COMMUTE WARRIOR ANDROID APPLICATION FOR ACTIVITY TRACKING

VETRI VENTHAN ELANGO
ALPER AKANSER
KOMAL PODDAR
YANZHI XU
RANDALL GUENSLER

GEORGIA INSTITUTE OF TECHNOLOGY

OVERVIEW

- **Introduction**

- **Background**

- **Commute Warrior Android App**

- **Deployment**

- **Future work**

INTRODUCTION

- **Travel survey data**
    - **Traditionally done using travel diaries**
    - **New technology has led to more GPS data**
- **Longitudinal GPS travel data have a wealth of information**
    - **GPS devices can provide accurate and detailed spatial and temporal data**
    - **High-resolution GPS data are useful in studying travel behavior, driver behavior, safety, emissions, etc.**

BACKGROUND

- **Multiple studies show significant under-reporting for travel diary trips**

- **Commute Atlanta study diary vs GPS comparison**
  - **29% of GPS vehicle trips were not reported in diaries**
  - **5.9 trips/day/household (reported) vs. 8.4 (GPS)**
  - **Under-reporting of VMT by 22%**
  - **Under-reporting is not random**
    - **Short distance/duration, end-of-day, differences across demographics, etc.**

TRAVEL DATA FROM GPS LOGGERS

- **GPS data collection that require participant interaction will likely yield under-reporting**

- **2013 study in UK and Australia with 19 participants, using GPS data loggers along with SenseCam (as ground truth) indicated that 21.5% of total trips were missed**

- **Passive travel data collection systems with minimal participant effort are needed**

SMARTPHONE TRAVEL DATA COLLECTION SYSTEMS

- **Nielsen 2013 data**
  - **64% of US cell phone users have a smartphone**
  - **80% of all new phone purchases are smartphones**
- **Smartphones have in-built GPS chipsets, processing power, and communications essential for data collections**
- **Smartphones are carried almost all the time**
- **Battery consumption is always a concern**

SMARTPHONE SYSTEM OBJECTIVES

- **Minimal user interaction**

- **Battery saving mode**

- **Ability to protect privacy**

- **Real-time, high-resolution data**

- **User-review of trips with functions that allow interactive capabilities to support submission of more detailed data**

COMMUTE WARRIOR ANDROID APPLICATION
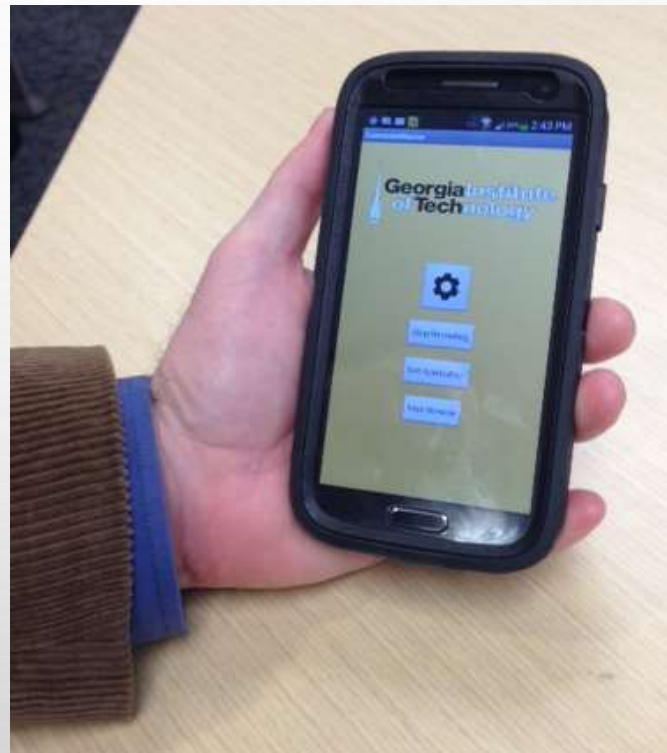
COMMUTE WARRIOR

