AI Meets Advanced Mobility:
Trends and Challenges

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Abstract

"Smart mobility" represents a corner stone and an integral part of the "Smart City Concept". This is a new area of research where latest tools of artificial intelligence (AI) are integrated in advanced mobility systems. It deals with the design of more efficient, more intelligent, and safer transportation systems that are better suited and more adapted to latest advances in information and communication technologies, including 5G networks and Internet of things: IOT. It is expected that most modes of transportation will become soon connected to the cloud and to IoT infrastructure. With more than a billion vehicles on the roads today, a number expected to increase by 250% in 2050, the design of highly efficient and safer transportation systems is becoming a necessity. This is a major challenge for car manufacturers, road infrastructure planners, and transportation policy makers. For instance, it is well accepted, that building more roads and related conventional transportation infrastructure will not resolve by itself, the ever-increasing traffic congestion problems. The talk highlights newly developed technologies allowing for the design of next generation mobility systems. These enabling technologies represent the core of the smart mobility concept and have become prevalent thanks to spectacular advances made in the fields of machine intelligence, smart devices, sensor networks, big data analytics and Internet of things. They allow for the design of more intelligent vehicles (L3 and L4 generations), permit safer travel journeys and enable the design of more effective and smarter transportation networks, while significantly reducing traffic congestion, road fatalities and injuries, fuel consumption and pollution. The talk outlines as well recent achievements in the field and highlights challenges toward achieving short and long-term goals of building more livable and more sustainable cities of the future.

Biography

Fakhreddine Karray holds the University Research Chair Professorship in Electrical and Computer Engineering at the University of Waterloo, Canada and directs the University's Center for Pattern Analysis and Machine Intelligence. He received the PhD degree from the University of Illinois, Urbana Champaign, USA in the area of Systems and Control. Karray's current research interests are in the areas of intelligent systems design, big data analytics, soft computing, sensor fusion, and context aware machines with applications to intelligent transportation systems, Internet of things, cognitive robotics and natural man- machine interaction. He has authored extensively in these areas and has disseminated his work in journals, conference proceedings, and textbooks chapters. He has authored a textbook on soft computing and intelligent systems, nine edited textbooks and 24 textbook chapters. He is the co-author of 25 US patents (assigned and pending), has chaired/co-chaired 14 international conferences in his area of expertise and has served as keynote/plenary speaker on numerous occasions. He has also served as the associate editor/guest editor for more than 14 journals, including the IEEE Transactions on Cybernetics, the IEEE Transactions on Neural Networks and Learning, the IEEE Transactions on Mechatronics, the IEEE Computational Intelligence Magazine. He is the Chair of the IEEE Computational Intelligence Society Chapter in Kitchener-Waterloo, Canada and chaired various committees of the IEEE Computational Intelligence Society.

Dr. Karray's work has been featured on Discovery Channel, CBC, AlHayat, AlSharq Alawsat, Washington Post, Wired Magazine, and DigitalTrends portal. He received national and international awards, including the Premier Research Excellence Award and the 2014 Pattern Recognition Society Best Paper Award. He is a co-founder and past vice president of the Arab Science and Technology Foundation, co-founder and past president of the Tunisian Scientific Society and is current president of the Association for Image and Machine Intelligence.