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Poster Title: Estimating Mode Choice Decisions for New Transportation Services: A Mode Choice Model Based Upon Fundamental Influencing Factors

Abstract: The introduction of new transportation technologies such as emerging mobility as a service (MaaS) and connected/automated vehicle (CAV) concepts is expected to greatly affect daily travel behaviors and consequently influence the mobility and energy performance of the transportation system. How travelers will evaluate the new transportation services against conventional modes is a question of interest to both researchers and practitioners. One major difficulty in answering this question is the lack of observed mode choice data from new transportation services (e.g., MaaS and CAVs). Stated preference (SP) surveys are usually designed to understand travelers' mode choice decision changes in hypothetical scenarios where CAVs and shared mobility services become available, but SP data has been criticized for not reflecting travelers' preferences in real life. This research proposes a mode choice model based upon a set of fundamental factors that influence mode choice decisions. These factors can be represented as a set of variables that travelers consider for mode choice decisions and can also be used to compare any existing or new/hypothetical travel mode. The model therefore can be estimated with observed data from existing transportation modes and later be applied to investigate travelers' mode choice behavior and associated energy implications for new transportation modes. The fundamental factors include variables such as mode access time at origins, access time at destinations, cost, degree to which the mode requires physical exertion by the traveler, and degree to which a traveler must actively perform a task or that a traveler can productively engage in other tasks. Both conventional modes and new transportation technologies can be described with such set of variables. The California state add-on dataset from the 2017 National Household Travel Survey was used to demonstrate the performance of the proposed model. Comparison was made to a multinomial logit model that included an alternative specific parameter of travel time weighting for different travel modes in the dataset (an approach that should provide good model predictive power, but with limited applicability to novel travel modes). The comparison showed similar predictive performance between the two models (both in terms of overall fitness and parameter signs), proving that the proposed model can reasonably represent travelers' mode choice preferences and has the potential to estimate the likely uptake rate and associated energy implications for new/novel travel modes.