

Editorial

Transportation in the 21st Century: New Vision on Future Mobility

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I am pleased to present this Special Issue on “Transportation in the 21st Century: New Vision on Future Mobility”. The knowledge about the future of mobility requires an answer to the questions of how many people will travel and what types of transport will they use. Everything indicates that the answer to these questions lies, among others, in the technological progress of the automation of transport processes. Many research centers around the world are working on solutions that will enable a faster, cheaper, safer, and possibly ecological movement of people and loads [1,2]. These studies focus not only on automated vehicles but also on issues related to traffic management and optimization of the efficiency of the transport network. A great deal of space in the literature is devoted to mobility in cities, which is obviously due to increasing urban congestion, which not only has a negative impact on the environment but also on the number of accidents and the quality of life of city inhabitants.

Basically, the idea to solve the problems related to congestion and environmental protection seems to be the use of connected automated and electric vehicles. It is said that establishing the use of automated, connected, and electric vehicles will be one of the most transformative changes since the invention of motorized vehicles over a hundred years ago. Connected automated vehicles (CAVs) will change the way we travel and transport goods, making road transit safer, more accessible, and efficient.

The use of connected and automated vehicles will ensure that various transport processes are carried out with minimal human input [3]. The expected effect of the use of connected automated and electric vehicles will include the effective implementation of transport routes, high transport safety, reduced energy consumption, and better use of land [4].

Until now, a number of concepts for the use of this type of vehicles have been described in the literature [5,6].

In addition, one of the most promising current transport ideas, especially in cities, is shared mobility [7]. It can be defined as trip alternatives that aim to maximize the utilization of the mobility resources that a society can pragmatically afford, disconnecting their usage from ownership. It refers to the shared use of vehicles, bicycles, or other modes of transportation in order to encourage users to access transport services only when we need. It also includes a variety of transportation modes such as peer-to-peer ride sharing, on-demand ride services, micro-transit, etc. [8,9].

In addition to shared mobility, more and more space in literature is currently being devoted to Mobility as a Service (MaaS). MaaS usually connects services from multiple mobility providers into a single service—often using an app or other digital platform. This kind of a mobility can include both public and private mobility providers. The number of publications about mobility as a service (MaaS) has increased rapidly in the past years, spreading into various fields [10]. MaaS comprises a sophisticated conglomerate of heterogeneous transportation means, physical infrastructures, and information and communications technologies (ICTs) working in combination to enable citizens to reach their destinations efficiently [11]. Thanks to this solution, the user will be brought to the desired place using various types of transport, paying for the entire journey as if for a single



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trip. Such a multimodal approach to the implementation of processes in passenger transport definitely increases the role of public transport while reducing the use of private cars.

Therefore, the use of these types of approach to the implementation of transport processes will significantly reduce city congestion and the negative impact of transport on the environment.

Yet another idea to improve mobility conditions while reducing the negative environmental impact of transport is to minimize travel needs by, e.g., enabling teleworking and distance learning, as well as improving and expanding online services [12].

Thus, the key challenge facing the mobility of the future is to find a balance between economic and environmental sustainability, as well as the satisfaction of passengers [13,14].

It is not possible to improve mobility without a proper traffic management system. It is important to consider both automated and conventional vehicles. Traffic management is aimed at, inter alia, the optimal use of energy, increasing the reliability of travel, and reducing the number of accidents, economic losses, environmental pollution, and congestion. A systematic review of the literature on various solutions in the field of traffic management including vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) systems was carried out in [15]. In turn, various methods and models of traffic management can be found in [16,17].

The efficiency of the transport network depends on the area in which transport processes are carried out. Again, by far the greatest network capacity is needed in highly urbanized city areas. Significant funds are being invested in improving the capacity and, at the same time, the efficiency of transport networks, which should result a faster implementation of such transport processes and, consequently, reduced costs. Many different criteria can be used in assessing the optimization of transport networks, such as the shortest distance traveled, the minimum cost of transport, or the highest robustness of the network to various disturbances [18].

To sum up, in the 21st century, mobility will be mainly determined by modern technologies, new methods of optimizing these processes, as well as new strategies for mobility management. Only taking into account a wide range of factors influencing this mobility will allow it to increase its efficiency while minimizing the use of resources and limiting its negative impact on the natural environment. I am convinced that the articles included in this Special Issue will contribute to the development of knowledge in this area.

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