DSC 2017 ESI KEYNOTE

Topic: « The cognitive simulation of the car driver for autonomous driving system development »

1 PRESENTATION

Advanced driver-assistance systems, partial autonomous system, self-driving cars; these words are now well established in automotive research and industry, from a time where it was a dream, we are now witnessing roads where these are welcomed. To fully apprehend questions and issues coming from these systems, we now agree that simulation is needed to develop such systems. Roads, traffic signs, cars, pedestrians, bicyclist need to be simulated.

So far, human driver was totally involved into the driving task, a complex activity requiring perceptive skills, situation awareness, decision making, actions planning, etc. Without this operator-overseer, cars need to integrate a huge amount of technology to take that back, in order to safely carry the not-a-driver to his destination. Simulation of the environment, cars dynamics and sensors will help to create these innovative technologies. Human driver cognitive simulation shall allow the understanding, by the car and its technologies, of the driver state and others surrounding human's behavior. Cognitive simulation of the human driver is the next keystone of safety and collaboration between human and autonomous driving system. Such driver cognition simulation shall allow users to test their systems from main concept to HMI specification or system validation, and these tests will integrate human like performances and situation awareness key performance indicators.

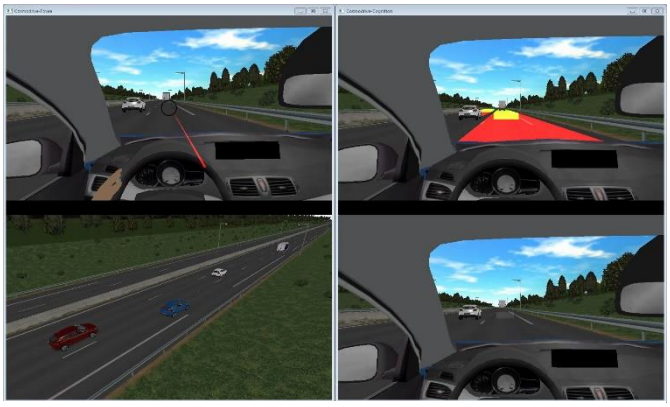

Figure 1: cognitive simulation model's visual output

ESI is now working on a cognitive model of the driver, driving into Pro-SiVIC, developed in partnership with French Laboratory Ergonomics and Cognitive Sciences applied to Transport (IFSTTAR-LESCOT), to get a step ahead into development and research for autonomous driving systems.