Distinguishing Drivers by Measuring Their Habits
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BACKGROUND

- Chronic illness is increasing and significantly impacts driving.
- Clinicians have a responsibility to report driving concerns.
- There are no agreed upon standardized tests for driving risk.
- Recent work has suggested the use of car "black box" data.
- However, many vehicles are shared by multiple drivers.
- This project explores the identification of a driving signature to distinguish between drivers. Creating a foundation for future analysis of driving signature change as predictor of driving ability.

METHODS

- Collaboration with Candrive project at OHRI:
  Candrive is now in the 5th year of collecting GPS and Engine Computer data from 256 older drivers in Ottawa (70+ at entry).
- Analyzing the data for attributes that distinguish drivers
  Trip measures: Time of day, Distance, Duration
  Driver Choices: Road types (city, highway)
  Driving Habits: Velocity, Acceleration, Throttle use, Speeding
- Techniques and goal
  Use signal processing and data analysis
  Identify features that distinguish drivers
  Build towards a driving signature tool

RESULTS

Road choice
- Choice of road shows clear driver habits with avoidance of all highways or only 100km/hr expressways

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Driver 1</th>
<th>Driver 2</th>
<th>Driver 3</th>
<th>Driver 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>city</td>
<td>99.2</td>
<td>71.6</td>
<td>95.5</td>
<td>86.4</td>
</tr>
<tr>
<td>highway</td>
<td>0.8</td>
<td>28.4</td>
<td>4.5</td>
<td>13.6</td>
</tr>
</tbody>
</table>

Summary information for 100 trips for each of 4 drivers showing percent of time each driver traveled on each road choice based on posted limit where posted limit known

Trip Durations
- Variations show distinct choices by the drivers including frequent long trips (driver 2).

CONCLUSIONS

- Preliminary results show how the various analysis techniques create features that distinguish the differing driving habits and tendencies of drivers.
- Specifically the analysis shows differentiation potential of:
  - road choice (highway avoidance)
  - time of day of travel (night driving/high traffic avoidance)
  - velocity and acceleration (driver habits)
  - velocity/posted limits (speed limit compliance)

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