Guest Editorial
Fuzzy Decision Systems for Sustainable Transport

SUSTAINABLE transport has gained widespread recognition by countries, local governments, cities, and transport authorities around the world to bring about positive change for the environment, ensure wider accessibility, and reduce carbon emissions. Many countries and cities have redesigned their transport systems to make them more sustainable. Incentives are being provided to ensure the shift from petroleum-fueled vehicles to zero-emission vehicles (e.g., electric vehicles, hydrogen vehicles, fuel cells, biogas, etc.) to limit the environmental harm caused by the widespread use of gasoline and diesel fuel. Recent technological developments around propulsion technologies and policy changes to reduce the need for travel or increase the share of sustainable modes have accelerated the shift toward sustainable transport. Global transport emissions increased by less than 0.5% in 2021 (compared to 1.9% annually since 2000), thanks to efficiency improvements, electrification, and more biofuels. However, transportation is still responsible for 24% of direct CO_2 emissions from fuel combustion. Road vehicles, such as cars, trucks, buses, and two-and three-wheeled vehicles, account for almost three-quarters of CO_2 emissions in transport. Emissions from them continue to increase, and more international policy and cooperation focus is needed in these areas. For example, electric vehicles are gaining more and more attention from governments and the general public across the world as electric vehicles make a significant contribution to the reduction of greenhouse gas emissions. Therefore, the shift toward sustainable transport requires effective decision mechanisms. The COVID-19 pandemic increased the uncertainty around the decisions influencing the shift toward sustainable transport due to financial, social, and technical uncertainties. In the literature, these uncertainties are often not taken into account sufficiently. Classical methods are insufficient in decision making involving the necessity of these decision mechanisms and multidimensionality. Fuzzy methods provide a suitable methodology for the solution of these sorts of problems involving uncertainty.

Fuzzy decision systems are one of the most important advances in computational intelligence. The recent theoretical developments in the area of fuzzy decision systems provide novel perspectives for the key mechanisms of decision making and information processing that can handle uncertain, ambiguous, noisy, and missed input information in sustainable transport problems and decisions.

The response to our call for this special issue of IEEE TRANSACTIONS ON FUZZY SYSTEMS was overwhelming, as we received a total of 87 submissions from around the world. During the review process, each article was assigned to and reviewed by at least three experts in the field, with a rigorous multiround. Thanks to the great support from Editor-in-Chief Jon Garibaldi, and the dedicated work of numerous reviewers, we were able to accept 22 excellent articles covering various topics in fuzzy decision system-based sustainable transport problems.

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