

An Enhanced Development and Evaluation of Vehicle to Pedestrian (V2P) Safety Interventions

With increasing worldwide focus on autonomous self-driving vehicles, it is not clear that such advanced technology can account for vulnerable users such as pedestrians. This research effort looked at the behaviors of pedestrians crossing a road while texting on a smartphone that would also alert them to the presence of an oncoming car, with varying degrees of reliability. The goal of this experiment was to examine how pedestrians, who were distracted by their smart phones, behaved in a road crossing scenario when an alert of varying reliability warned them of a possible collision.

This experiment was conducted in a controlled roadway environment with pedestrian participants approaching a road crossing while performing a secondary data entry task on a smartphone. Whether people stopped at or before approximately two feet from the road's edge predicted safer crossings. Such a threshold could be critical for designers of autonomous cars who need to prioritize the tracking of multiple entities in congested environments.

This research effort demonstrated that only 2% of participants exhibited a tendency towards unsafe crossings, while 18% tended towards risky crossings. An opportunistic experimental factor emerged in the form of comparing US-born participants with an equal number of participants from other countries. These results suggest national origin plays an important role in the use of technological interventions meant to promote positive behaviors and solutions effective in one setting may not generalize to other nations.

These results also call into question the use of alerts on a smartphone meant to stop people from walking into traffic. Technology-focused interventions are currently not producing effective solutions, especially across different nationalities. This research suggests design criteria might be elucidated from such use of machine learning classification methods in concert with controlled experiments.

More research is needed to determine such thresholds, including variations due to nationality, road and sidewalk design, and proximity to particularly vulnerable populations, i.e., high school and college campuses with higher numbers of people like to engage in distracted walking. Allowing non-partisan researchers to access this data and develop safety-based models to be shared across all manufacturers would help prevent future fatalities.

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