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Uncertainty quantification in computer vision problem: Application to transportation

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Nowadays, monitoring roadways to ensure safety of vehicles and pedestrians is a challenging problem because of the high volume of traffic. The development of intelligent and omnipresent systems for automatic monitoring of modern roadway becomes indispensable. With the technological advances in sensors design, communication, computer vision and distributed inferences are stimulating the development of new innovative and intelligent techniques that will help transportation agencies and enforcement officers to ensure safety and improve traffic flow. Visual sensor network technology is seen to play an important role in such application. However, the aggregation and the interpretation of distributed visual information in real-time is still the biggest challenge. The complexity of such operations is mainly caused by the presence of multilevel uncertainty. Uncertainty in trajectory estimation of vehicles, visual signatures of vehicle and pedestrian, travelling time across visual-sensors, poses, etc. This explosion of uncertainty will certainly affect the global decision of the automated roadway monitoring systems. The major question should be asked today is how we can quantify this explosion of uncertainty to improve the decisional process of the automated visual monitoring systems? Through this talk, I will attempt to answer this question through the presentation of new approaches that integrate a combination of multi-level distributed artificial intelligence, dynamic computer vision techniques and filtering theory.

Biography

Fouad Bousetouane received his BSc in Computer Science and Mathematics, in 2008 and Master by Research degree in Artificial Intelligence and Pattern Recognition from Badji Mokhtar University, Algeria, in 2010. He obtained his PhD in Artificial Intelligence and Computer Vision from UBMA-University (Algeria), co-supported by LISIC-Laboratory (France) in 2014. He is Valedictorian, Member of International Association of Computer Science and Information Technology (IACSIT) and Computer Vision Foundation (CVF). He collaborated with researchers from CNRS-Lille (France) and LISIC-laboratory (France) for developing computer vision algorithms for multi-object tracking, handoff management, dynamic/static occlusion handling and re-identification across multi-sensor networks. He is Co-Founder of Robotics and Intelligent Computing start-up. He authored many technical articles in machine learning, computer vision, satellite image processing, and served as a reviewer for top ranked journals and conferences including (*IET-Image Processing Journal, IEEE Transaction Journal on Intelligent Transportation Systems, IEEE-IROS2012 and IEEE-ITSC-2015*). Currently, he is a Post-doctoral Researcher in Computer Vision and Artificial Intelligence at Real-Time Intelligent Systems (RTIS) laboratory, University of Nevada, Las Vegas, USA. His research interests include artificial intelligence, pattern recognition, probabilistic graphical models and Bayesian computation, machine learning, computer vision and deep learning.

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