

Preface

Special Issue on Cognitive Mobility

One of the cornerstones of 21st Century global society is our ever-expanding mobility. Its sustainability within the current framework is increasingly questionable. Rapid digital development is giving us new tools to reduce the environmental footprint of our mobility system by increasing its efficiency; it is called cognitive mobility.

The articles of this special edition cover the most relevant areas of cognitive mobility. One of the pillars of understanding better mobility is the use of smarter sensors. The paper “Data acquisition as basic of cognitive approach” shows a tangible example. The measured and collected data is the basis of further evaluations; one is presented in the paper “Investigating the energetics of electric vehicles based on real measurements.” As one of the main aims of the cognitive mobility approach is to develop mobility to be more sustainable, the energy use of vehicles is a key topic. Engines will play a role in the next decades; papers deal with increased efficiency of engines, such as “Cost-efficient training method for artificial neural networks based on engine measurements” or “Research on the Quantification of Exhaust Emission Volumes in an Opted Road Section.” The main energy converter could be an electric “Competition vs. Cooperation: Do Subsidies with Government-Set Eligibility Threshold Values Behave as Focal Points on the Hungarian BEV Market?” or partially at least partially internal combustion engine with liquid fuel “Evaluation of an Oil Refining Tower by Numerical Simulation”. Using cognitive tools for improving the drivetrain is essential as well, as presented in “Integrated Torque Vectoring Control Using Vehicle Yaw Rate and Sideslip Angle for Improving Steering and Stability of All Off-Wheel-Motor Drive Electric Vehicles” or in Energy condition measurement of gear shifting under load in commercial vehicles.

One of the rapidly developing areas of cognitive mobility is the safety and security of the system. Understanding the challenges and research for the solution is a key topic is in authentication “Investigating the safety effect of PKI authentication in automotive systems”, in environment perception “Neural network-based multi-class traffic-sign classification with the German Traffic Sign Recognition Benchmark” and relation with vulnerable participants as well, like in “Assessability of road accidents – a methodology for exploring the effect of accident type and data recording technology“

Handling the more wider aspects with interdisciplinary approach is as well part of cognitive mobility. Sustainability across generations is represented in “Who should communicate to make the world a greener place?”. Environment and pollution questions are appearing in “Adapting to climate change in the digital era

– a new dimension of regional sustainability?” and “Eye tracking study of visual pollution”. Transport management and Covid 19 challenges are touched as well with the cognitive mobility aspect in “Prediction of transport performance development due to the impact of COVID-19 measures in the context of sustainable mobility in railway passenger transport”

It is time to express our special gratitude to Anna Sudár, Marianna Márkus, and Janka Patkó for giving technical background for this special issue. We are grateful to all the writers and co-authors for their dedication to developing contributions for this special issue and sharing their findings with the journal. Last but not least, we would like to thank the editorial board of the journal *Acta Polytechnica Hungarica*, Ms. Anikó Szakál, Prof. Imre J. Rudas, and Prof. Levente Kovács, for their help in publishing this Special Issue.

Prof. Dr. Máté Zöldy

Guest editor

Prof. Dr. Péter Baranyí

Guest editor