FOTware: a modular, customizable software for analysis of multiple-source field-operational-test data

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Field operational test (FOT) studies popularity is increasing in the US, Europe, and Japan as large-scale projects such as SHRPII, euroFOT, and Smartway, respectively show. This increase in popularity is supported by continuously improved logging technology which favors collection of multiple-source data (from vehicle CAN, cameras, GPS, and eye tracking) over longer periods of time. Thus the huge amount of data typically associated with FOTs is becoming even more gigantic and promise to serve many new different types of data analysis. A systematical viewing of the FOT dataset is impossible due to data size, however the need to plot and visualize data synchronized among the multiple-data sources is still fundamental in many occasions. In fact, critical and specific segments of data need to be visualized both to assure quality and to take a close look into critical events such as crashes and near-crashes. The increasing number of available data sources also creates new requirements on the integration of information into a human-friendly and highly-usable software.

As a response to the above mentioned requirements, Chalmers, Volvo Cars, and Volvo Technology has developed a modular customizable software for analysis of multiple-source FOT data. This software is called FOTware, and its development is based on the experience gained from several FOT studies within SAFER such as SeMiFOT (https://www.chalmers.se/safer/EN/projects/traffic-safety-analysis/semifot) and euroFOT (http://www.eurofot-ip.eu/). FOTware is based on a Matlab graphical user interface (GUI) and is meant to assist analysis of video data in combination with other data types such as the ones available from the vehicles CAN, eye tracking, GPS and other extra sensors (e.g. accelerometers). FOTware is intended to support most of the quality and hypothesis testing analysis in euroFOT in Sweden. The broader availability of this tool is currently being evaluated. FOTware is based on a very flexible structure which can be easily extended to include new synchronous or asynchronous data types. The main feature of FOTware is to enable the user to easily and rapidly customize the GUI to different specific analysis-needs (e.g. video annotation, data quality analysis from signal distribution, outlier analysis, etc…). FOTware provides the user with a customizable number of modules which enable different features and are controlled and synchronized by a core module.

The FOTware modules provide the following data analysis functionalities: data extraction from a file management system and from a relational database, data visualization of synchronized multiple sources data, real-time synchronization of asynchronous eye tracking and video data, data and video playback with adjustable speed, synchronous computation of performance indicators and statistical signals properties, and video annotation. A screenshot from an early version of FOTware is shown below.
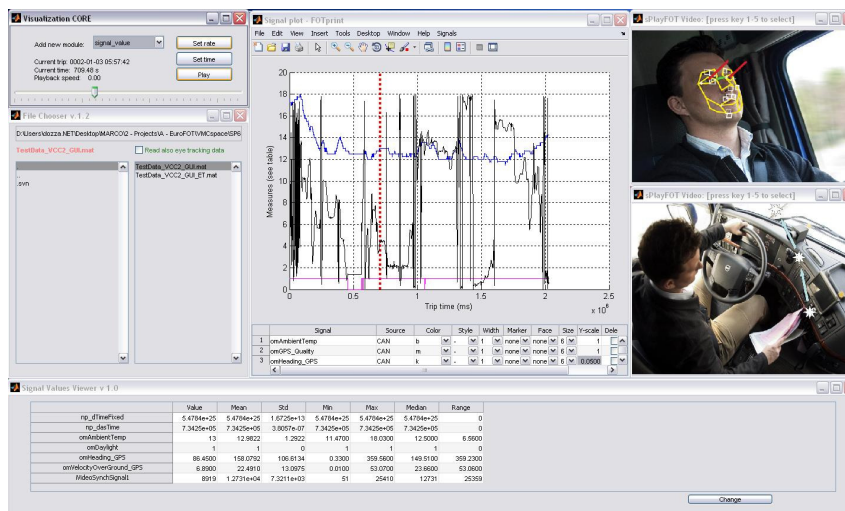
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