

UAVs in the Environment of Internet of Vehicles: Fusion of Autonomous Vehicles for Traffic and Transportation Tasks

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Abstract: Although Unmanned Aerial Vehicles (UAVs) have been used in the military domain for decades, their history in the civilian domain is much shorter. The development of technology and the simultaneous decline in the prices of basic components such as sensors, processors, and components of communication technologies has enabled the development of UAVs and their penetration into various spheres of life. This progress has also manifested itself in other areas, giving the rise to big data computing in the form of cloud and edge computing, or the concept of the Internet of Things (IoT) and the related concept of ubiquitous robotics. On the other hand, the ever-increasing density of traffic and other negatives associated with it require the creation of such traffic systems that are able to fuse all types of vehicles into one entity. However, without timely data and subsequent processed outputs based on these data, it is not possible to manage traffic online. For these purposes, the concept of Internet of Vehicles (IoV) adapted to the needs of traffic and transportation has emerged, which is based on IoT and associated technologies. In addition, existing traffic and transportation systems work with ground vehicles. Our ambition is to implement UAVs into existing systems using IoV.

Therefore, we will discuss basic notions and tasks of IoV, which is represented by a dynamic network of various vehicles. Its main role is to maintain such a network in a real time following all prescribed conditions. To illustrate this domain we will show some problems like e.g. UAV navigation using IoV, communication V2X in the area of robotic swarms or data analysis in the infrastructure of IoV.

Short Bio:

Ján Vaščák received the Dipl.-Ing. and Dr.-Ing. (Ph.D.) degrees in cybernetics from the Technical University of Košice, Slovakia. He is currently an associate professor at his alma mater in the study programme Intelligent Systems. His research focuses on the navigation of autonomous vehicles and the use of computational intelligence in robotic tasks. More recently, he has been working on the potential use of IoT in navigation and traffic & transportation systems in general. He is a member of the editorial boards of several scientific journals such as Applied Soft Computing, Acta Polytechnica Hungarica and International Journal of Imaging and Robotics. He is a Senior Member of IEEE and is currently the Chair of the IEEE Computational Intelligence Chapter within the Czechoslovakia section of IEEE. Assoc. Prof. Vaščák is the author or co-author of more than 190 publications.

