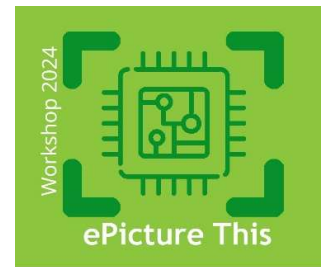


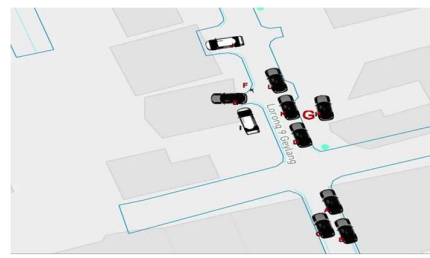
ABSTRACT PRESENTATION

Title: Accidentology and Monitored Deployment
Presenter name: Prof.dr.ir. Pieter Jonker
Company name / Institute: Resembler.ai & TU Delft
Abstract can be published on website: YES NO



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This presentation addresses the assessment of Automated Vehicles (AVs) on safe operation and admission to operate in an Operational Design Domain. We use *Replacement Tests* to test the ability of an AV to successfully replace a human in driving, i.e. the AV should be as good as or better than a human driver. Our approach is fundamentally different from current approaches in which statistical data of accidents is used to artificially generate simulator data to train and test AVs. About 92% of all accidents are caused by human drivers doing stupid things, possibly not adhering to traffic rules. There are even more incidents / near misses, where surrounding human drivers doing clever things, also possibly not adhering to traffic rules, but (!) leading to avoiding an accident. Those drivers timely predict the risk build-up and manage to avoid a collision. Experienced drivers are very good in predicting what is likely going to happen based on cues in their view, such as a mother looking at her child at the other side of the street while the kid is occluded by a parked car. Such information is totally lost when generating tests from statistical data, in contrast with tests derived from real data.



Video Footage and 3D animated control room view of a child crossing a street running to his mother

To generate proper replacement tests, we developed a database covering over 350 million km of real-life edge case accidents and incidents extracted from camera footage of dash cams and traffic cams. We abstracted them into 3D animated graphics models and semi-automatically annotated them with contextual data. We extracted archetype accidents and -filtered on severity and occurrence - they can be used to generate replacement test scenarios. Because of the abstractions, we are able to generate accidents / incidents for any route or area of deployment in the world. Our output is both (open scenario) simulator data and text descriptions generated by our Large Language Model. For the replacement test, each accident is accompanied by a risk progression graph showing the risk-build up as perceived by the human driver. The risk progression graph is extracted from the video. The purpose is that the AV under test should be as good or better than the human driver in prediction and mitigation.

Our method is not only apt for AV testing, but can also be used to train human drivers from e.g. a delivery fleet to handle traffic situations on their routes and when trained to instruct them which accidents might happen on their route on this day and this hour. Our method can also be used for Monitored Deployment in which life incident dashcam footage from vehicles from a fleet is anonymized, compressed, encrypted, sent to the control room, transformed into its 3D description and automatically a report is generated describing the incident for the management or / and the insurance company. And subsequently used to improve operations.