A Systematic Review of Situational Awareness and Cognitive Load Measurement in Driving

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Abstract : With the development of autonomous vehicles, a human-machine interaction (HMI) system is needed for a safe transition of control when a takeover request (TOR) is required. An important part of the HMI system is the ability to monitor the level of situational awareness (SA) of any driver in real-time, in different scenarios, and without any pre-calibration. Presenting state-of-the-art machine learning models used to measure SA is the purpose of this systematic review. Investigating the limitations of each type of sensor, the gaps, and the most suited sensor and computational model that can be used in driving applications. To the author's best knowledge this is the first literature review identifying online and offline classification methods used to measure SA, explaining which measurements are subject or session-specific, and how many classifications can be done with each classification model. This information can be very useful for researchers measuring SA to identify the most suited model to measure SA for different applications.