Bus Headway and Load Analysis Using AVL and APC Data

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Context

- New sensing technology in public transit
- Automatic Passenger Counter (APC)
- Automatic Vehicle Locator (AVL)
- This tech allows for analyses previously not feasible
  > Better understand behavior of transit
  > Improve transit planning and operations
- My research focuses on taking advantage of APC and AVL
Campus Transit Lab (CTL) Background

- CTL was formed based on a unique partnership between operators, interdisciplinary academic units, and technology developers
  - Transportation & Parking Services
  - Civil & Env. Engineering, Statistics, Coll. of Engineering
  - Clever Devices, Inc.

- CTL consists of
  - Transit operations
  - Automated sensing of vehicles and passengers
  - Manual data collection of passenger flows & choices
Campus Transit Lab Infrastructure

<table>
<thead>
<tr>
<th>Route</th>
<th>Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campus Loop South</td>
<td>5.33</td>
</tr>
<tr>
<td>Campus Loop North</td>
<td>5.30</td>
</tr>
<tr>
<td>North Express</td>
<td>3.91</td>
</tr>
<tr>
<td>Medical Center Express</td>
<td>3.12</td>
</tr>
<tr>
<td>East Residential</td>
<td>5.13</td>
</tr>
<tr>
<td>Buckeye Village</td>
<td>4.01</td>
</tr>
</tbody>
</table>

26.80 Total Route Miles
My Activities

- Using AVL data to analyze bus headways
- Use APC data to analyze load profiles
- Develop data structures to organize AVL and APC data in a consistent fashion for long term use in various studies
- Design and prototype a website that features CTL and the collected data
- Participate with graduate students on other projects
Headway Analyses Using AVL Data

What is a headway?

Time-Space Diagram
AVL Trajectory Data

Campus Loop South for 4/8/2010
Various Headway Distributions
Load levels and their variability across bus trips to determine effective frequencies and levels of service

Determine locations for bus holding to improve headway regularity with minimal impact on riding passengers
Concluding remarks

- In depth analysis along the lines of what was presented
- Continue working on other activities
  - Data structures
  - CTL Website
- In my interactions with faculty and graduate students I’m recognizing the value of interdisciplinary research
People Involved

- **Undergrad**
  - Justin Vayda, Computer Science & Engineering

- **Professors**
  - Paul Sivilotti, Computer Science
  - Rabi Mishalani, Civil & Env. Engineering
  - Mark McCord, Civil & Env. Engineering, City & Regional Planning
  - Prem Goel, Statistics