

COMMUTE WARRIOR ANDROID APPLICATION FOR ACTIVITY TRACKING

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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**

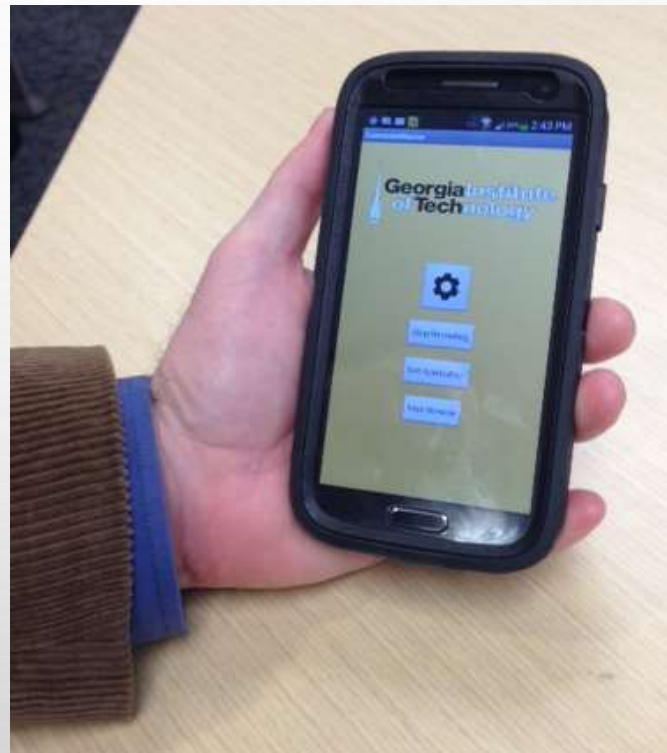
SMARTPHONE TRAVEL DATA COLLECTION SYSTEMS

- **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

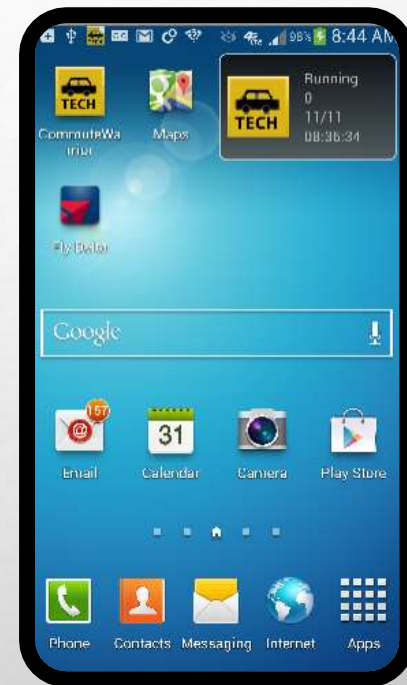


COMMUTE WARRIOR

- **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**



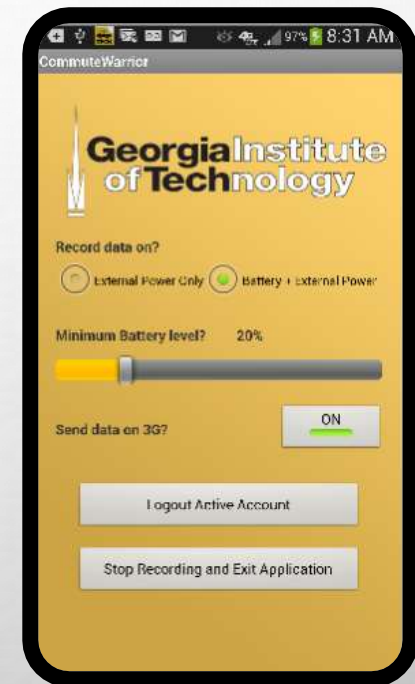
COMMUTE WARRIOR MAIN INTERFACE

- **Settings Menu (gear icon)**
- **Travel Journal**
- **Stop Recording**
- **Hide Window**
 - **Runs in background**
 - **Automatically restarts**



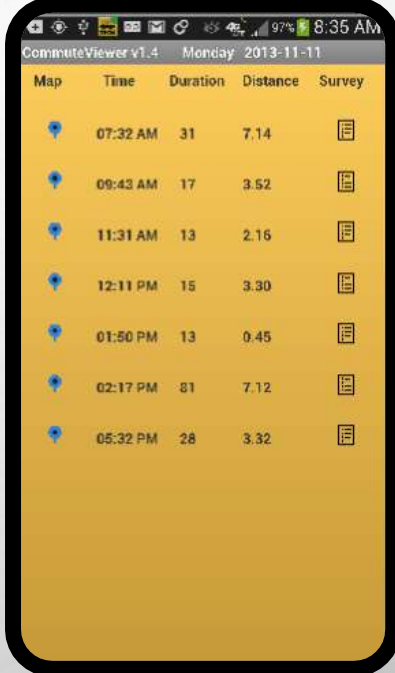
COMMUTE WARRIOR SETTINGS

- **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 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**



