# Distinguishing Drivers by Measuring Their Habits

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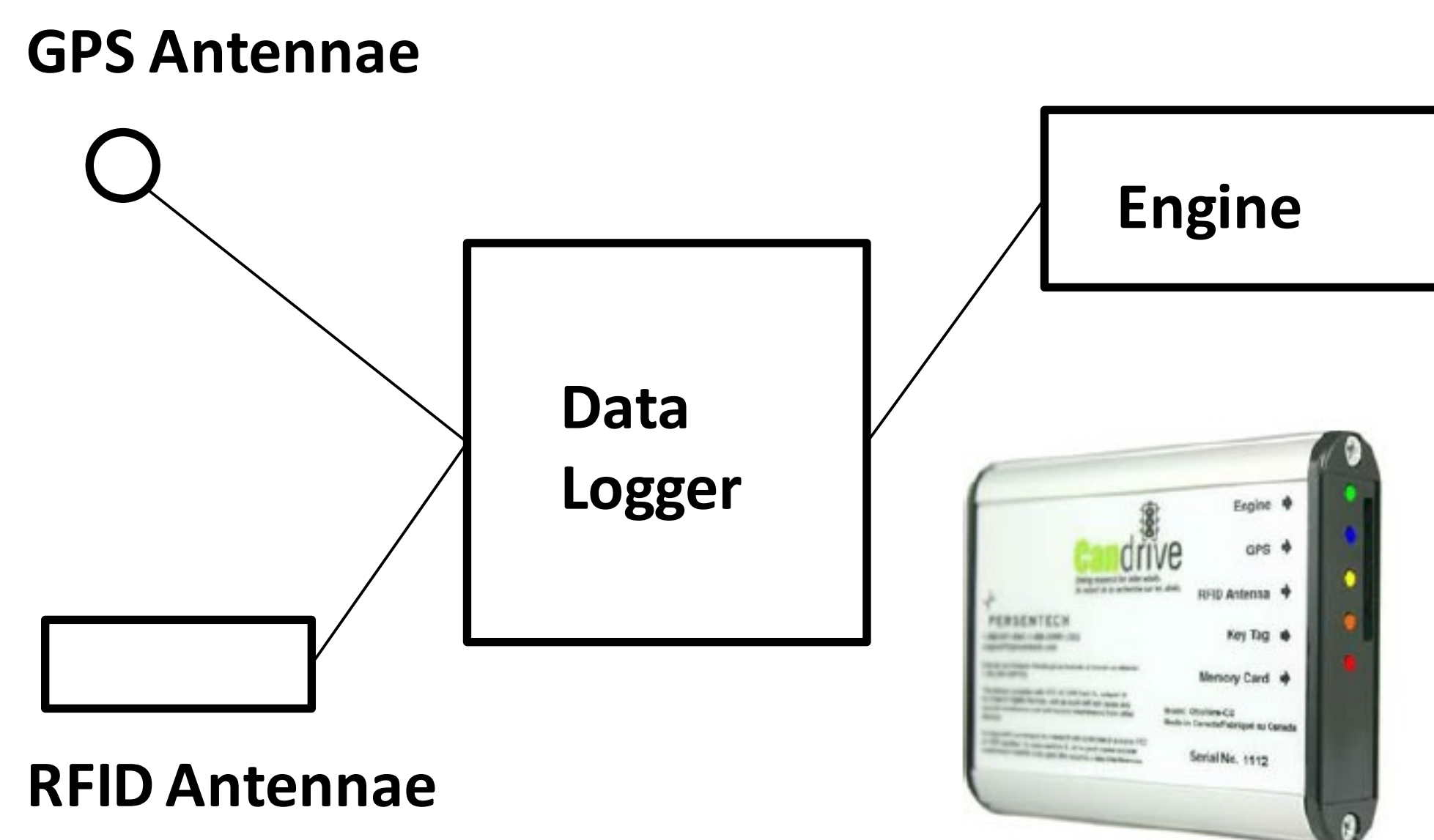
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## BACKGROUND

- 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

**GPS Antennae**

**Engine**

**Data Logger**

**RFID Antennae**

*Block diagram of the data collection architecture along with an image of the Persentech OttoView-CD data collection device.*
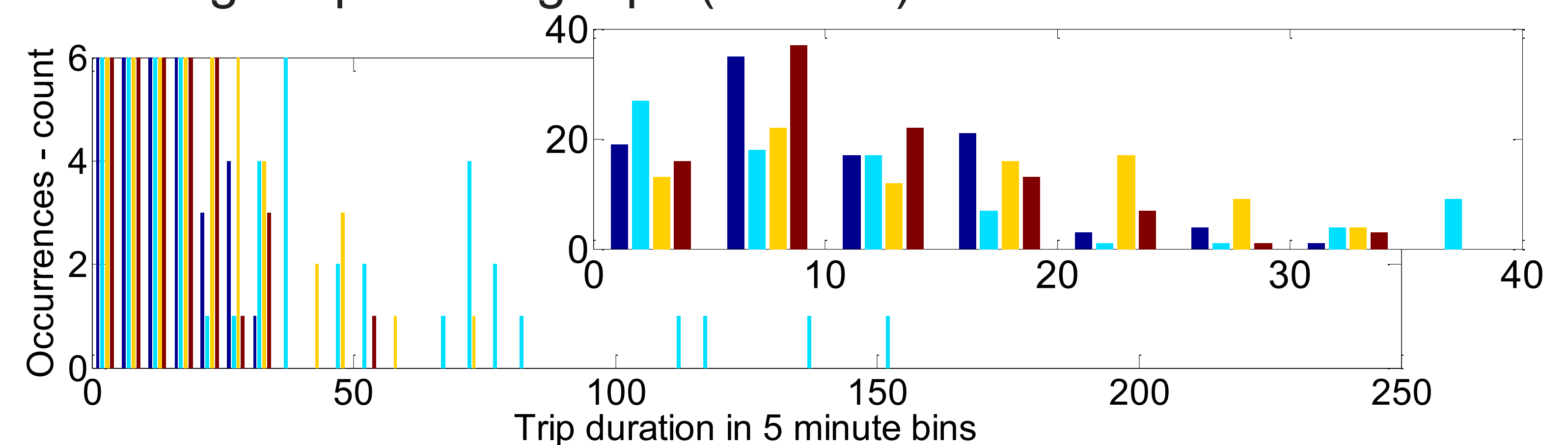
## RESULTS

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

| Road Type | Driver 1 | Driver 2 | Driver 3 | Driver 4 |
|-----------|----------|----------|----------|----------|
| city | 99.2 | 71.6 | 95.5 | 86.4 |
| highway | 0.8 | 28.4 | 4.5 | 13.6 |

*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).



*Histogram of trip durations for the 100 trips for each of the participants shown on two different scales. Driver 1 - dark blue, 2 - light blue, 3 - yellow, 4 - red.*

## 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)

## ACKNOWLEDGEMENTS

**Carleton UNIVERSITY**

**Candrive** *Driving research for older adults. Au volant de la recherche sur les aînés.*