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## Intelligent Surveillance for Transport Systems

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Transport operators are facing increasing demands for more efficiency, safety, and better security from the general public as well as from governments. Increasing the use of public transport is also consistent with improving the environment. An important part of the efforts deployed to meet these demands is the ever-increasing use of video surveillance cameras and other sensors throughout their networks (roads, rail, public transport, maritime), to monitor passenger flows, cars flows, and trains to enable staff to be informed of possible congestion, and detect incidents or potential incidents without delay. A major difficulty of this approach, however, is the very large number of sensing devices required to effectively monitor even a comparatively small network. In addition to the cost of the devices themselves, the cost and complexity of the required wiring and maintenance, plus the sheer impossibility of watching everything at the same time, make such a system increasingly ineffective as the number of sensors increases.

In recent years, the pattern recognition (PR) and artificial intelligence (AI) scientific communities have shared knowledge and efforts to obtain more effective solutions for the transport research area. In the type of environments considered by the set of papers presented here, the term surveillance is normally associated with visual monitoring. Thus, a significant amount of technical work has taken place to investigate and develop robust vision systems able to detect situations of interest for transport operators. These situations include road traffic measurement, automatic incident detection, counterflow, etc.

The papers presented in this special section deal with either road or rail transport and its users (cars, trains, pedestrians, cycles). The application areas addressed by these papers are either linked to safety or present advanced video tools applied to traffic monitoring and control.

Thus, [Chang and Liu](#) have proposed a very interesting tool based on road sign detection based on a multiview technique. This tool is very useful for cars' drivers (and in the near future for autonomous vehicles) to warn them of the existence of an intersection, a potential danger ahead, and so on, during night and day.

Another very interesting topic also addressed in this special section is that of pedestrian safety at intersections. Currently, if the presence of pedestrians is not known

at intersections, they will not be taken into account for intersection control. Thus, [Shirazi and Morris](#) deal with this subject and include a detailed evaluation of their approach.

Traffic monitoring and traffic surveillance are the two main tasks related to video surveillance on roads all over the world. [Eichel et al.](#), [Crouzil et al.](#), and [Chen, Ellis, and Velastin](#) present three papers dealing with these subjects. These papers range from proactive systems to work in real time for incident detection to off-line analysis for traffic control planning, statistics, counting, etc.

In image processing, the problem of shadows is still a difficult but important problem to overcome. This topic is addressed in the paper by [Barcellos, Gomes, and Scharcanski](#).

Finally, visual tracking of multiple types of users is also considered in this section. [Salmene, Khoudour, and Ruichek](#) have proposed a system able to detect and track different kinds of users, e.g., at level crossing environments, with a specific framework to differentiate between different types of users.

We hope that readers will find that the special section gives an updated overall view of this very exciting field of the use of image analysis for intelligent transport systems and that these papers will stimulate further research and progress in the area.

We thank all of the authors who have contributed to this special section and who have met the deadlines by sending in their revised manuscripts within time. We would like to thank all of the reviewers who helped the authors and us with the quality of the final papers. Finally, last but not least, thanks are due to the JEI editorial staff who patiently helped us bring this special section together and provided valuable advice and guidance throughout the process.

**Louahdi Khoudour**, director of research, received his PhD in computer vision from the University of Lille in 1997 and Habilitation à Diriger des Recherches (HDR) degree from the University of Paris in 2006. He worked at Ifsttar (formerly INRETS: French National Institute on traffic and safety research) for many years. He moved to CEREMA in 2011, where he is head of a research group working on safety and security in transport.

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