Connectivity in Connected and Autonomous Vehicles

Evtim Peytchev

Nottingham Trent University, UK

This lecture introduces the Connectivity part in the domain of Connected and Autonomous Vehicles (CAV). Understanding the contemporary communication technologies like 4G and 5G, WiFi etc. is essentials for this introduction. It goes into technical details and explains how multiple devices can communicate on the same wavelength at the same time. Furthermore, details of the different equipment components are given – e.g. handset, SIM card, base station etc. Special use of WiFi – Dedicated Short Range Communication (DSRC) and its use cases is considered.

Based on the connectivity technology, the lecture considers several reference implementations of a communication frameworks, where Vehicle to vehicle (V2V) and vehicle to infrastructure (V2I) communications are seamlessly integrated. Furthermore, five general requirements for building vehicular applications are introduced and explained.

The presented material also considers the 802.11p standard for communication between cars and also highlights some differences between the American and European standards in using the 802.11p approach.

A closer look into the vehicle telematics' basic concepts is also provided. The material in the lecture covers aspects of sensor equipment and functionality in vehicles. Significant part of the unit is dedicated to in-car computer networks like Controller Area Network (CAN) bus and others.