The Electrical and Computer Engineering Program presents
ECEN Seminar Series

Advances in Smart Mobility: State of the Art and Challenges

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Major advances recently achieved in the fields of machine learning, big data analytics, and cloud computing have opened up new market opportunities in strategic areas such as in transportation, health, energy and urban planning. These are critical components for building sustainable cities of the future better known as smart cities. "Smart mobility" represents a corner stone and an integral part of the smart city concept. It deals with the design of more efficient, more intelligent, and safer transportation and communication 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. 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, 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 also outlines recent research work carried out at the Center for Pattern Analysis and Machine Intelligence and highlights challenges toward achieving short and long-term goals for building more livable and more sustainable cities of the future.

Fakhreddine Karray is the University Research Chair Professor in Electrical and Computer Engineering at the University of Waterloo and the director of 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, 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, technical articles, textbooks and US patents. He has chaired/co-chaired 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 several 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 sub-committees of the IEEE Computational Intelligence Society. He received national and international awards, including the Premier Research Excellence Award and the 2014 Pattern Recognition Society Best Paper Award. Karray is the co-founder of two University of Waterloo spin-off companies, specializing in designing and commercializing products for next generation connected cars and man-machine interaction systems. He is a co-founder and past vice president of the Arab Science and Technology Foundation and is current president of the Association for Image and Machine Intelligence.

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