a home office, reducing the need to travel to sites.

Unmanned aerial vehicles (UAVs) or drones, fly over the sites and the images captured in the air and on the ground via CCTV and bodycams, are fed into the portal. Using the data captured, i-VSS has the capability to estimate activity efficiencies, safe distances at which to work, identify potential risks and provide real time hazard identification and warning systems. It could provide metrics to demonstrate carbon footprint reduction and potential cost savings too.

i-VSS is now being trialled on the Preston Western Distributor and East-West link road scheme. The Lancashire County Council project awarded to Costain, will see a major new road linking the towns of Preston and southern Fylde to the M55 motorway. The complex project will deliver a new motorway junction, four new bridges and three underpasses and is a key element of the City Deal Partnership's plans to support new development and economic growth in the region.

Scheduled to open early in 2023, this multi-million-pound scheme will promote the development of new housing and business in the area, while increasing capacity on the existing local road network.

i-VSS is being used on this project as a traffic management system to predict and identify potential bottlenecks on the surrounding road networks. It will also be used by site teams as a logistics tool during road repair works and the data provided can help mitigate congestion for road users. During the COVID-19 pandemic, the tool helped to manage social distancing and safety measures on project sites.

John Holding Costain's, project director for Preston Western Distributor and East-West Link road project explained, "Using i-VSS to monitor the works with the interfaces with the local highway network allowed us to track traffic flows and efficiency make changes in real time. The information gained should allow us to tailor the works we are doing to ensure we maximise the working area available to the site team. We are excited to see how this innovative new technology can be used to deliver a safer, more efficient projects."

Other features include site security monitoring with virtual trip wires to guard against vandalism and theft on sites. Photogrammetry capabilities can capture 'live' construction progress, which is fed into a BIM model and schedule of works.

Environmental benefits of i-VSS include the use of alternative energy sources to power the cameras (solar powered cameras) as well as utilising the platform to monitor vehicle and plant machinery usage and behaviours on sites.

To discover how Costain is digitally optimising infrastructure design and delivery visit www.costain.com/digitaldelivery

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