Exhibit D

Research Project Requirement Template

A Pilot Study to Integrate Mobility Data Collection APPs with Personalized Recommendation Systems

Recipient/Grant (Contract) Number: The University of Texas at Austin; University of Washington /Grant # 69A3552344815 and 69A3552348320

Center Name: Center for Understanding Future Travel Behavior and Demand (TBD)

Research Priority: Improving Mobility of People and Goods

Principal Investigator(s): Shuai Huang

Project Partners: N/A

Research Project Funding: $75,000 (Federal + non-Federal funding)

Project Start and End Date: 11/1/2023 - 12/31/2024

Project Description: Recent years have witnessed many efforts to use smartphones to collect travel data. Typical examples include the automatic collection of sensor data such as location, accelerometer, or microphone readings, and personalized recommendation/behavior modification by gamifying travel and providing incentives for particular mode choices or building route choice models for active transportation modes such as bicycling. However, it seems that the two lines of work are usually pursued separately. Our hypothesis is that, to make better personalized recommendation, the data collection could be further optimized as well, with the help of incorporation of latest developments in adaptive sensing, uncertainty quantification, and predictive science that can help the APP prioritize data collection tasks, identify crucial time points for data collection, etc. On the other hand, the better personalized recommendation the APP can offer, the better user engagement, that will ultimately translate into a long-term adaption of the APP by a wide range of users. The proposed project will take on the following tasks:

1. Review the existing works to identify and evaluate current open-source software that can collect mobility trajectories, user data, and offer personalized recommendations.
2. Design a smartphone application to collect travel behavior data and recommend personalized options.
3. Develop the application and conduct a pilot test on the functions for Android and iOS systems.

The proposed research is expected to launch a new smartphone application on travel behaviors and provide more personalized recommendations based on the collected data, while the end tasks (i.e., the personalized recommendation algorithms) could also help improve data collection as well.

US DOT Priorities:

Transformation research priority (page 58: data-driven insight): Our study will create tool and methods to better collect data and build data-driven personalized recommendation models for responsive, data-driven decision-making.

Climate and sustainability priority (page 46: desire outcome [4th point]): Our study will create tool and methods to change travel behavior improvement of transit and micromobility and pedestrian and bicycle infrastructure by reducing car dependency and encouraging walking, biking, and transit use.

T2 Priorities: Ensure research investments are fully leveraged through the demonstration and deployment of the resulting products and technologies. **2022-2026 Objectives: Research Planning**: Require that T2 performance measures be incorporated into research project lifecycle planning at an early stage (p.67).

Outputs: From this research, we are expecting to develop an APP and the associated code and publish a technical report detailing the design of the APP and its implementation and evaluation. We also expect to publish an impactful journal article in reputed journals as well as convey the findings of the research work to academics and practitioners through conference presentations. A database will be produced and shared on an open platform, which can be used for further research.

Outcomes/Impacts:
The outputs of this research project will help us better understand travel behavior and further lead to more accurate travel demand prediction and personalized recommendation. The outcome of the study will facilitate the creation of personalized travel demand management tools aiming to reduce traffic congestion and energy overconsumption; improve quality of life and citizens' well-being; and improve the effectiveness of strategies for travel demand management. Overall, the outcome of the study will have an impact on the sustainable development process.

Final Research Report: A URL link to the final report will be provided upon completion of the project.