- **Android App for personal cell phone tracking**

- **Monitors second-by-second phone location and speed**

- **Transmits real-time data to server via cellular**
    - **Settings for Wi-Fi only transmission if desired**

- **Integrates the functionality of previous vehicle monitoring systems, including travel diary reporting**

- **Runs in background with low battery power draw**

COMMUTE WARRIOR HOME SCREEN

- **App runs in background**

- **Always on**

- **Can stop recording at any time (via menu) for privacy**

- **Commute Warrior Widget**

  - **Shows status (running)**

  - **Shows data collection and transmission activity**
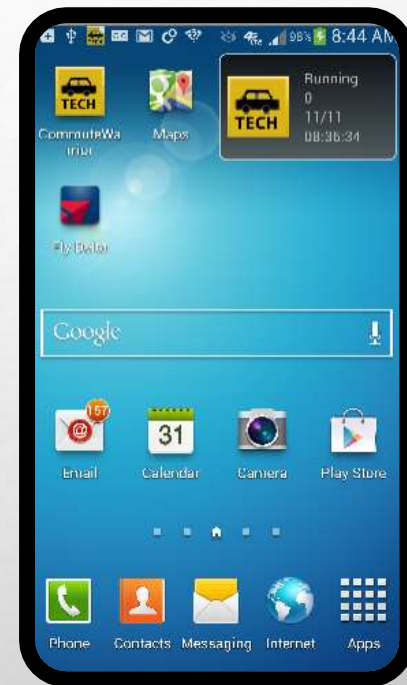
COMMUTE WARRIOR LOGIN SCREEN

- **Login required to record data, access data, view trips, and record travel diary data**

- **Account-Smartphone link**

COMMUTE WARRIOR
MAIN INTERFACE

- **Settings Menu (gear icon)**

- **Travel Journal**

- **Stop Recording**

- **Hide Window**

  - **Runs in background**

  - **Automatically restarts**
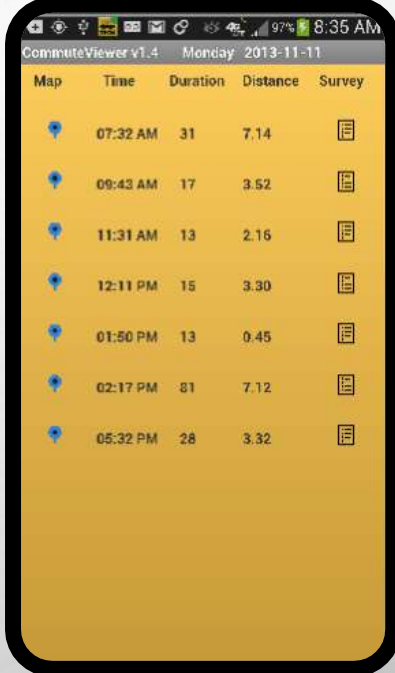
COMMUTE WARRIOR SETTINGS

- **Power options**
  - **Run only on A/C**
  - **Run on A/C or battery**

- **Set maximum battery drain**

- **Data via cellular, or Wi-Fi only**

- **Logout**

- **Stop recording and exit**

COMMUTE WARRIOR TRAVEL JOURNAL CALENDAR

- **All days for which trip data were recorded appear in green**

- **Back/forward by month**

- **Dates link to trip journal**
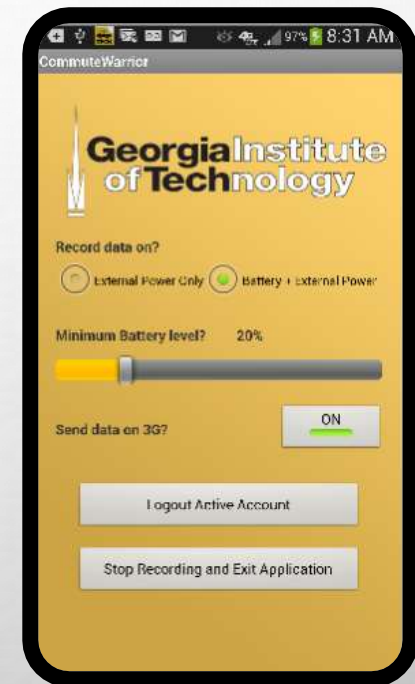
COMMUTE WARRIOR
TRIP VIEWER AND DIARY INTERFACE

