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Using artificial intelligence (AI) to reduce occupational road risk 'SideScan®Predict'

AWARD WINNER

ON VIDEO

FM Conway 2 6

In cab warning system

DESCRIPTION

FM Conway's fleet of vehicles travel over 22 million miles a year, many of which are on congested city streets. Reducing occupational road risk is therefore a key priority for FM Conway, particularly to other vulnerable road users (VRU).

There has been considerable work across the industry to reduce the risk of large vehicles coming into contact with other vehicles, pedestrians, and cyclists. Existing ultrasonic detection systems have done a tremendous job in making both the driver and VRU aware of the proximity of one another and thus reducing collisions.

However, the current systems are not predictive, but merely register the presence of a potential obstacle. This can result in false warnings, leading the driver to lack confidence in the system because they become habituated to the warning signal, potentially rendering them less effective.

Specifications such as FORS and DVS have suggested a preference for the systems to be activated all the time if technologies can reduce false positives.

The ability to predict peoples' movements or capturing the human factors when operating vehicles would be of significant benefit in further reducing the risk of fatal or life changing harm on our roads. This is challenging when one also considers that drivers and pedestrians can be unpredictable in their actions and their perception of the risk.

FM Conway's occupational road team explored whether the current advances in optical artificial intelligence could help to achieve this. They discovered that Brigade Electronics had made some significant innovations in artificially intelligent detection systems and algorithms that could predict human behaviour.

They joined forces with Brigade to undertake practical trials in the challenging environment in which their vehicles operated.

The system

Using artificial intelligence, SideScan®Predict constantly gathers object detection data such as the speed and distance of a cyclist or other VRU from the lorry. Additional technology is embedded within the Sidescan®Predict system to gather information such as the speed, direction, acceleration, and the turning rate of a vehicle.

This data feeds an algorithm created by Brigade to calculate the risk of a collision with cyclists, pedestrians, cars, or a static object. It generates visual and audible alerts to make the driver aware of potential dangers using a three-step warning system.

1. 'Moving Object Detected' – triggers a yellow visual warning but has no sound to minimise driver distraction
2. 'Danger of Collision' – yellow light and an audible warning to the driver to be vigilant e.g., triggered by a cyclist moving close to the truck
3. 'Collision Predicted' – a flashing red light and high pitch audible warning for the driver to take immediate action to avoid a collision.

The system is also always switched on when the vehicle's speed is below 22mph/30kph, regardless of the indicator selection and cannot be de- activated by the driver.

SideScan®Predict is designed for most rigid body vehicles including rigid box vehicles, tippers, mixers, coaches and buses with the only requirement that they have a minimum length of 5.2m.

The system comprises six sensors which have a detection area of 2.5m compared to other systems on the market which detect at between 1m and 1.5m.

The system has been designed so that it can be adjusted to meet variations in European standards.

The trial

Brigade installed the system and fully briefed the drivers who were trialling the system. Over a 6 month period, the drivers provided detailed feedback to Brigade who then adjusted the set-up to enhance performance. The objective was to achieve the optimal driver effectiveness and cross reference that information by automatic data upload on a live platform.

BENEFITS

- Potential reduction in fatalities related to pedestrians and other VRU's of 84%
- Drivers like the system and empowered by role in trial
- More accurate detection over wider area of hazardous situations
- Drivers cannot stop the system from operating at speeds below 22mph/30kmh
- Significant reduction in false alarms so more effective for drivers
- System designed to ensure that driver can always see and hear alarms when triggered
- System can be retrofitted and easily configured/tested to ensure effective operation
- Installation per machine circa 6 hours
- System has warning light to alert driver of any system failure
- Fewer incidents involving death or serious injury
- Could be widely adopted across industry.

TRANSFERABILITY AND DEVELOPMENT

- FM Conway had the system fitted to 10 vehicles and plans to expand this across the fleet. It is now specified as a minimum requirement in FM Conway's Fleet Operator Scheme.
- As the system is designed so that it can be fitted to a full range of HGV rigid vehicles from tippers to concrete mixer trucks it could be widely adopted within the industry and, of course, to delivery vehicles in other sectors.
- A potential development will be to integrate this system with another that uses AI and optical cameras to monitor driving techniques and other distractions within the cab.

One of the sensors