

0-6767: Evaluation of Existing Smartphone Applications and Data Needs for Travel Survey

Background

Current and reliable data on traffic movements play a key role in transportation planning, modeling, and air quality analysis. Traditional travel surveys conducted via paper or computer are costly, time consuming, and labor intensive for survey conductors; and place a significant burden on the survey participants. Furthermore, accuracy and completeness are susceptible to participants' after-fact memory. To address this issue, this project evaluated existing smartphone applications for conducting travel surveys.

What the Researchers Did

Researchers reviewed existing smartphone travel survey efforts across the country and elsewhere in the world. Researchers also examined current travel survey practice in Texas. Researchers then compiled a list of smartphone-based travel survey apps, compared them, and evaluated them. Researchers classified data elements collected by the Texas Department of Transportation (TxDOT) and evaluated the feasibility of gathering these elements using smartphone applications.

Researchers developed a prototype household travel survey app to verify that all information in the TxDOT travel survey specification can be collected through smartphones. Figure 1 shows screenshots of this app. A small pilot survey was conducted through the app, and a semi-structured interview was conducted to obtain user feedback on the app. Finally, researchers identified the potential for using smartphones for travel surveys and some possible problems.

What They Found

There is no doubt that smartphones with a global positioning system (GPS) function can provide more precise temporal and spatial information and reduce survey burden and cost compared to previous methods. Several countries, such as the United States, Australia, Japan, and Singapore, have already developed smartphone applications that are used for travel surveys, and pilot experiments have investigated the advantages and disadvantages of this new method.

Although the researchers believe that smartphones will be very useful for conducting household travel surveys, the use of smartphones for these surveys still has inevitable challenges, such as sample bias. Using traditional controlled recruitment does not reduce the labor cost associated with surveys.

What This Means

The most apparent advantage of a smartphone-based household travel survey method is higher accuracy in temporal and spatial data collection compared to traditional methods and reduced burden on survey participants. Furthermore, the data collection, input, and editing burden can be reduced significantly by a smartphone app.

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There is no need to deliver the survey equipment to the participants; therefore, the smartphone-based method is an effective and economical way to collect survey data.

The main challenges are sample bias, battery consumption, weak GPS signal in some regions, and privacy and data security. However, sample bias may be overcome by post-processing

considering user demographics and additional sampling. Battery issues can be alleviated using car chargers. Weak GPS signal, privacy, and data security challenges can be solved by a combination of technologies and policies. Large-scale smartphone-based travel surveys have not been performed yet, but they will likely be used very soon.

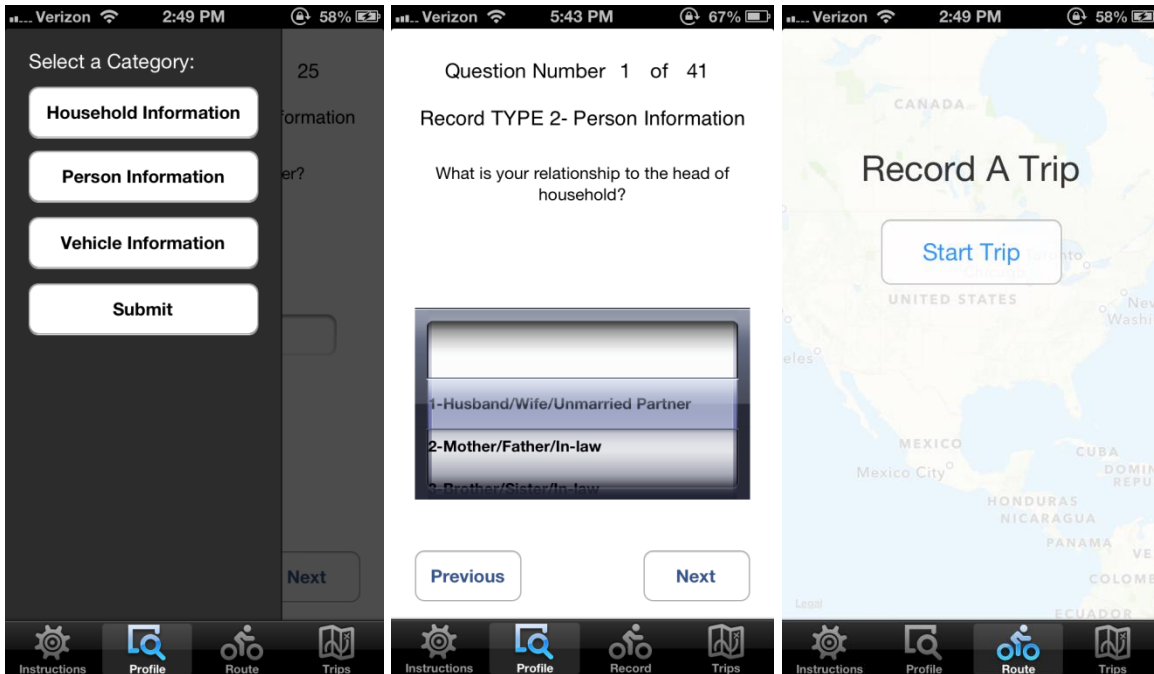


Figure 1. Screenshots of Prototype TxDOT Survey App.

For More Information

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