CommuteViewer v1.4 Monday 2013-11-11 97% 8:35 AM

Map	Time	Duration	Distance	Survey
	07:32 AM	31	7.14	
	09:43 AM	17	3.52	
	11:31 AM	13	2.16	
	12:11 PM	15	3.30	
	01:50 PM	13	0.45	
	02:17 PM	81	7.12	
	05:32 PM	28	3.32	

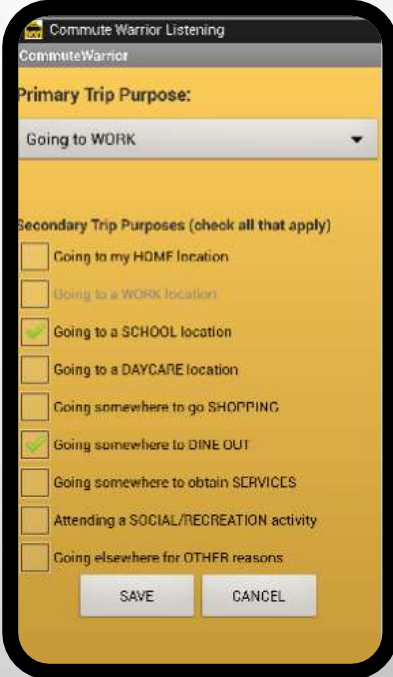
COMMUTE WARRIOR TRIP VIEWER

- **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.**



The screenshot shows the 'Commute Warrior Listening' app interface. The title bar reads 'CommuteWarrior'. Below the title bar, the text 'Primary Trip Purpose:' is displayed above a dropdown menu currently set to 'Going to WORK'. Underneath, the section 'Secondary Trip Purposes (check all that apply)' contains a list of options with checkboxes: 'Going to my HOME location', 'Going to a WORK location', 'Going to a SCHOOL location' (checked), 'Going to a DAYCARE location', 'Going somewhere to go SHOPPING', 'Going somewhere to DINE OUT' (checked), 'Going somewhere to obtain SERVICES', 'Attending a SOCIAL/RECREATION activity', and 'Going elsewhere for OTHER reasons'. At the bottom of the form are two buttons labeled 'SAVE' and 'CANCEL'.

COMMUTE WARRIOR WEB INTERFACE LONG FORM TRAVEL DIARY SURVEY

Georgia Tech College of Engineering Commuter Warrior

Record Trip Purpose 05/19/2014 - motorola XT1058

Start Time: 11:40:00
 Duration: 20 m, 37 s
 Miles: 3.00

Primary Trip Purpose

- Going to my HOME location
- Going to a WORK station
- Going to a SCHOOL location
- Going to a CAR CARE location
- Going somewhere to go SHOPPING
- Going somewhere to GO OUT
- Going somewhere to catch RIDE/BIKES
- Performing a SPECIAL/REGULAR activity
- Going elsewhere for OTHER reasons

This is not a real trip (necessary and only)
 This is a quality item of the trip that appears in my trip log
 There is a 47-hour problem with my data for this trip
 Just missing amount



Secondary Trip Purpose (check all that apply)

- Going to my HOME location
- Going to a WORK location
- Going to a SCHOOL location
- Going to a CAR CARE location
- Going somewhere to go SHOPPING
- Going somewhere to GO OUT
- Going somewhere to catch RIDE/BIKES
- Performing a SPECIAL/REGULAR activity
- Going elsewhere for OTHER reasons
- Just missing amount

Commute Warrior
 Georgia Tech - All Rights Reserved
 User Version 05/21/2014
[Download the Commute Warrior Software](#)
 Version 1.0.1

Georgia Tech College of Engineering Commuter Warrior

Record Activities for Trip Purposes - 05/09/2014 - motorola XT1058

Check all that apply for each Trip Purpose

Primary Purpose **Going somewhere to go SHOPPING**

<input type="checkbox"/> Auto Supply Store	<input type="checkbox"/> Furniture Store	<input type="checkbox"/> Office Supply Store
<input type="checkbox"/> Bookstore	<input type="checkbox"/> Design Store	<input type="checkbox"/> Pet Supply Store
<input type="checkbox"/> Book Store	<input type="checkbox"/> Bookery/Printer	<input type="checkbox"/> Pharmacy
<input type="checkbox"/> Bookery/Supply	<input type="checkbox"/> Gift Shop	<input type="checkbox"/> Sporting Goods
<input type="checkbox"/> Clothing Store	<input type="checkbox"/> Grocery Store	<input type="checkbox"/> Toy Store
<input type="checkbox"/> Computer Store	<input type="checkbox"/> Hardware Store	<input type="checkbox"/> Shoes/Shopping
<input type="checkbox"/> Craft Supply Store	<input type="checkbox"/> Hardware/Toolbox	<input type="checkbox"/> Game Shopping
<input type="checkbox"/> Electronic Store	<input type="checkbox"/> Music CD Store	

Secondary Purpose **Going somewhere to GO OUT**

- Coffee Shop
- Food/Drink
- Pub
- Restaurant
- Wine/Drinking

Please provide any additional comments or notes

How busy are you about the location and contents of the map?

- Absolutely none
- More than 95% busy
- More than 75% busy
- About 50% busy
- Less than 25% busy
- Less than 10% busy
- Not busy at all

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?

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