

Agent-Based Model for Simulating Pedestrian Intersection Behavior in the Presence of Autonomous Vehicles

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Autonomous vehicles (AVs) have been a subject of increasing interest due to rapid advancements in transportation technology. However, a critical challenge lies in assessing pedestrians' preparedness to accept and interact with this emerging technology. While existing studies often concentrate on pedestrian crossing behavior within road segments, this research aims to delve deeper into the impact of pedestrians' individual traits on their crossing behavior at intersections in the presence of AVs. Our study site is located near Shalun train station in Tainan, Taiwan. To create an accurate 3D Simulation Environment representing a crossroad, we utilized the HD map file (centerline data). The data collection on crossing behavior was conducted using Anylogic, an Agent-Based Modeling (ABM) tool. Additionally, we gathered information from participants regarding their age, educational background, gender, and attitudes toward AVs through questionnaires. The simulation included 10 male and female students, each controlling a simulated pedestrian agent. The AVs were equipped with green and red lights to indicate their intention to "move forward" or "yield" to pedestrians. We examined vehicle movements from two directions: right turns from the same direction and left turns from the opposite direction. As a baseline, conventional vehicles (CVs) were also simulated for comparison. The results of our experiment are expected to provide valuable insights for future studies in designing pedestrian crossing behavior at intersections, considering their individual characteristics.

Keywords: Agent-Based modeling, pedestrians, automated vehicles.