- **Daily record of all trips**

- **Date/time, duration, distance**

- **Map icon for trip playback**

- **Survey icon for trip purpose**
    - **Purpose data via App**
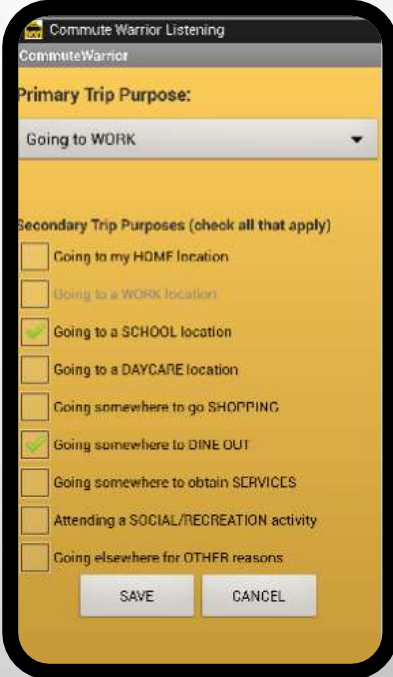
COMMUTE WARRIOR TRIP VIEWER

- **For trip purpose recall**

- **Pan/zoom, center/auto-center, slider bar**

- **Green (start), red (end)**

- **Trip playback animation**

  - **Visualize trip speed and delays**

COMMUTE WARRIOR TRAVEL DIARY CUSTOMIZABLE TRIP DATA ENTRY

- **Primary trip purpose and secondary activities**

- **Purpose-only for App entry**

- **Web interface supports long form diary with more complex nested options such as business types, route information, passengers, etc.**

COMMUTE WARRIOR WEB INTERFACE LONG FORM TRAVEL DIARY SURVEY

COMMUTE WARRIOR
TRAVEL DIARY SURVEY REQUESTS

- **Researchers can request that users complete travel diary entries for any desired dates**
  - **Special events**
  - **Interesting data event identified by analysts**
- **Server can be programmed to issue diary-day requests**
  - **Regular (e.g., Mondays)**
  - **Random (e.g., 7x/month)**

ONGOING DEPLOYMENT EFFORTS

- Beta Testing: School of Civil and Environmental Engineering, Georgia Institute of Technology; target 40 participants

- Initial Field Deployment: target 80 participants

- Deployment Partners
  - Georgia Regional Transportation Authority (GRTA)
    - Xpress bus rider newsletter
    - GRTA blog site
  - State Road and Tollway Authority (SRTA)

PARTICIPATION

- **Anyone can participate**

  - **http://transportation.ce.gatech.edu/commutewarrior**

- **Contact us:**

  - **commutewarrior@ce.gatech.edu**

SUMMARY

- App collects travel data with minimal interaction

- App has marginal impact on smartphone battery life

- App is efficient in collecting all modes of travel

- Since January 1, 2014
  - More than 4300 trips monitored
  - More than 10,000 miles monitored

- Commute Warrior Android App available
  - Beta testing system via Google Groups

FUTURE WORK

- **On Google Play Store in March 2014**

- **Deploy 200 units in Spring 2014**

  - **1000+ participants in Summer/Fall 2014**

  - **I-85 HOT lane commutershed**

- **Add travel mode to the App survey**

- **Add health measures functionality to the App**

- **iOS version of the app forthcoming in June 2014**

QUESTIONS?

CONTACTS

VETRI VENTHAN ELANGO
(VETRI@GATECH.EDU)

RANDALL GUENSLER
(RANDALL.GUENSLER@CE.GATECH.EDU)