Passive Data Collection and Its Application to Tour-based Modeling

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Outline

1. Background
   - Literature Review and the Region of Waterloo’s LRT project

2. Application Example
   - Assessment of GPS and Self-reported Data in the City of Edmonton

3. Current Work
   - Passive data collection in the Region of Waterloo

4. Future Work
Background: LRT in the Region of Waterloo
Background: Literature Review

- **Urban sprawl and its impacts** (Ewing, 2008)
- **Benefits of urban core area with high density and high diversity** (Talen, & Koschinsky, 2014; Cervero, & Kockelman, 1997)
- **Approaches to measuring sprawl** (Malpezzi, 1999; Galster et al., 2000)
- **Tour-based activity model as a transportation modeling approach** (Gunn, van der Hoorn, & Daly, 1987)
- **Importance of the new data collection methods for tour-based modeling** (Casello & Usyukov, 2014; Nour, Hellinga, Casello, 2016; )
Background: iCity-ORF: First Annual Presentation

• **Transportation Data Collection**
  • Traditional survey-based methods
  • New passive methods exit for multiple modes (video and loop detection, AVL/APC data, WiFi and Bluetooth detection, smartphone app)

• **Smartphone App**
  • Collected Data (GPS coordinate, bearing, speed, acceleration, battery, network info)
  • Characteristics (iOS, Android, battery efficient, minimum interaction from users)
Application Example: Assessment of Travel Data in the City of Edmonton

Can GPS data collected by smartphone be an effective supplement to traditional travel survey?

- Analyze the GPS attributes to identify activities
- Build an algorithm to detect activities
- Generate integrated truth data
- Compare the number of reported activities and detected activities
Current Work: Goals

Urban core intensification

Building vibrant urban places
Current Work: Measurement of Land Use Diversity

Measuring spatial indicators of land use diversity:

- Entropy index
- Land use mix index
Current Work: Passive Data Collection in the Core Area

- Passive Data Collection – Smartphone collected GPS data
  - Access mode from origin to activity center
  - Duration of pedestrian tour in study area
  - Distance traveled for pedestrian tour
  - Number of activities completed on tour

- Web-based Demography Survey
  - Demographics / household composition of participants
Future Work: Data Analysis

• LRT operation: January 2018

• 12 months data collection after the introduction of LRT

• Record pedestrian tours as a function of access mode + attraction locations + land use
References


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WPTI
https://uwaterloo.ca/waterloo-public-transportation-initiative/