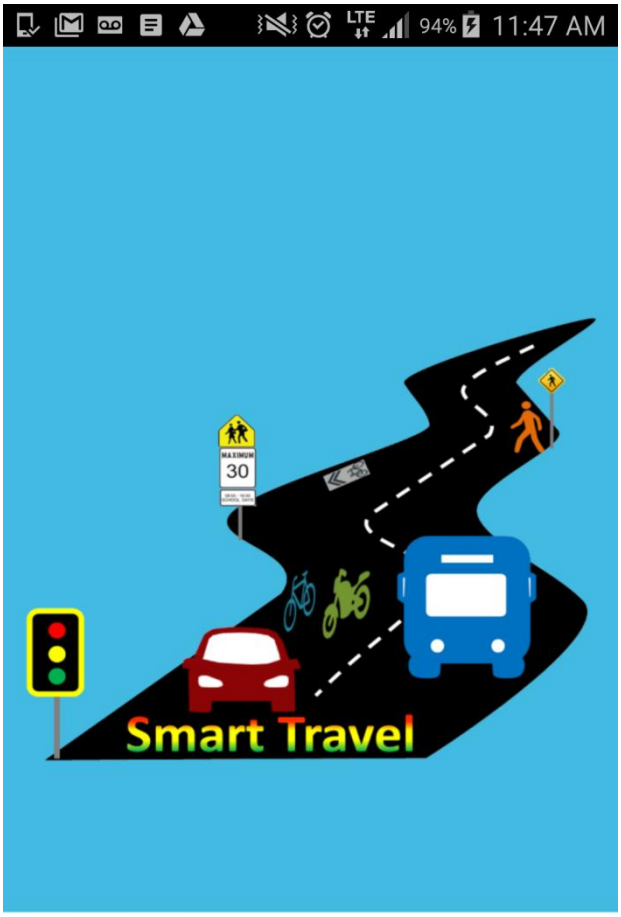
Edmonton SmartTravel
User Manual for Android Phone



Edmonton

OFFICE of TRAFFIC SAFETY

Centre for Smart Transportation

Contents

About SmartTravel

On September 22, 2015, Edmonton City Council approved the 2016-2020 Road Safety Strategy that adopts Vision Zero, the long-term goal of zero fatalities and serious injuries resulting from motor vehicle collisions. Considering that human error accounts for over 90% of roadway collisions, to reach Vision Zero the City of Edmonton requires a systemic and innovative approach to improve road user attitudes/behaviours.

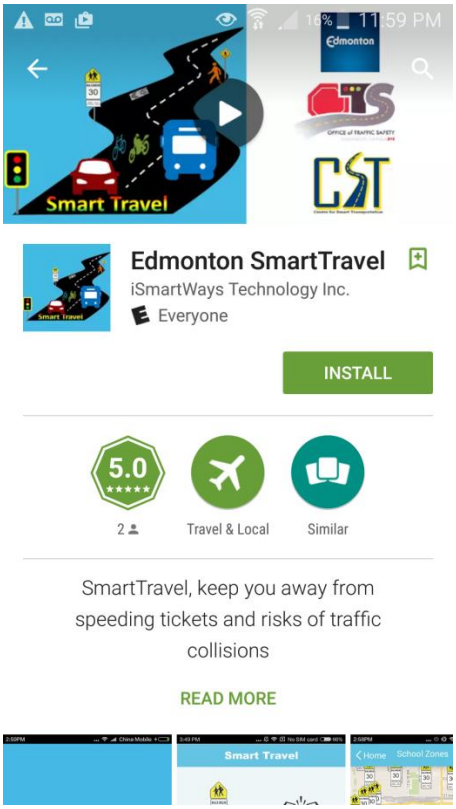
Recognizing that most drivers now carry a smartphone, the City of Edmonton Office of Traffic Safety (OTS) and University of Alberta Centre for Smart Transportation (CST) are working together on a technology-based research & development project to create SmartTravel, a traffic safety smartphone application (app). This app will be used as a personal tool to increase drivers' awareness of potential collisions and influence their attitudes/behaviours to reduce collisions and speeding. Different voices, including a child's voice, are used to engage the user's attention. For example, when users enter a school zone, they will hear an alert spoken by a little girl: "School zone ahead, please slow down." At a new speed limit zone, an adult male voice will alert users, saying "Caution! Change in speed limit." An adult female voice reminds users to be cautious of pedestrians, saying "Watch out for pedestrians. High-risk pedestrian collision location."

