Predicting the Demand for Connected Autonomous Vehicles: A New Approach Based on the Theory of Innovations
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Motivation
Connected autonomous vehicles (CAVs) are an emerging reality and they are growing much faster than expected. Meanwhile, autonomous vehicles have already surpassed some degrees of automation into the mainstream. Now CAVs are on the verge of introduction into the market. A key issue is the notion that most people are not willing to consider the use of autonomous vehicles (AVs) due to safety concerns, high costs, and ethical issues. There has been a growing interest in how people’s perceptions about AVs will change over time. This is important because people’s perceptions and attitudes about autonomous vehicles can influence adoption rates.

Resistance Concept (Cont’d)
- The majority of studies on adoption forecasting are based on expert knowledge, perceptions of adoption barriers, and factors expected to impact the diffusion of the technology. However, these studies do not consider the individual’s behavioral change over time, as the impact of some factors might change over time.

Agent-Based Simulation Model of CAVs
- We introduce a two agent-based simulation (ABM) to simulate the adoption process of autonomous vehicles (CAVs) in the population. The goal of this model is to estimate the impact of various factors on the adoption rates of autonomous vehicles in the future.

Agent-Based Simulation Model of CAVs (Cont’d)
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Data
- Data is gathered from a variety of sources, including the University of Memphis (UofM) surveys. The data is used to calibrate and validate the model.

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Results
- The model shows that the adoption rate of autonomous vehicles is strongly influenced by the level of trust in the technology, the perceived benefits of the technology, and the level of perceived inconvenience. The model also shows that the adoption rate is lower in the earlier stages, but increases significantly in the later stages.

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