

A Review of Road Safety Monitoring

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Abstract

Road traffic injuries and fatalities remain a major global concern, with the World Health Organization (WHO) reporting 1.35 million deaths in 2016 in their Global Status Report on Road Safety 2018. These incidents not only result in a significant loss of life but also have significant social and economic consequences. To address this issue, several countries adopt best road safety practices to develop and implement their own national road safety strategy with specific goals and targets, aimed at eliminating fatal crashes and reducing serious injuries. The strategy is executed through a well-defined action plan that includes a long-term program of proposed safety measures, which can be applied over a period of 10 years or more. However, the absence of tools for controlling actions and monitoring road safety performance can hinder the achievement of the strategic goals. It is therefore imperative to monitor the progress and impact of implemented actions to evaluate the success of the road safety strategy and provide feedback to road safety managers. These information can be used to make necessary timely adjustments in case of deviation from the set targets. In light of the above, this study aims to provide a comprehensive overview of road safety monitoring systems through a literature review. An automated initial search was performed using a selected search string in the Web of Science database, covering papers on road safety management published between January 2000 and July 2021. Out of the 290 candidate papers, 36 studies were selected for further analysis after applying inclusion and exclusion criteria, based on titles, abstracts, and conclusions. The data extracted from the selected studies was used to meet the study's objectives, which were:

- Providing an overview of the papers carried out on road safety monitoring, including publication year, channel and source, author type, and geographical distribution;
- Identifying the available research categories and tools for road safety monitoring;
- Classifying and categorizing the selected studies into different road safety models used.

This review reveals that most studies were carried out mainly as part of two research categories; (1) Solution proposal category where the researchers develop new or improve an existing road safety monitoring technique, and (2) Evaluation research category where the researchers conduct an evaluation of an implemented technique in road safety monitoring systems.

The study presents and discusses then the various techniques, systems, or frameworks related to road safety monitoring identified in the selected papers belonging to these two categories.

Finally, this overview of road safety monitoring systems can serve as a foundation for developing a data-based framework for monitoring the success of road safety strategies implementation.

Biographies

Ibtissam EL KHALAI is a PhD student at Ecole Mohammadia D'Ingénieurs (EMI), Mohammed Vth University in Rabat, Morocco. She is a mechanical Engineer graduated from Ecole Mohammadia d'Ingénieurs, Rabat, Morocco in 2008. She has worked three years for an industrial company, and is working now for the Ministry of Transport and Logistics. Her research focuses on road safety management.

Zoubida CHORFI, Ph.D. is a Professor of Industrial Engineering in EMI School of Engineering at Mohammed V University in Rabat. She received her Dipl-Ing degree in Industrial Engineering from (EMI), Rabat, Morocco, in 2011.

She earned Ph.D in Industrial Engineering from same institution in 2019. She has more than three years of industrial experience in several industrial companies. Her areas of interest include supply chain management, performance measurement, multi-criteria decision analysis, design of experiments, Machine learning etc. She published several papers in research journals and conferences.

Abdelaziz BERRADO, Ph.D. is a Professor of Industrial Engineering in EMI School of Engineering at Mohammed V University in Rabat. He holds degrees in Decision Systems and Industrial Engineering. He is interested in the areas of Machine Learning, Industrial Statistics, Operations and Supply Chain Modelling, Planning and Control with applications in healthcare and other industries. He published several papers in research journals and conferences with local and international funding. He is a fellow of IEOM society and a member of INFORMS and IEEE. Previously, he was also a senior engineer at Intel.