The SmartTravel app is designed to run in the background and complies 100% with distracted driving legislation. When not driving, users can review maps of high-collision locations, school zones and speed limits, as well as traffic safety information sent through SmartTravel's push notification system. Push information includes real-time traffic disruptions, reminders of seasonal events (back to school, adverse weather, etc.), enforcement, and education campaigns.

Installation Manual

This installation manual is created based on the installation process for a Samsung S5 phone. The process could be different for other Android-based phones. To make the app run properly, your phone is required to have Android version 4.4.2 or above. Below are the steps to install the app:

1. Search for Edmonton SmartTravel in the Google Play Store

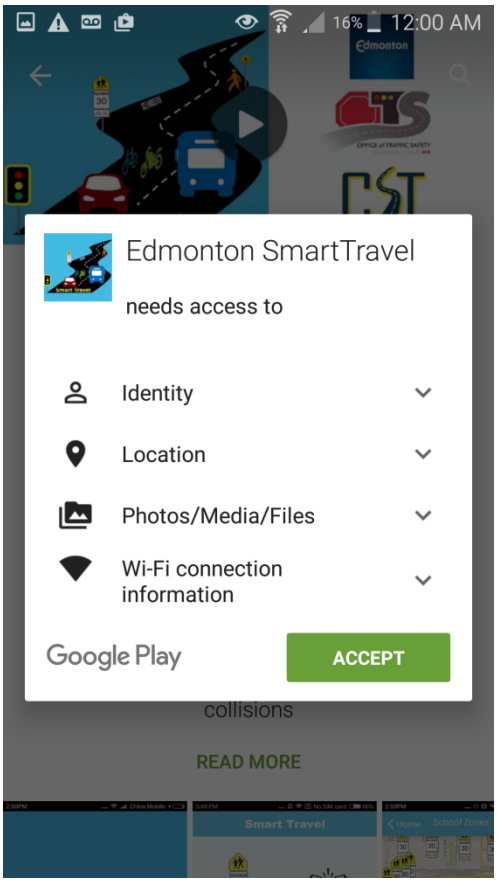


2. Install the app. To function properly, SmartTravel needs access to your phone's:
    - **Identity:** This identity is about your device identity (also called device token), which is not your phone number; it is a 64 hexadecimal characters, such as *b968fec9ffd5eceb917990fa53fe51626cae2663c0930607d88e4c0516d26fca*.

This access allows SmartTravel to send push notification traffic safety related messages to you (see next section to learn more about push notification messages).

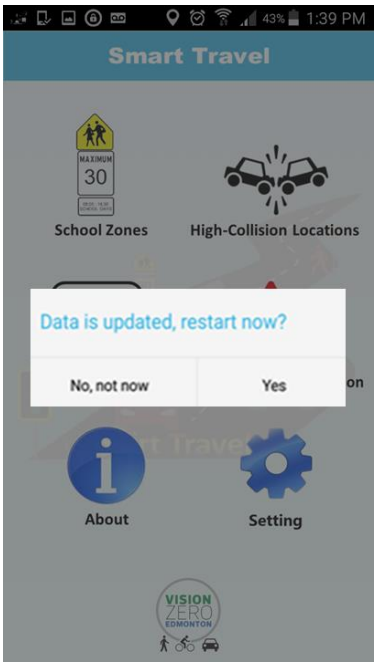
- **Location:** your location will be compared to the the app's data and if they match, the relevant verbal alert will be activated.
- **Photos/Media/Files:** this access allows SmartTravel to store and update the data of school zones, speed limits and high-collision locations, which are required to provide verbal alerts.
- **Wi-Fi connection information:** this access allows SmartTravel to know the device's Wi-Fi connection information including whether Wi-Fi is turned off as well as connected Wi-Fi devices. This information is important for driving data collection (see Section "Collection of Driving Data" for further detail).

Click ACCEPT if you agree.



