Data Collection for Sustainable Mobility Planning and Design

Pedram Fard¹ Amir Zarinbal² Jeffrey Casello³

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¹School of Planning, ²Department of Civil and Environmental Engineering, ³School of Planning and Department of Civil and Environmental Engineering

- Innovative techniques exist for traveler data collection.
- Natural experiment occurring in the Region of Waterloo;
- Possible to understand how investments in sustainable modes influence traveler behavior;
- Travel data matched with traveler perception allow for robust travel utility models.

Background

Transportation Data Collection

- Traditional survey-based methods require significant effort, produce limited results.
- New, passive methods exist for multiple modes:
 - For walking / cycling infrared, video, and loop detection;
 - For transit AVL / APC data becoming the norm.







Transportation Data Collection

- New, passive methods exist for multiple modes:
 - For autos / multiple modes WiFi and Bluetooth detection;
 - With multiple sensors, allow for O-D and path identification.
 - Smartphone applications



Region of Waterloo – LRT / BRT



Goals

Project objectives are to understand:

- How important CTC is to overall transportation behavior in the Region;
- Traveler behavior in the CTC:
 - How many activities can be accomplished in one tour?
 - How long are tours in time?
 - How long are tours in distance traveled?
 - How do the above characteristics vary as a function of origin, access mode, household composition, etc.
- Traveler satisfaction



Methods – WiFi Detection

Proposed WIFI Positions in Downtown Kitchener



Smart Phone Data Collection

Collected Data:

- GPS coordinate, Bearing
- Speed, Acceleration
- Cell phone accelerometer
- Battery, Network info



Map: 11/17/2015

- Characteristics
 - iOS, Android (Smart phone, Tablets)
 - Battery efficient
 - No need for cell phone data
 - Minimum interaction from users
 - Rich management tools

Smart Phone Data Collection

- Implementation: City of Edmonton, AB
 - EdmoTrack: <u>www.edmotrack.com</u>
 - 1971 Participants
 - 76 Days
 - 5.8M GPS points
 - ~1 GB data set
- Analysis Capabilities
 - Users can review their trips
 - Website: Google Maps, App
 - Travel segment analysis
 - Activity, Moving Segment
 - Transportation mode analysis
 - Real-time mode detection



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EdmoTrack

Carrier 穼

Smart Phone Data Collection

- Additional applications ongoing with passenger travel:
 - University of North Carolina;
 - Rutgers University;
- Exploring possibilities for expansion into real-time asset tracking



Integrating Traveler Interface

Seeking traveler satisfaction levels in real time

(Dunlop, Casello and Doherty, 2015):



Timelines

Project Schedule:

- Hardware specification and locations ongoing;
- Implementation fall 2016;
- Data collection through 2017;
- Ongoing data analysis.

Student Engagement:

- Ph.D. candidate arriving F2016;
- Postdoc position expected W2017 (applications being accepted!).

Contact Information

Professor Jeffrey M. Casello, Ph.D., P.E.

jcasello@uwaterloo.ca

www.civil.uwaterloo.ca/wpti

519 888 4567 ext. 37538