Lecture 1
Title: Machine learning and deep reinforcement learning applied to cooperative, connected and automated vehicles

Abstract
Machine learning (ML) and deep reinforcement learning (DRL) have the potential to bring about significant impacts in automation across various industries and domains. The number of cooperative, connected and automated vehicles (CCAVs) in urban areas will gradually increase in the near future. As a consequence, mixed traffic made of both regular human driven and CCAVs will likely be a typical scenario over the next few years. Connected and automated vehicles can benefit the whole traffic experience by preventing collisions and optimizing traffic waves, by developing and implementing innovative services.
The talk will explain how ML and DRL techniques can be applied for a full integration of CCAVs in the real traffic for transportation of both passengers and goods. The goal is providing benefits to all citizens and positive impacts for society are: i) safety (i.e., reducing the number of road accidents caused by human error; ii) environment (i.e., reducing transport emissions and congestion by smoothening traffic flow and avoiding unnecessary trips); iii) inclusiveness (i.e., ensuring inclusive mobility and good access for all).

Lecture 2
Title: Addressing cyber-physical systems problems by Labeled Petri Nets
Cyber physical systems (CPS) are view as an integration of physical processing, sensing, computation, communication, and control. Different problems are faced in this context such as security, safety, that become important in safety-critical applications, such as air traffic management systems, where it is usually necessary to check whether the current behavior falls into the dangerous or undesired situations.
The talk will present security problems in the field of the online fault diagnosis problem of discrete event systems such as the fault diagnosis under malicious external attacks. Different scenarios will be considered where an attacker can intercept sensor measurements and alter them arbitrarily, which may prevent an occurred fault from being detected. In the framework of labeled Petri nets, the talk will present integer linear programming problems built to estimate the possible transition sequences of a given observation by introducing a set of binary variables.

I am fully available for delivering lectures for the Distinguished Lecturer Program.