CERIS : Civil Engineering Research and Innovation for Sustainability

Peer-to-peer autonomous car-sharing – Supported by data-driven demand modeling

Summary

Shared autonomous vehicles (SAV) present themselves as a disruptive innovation in urban mobility, their introduction in the market has the potential to influence travel behavior and contribute to a more sustainable transport system. Pro-active actions would certainly help shape the right framework to receive this new trend in mobility. In this work, we explore a peer-to-peer autonomous car-sharing (P2P ACS) solution that proposes employing private autonomous vehicles (AV) during their idle periods as a mobility-on-demand service. To do so, we conceptualized and designed the P2P ACS theoretical framework where we identified the relevant agents and their behavior. We further developed the P2P ACS simulation framework with the coding of these behaviors and added major algorithms to enable the agents' actions as dispatch and improve model robustness.

Finally, we implemented the proposed framework within an agent-based model and tested it for the Greater Lisbon area. This analysis enabled the assessment of the potential impact of this new emergent technology in different system configuration scenarios, from the perspective of the different stakeholders. The analysis of future scenarios is complemented by considerations on beneficial policies and measures to help guide decision-making.

Keywords

Autonomous vehicle, shared fleet, peer-to-peer, agent-based model.

P2P ACS simulation environment.

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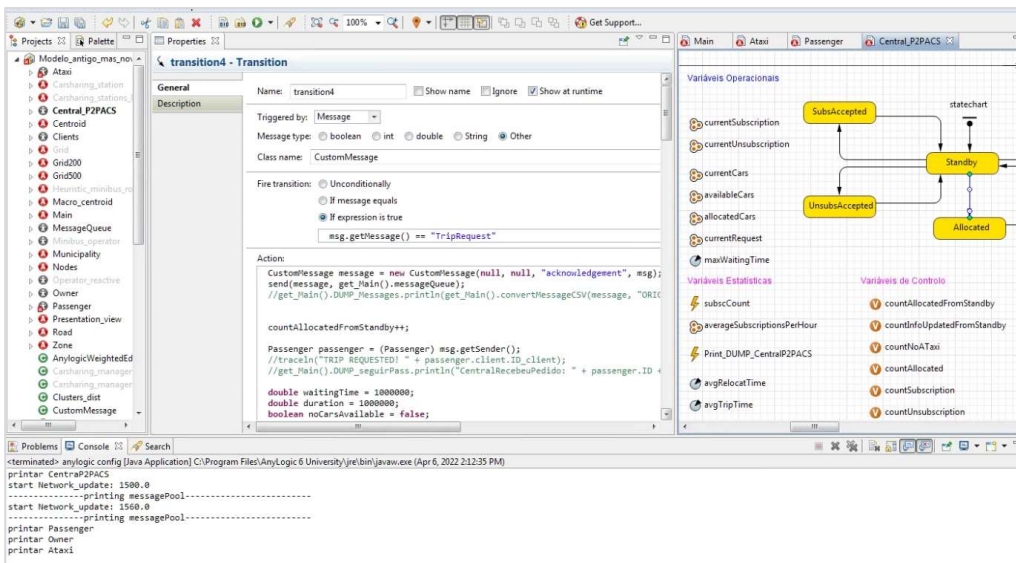
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