4. After finishing the installation, click OPEN.

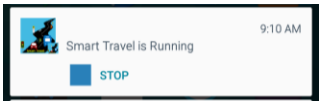
5. When you click Open, the app will run and you will see the image below. After a few seconds a question window to update the app will pop up. Click the Yes button. **Congratulations! The SmartTravel app is now ready to use.**



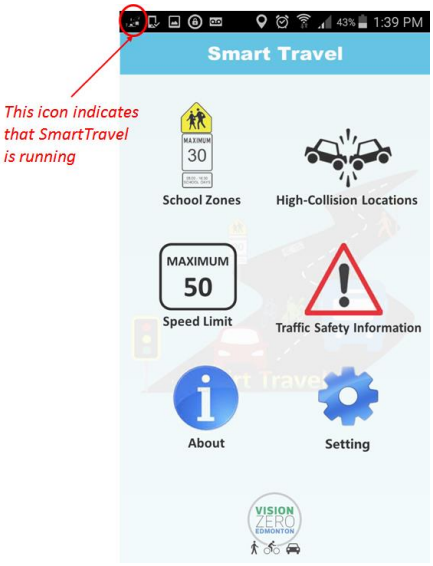
Since the data required for alerts is stored in your phone, if you can download and install the app in a Wi-Fi environment you will not need a data plan for the app to provide these alerts while you are driving. However, a data plan is required to enable you to receive push notification messages without Wi-Fi connection.

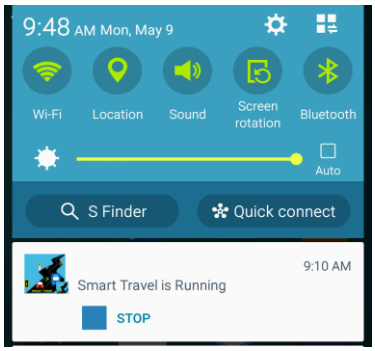
Click the Edmonton Vision Zero logo and the app will bring you to the City of Edmonton Traffic Safety Vision Zero website
http://www.edmonton.ca/transportation/traffic-safety.aspx

6. When the app has been installed, you will see the SmartTravel icon  appears at the top left of your phone screen (see the icon circled in red in the figure below, left). When you scroll down the screen, you will see



as shown in the figure below (right).

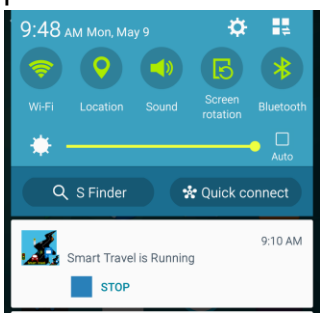




When the user is not driving at a speed of at least 20 km/h within 30 minutes, the app will stay quietly in the background, and the GPS location and speed will be checked every 5 minutes to save the battery power. The 30 minutes is meant to account for slow traffic and/or temporary stops. When the app detects a speed of 20 km/h or higher, the alert system will be activated to give alerts when users are approaching school zones, speed-limit changes, or high-collision locations (the GPS location and speed will be checked every second). With its capability to work in the background and automatically activate when the user starts driving, SmartTravel will not require you to take the effort to start this app each time you get into your car.

The app is still able to give verbal alerts even when users are using other apps at the same time, such as Google Maps that provides verbal travel directions.

To stop the app you can click the stop button, as shown below. After stopping, the app will stop detecting your location and will not provide alerts. However, you will still be able to receive push notification messages.



About Page

To learn more about SmartTravel app, you can click the About icon 

to go to the About page.

This page has three information icons:

-  Click this button and the app will take you to the City of Edmonton SmartTravel website http://www.edmonton.ca/programs_services/apps_mobile/smart-travel-app.aspx
- 

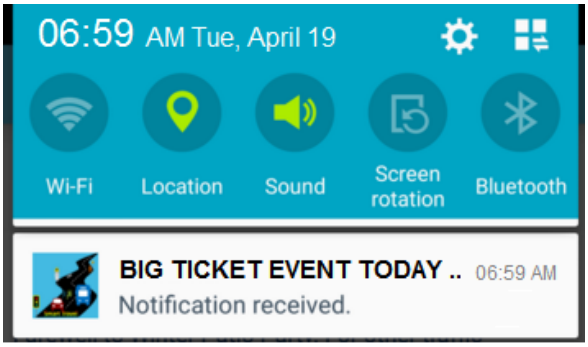
Click this button and the app will take you to the pdf of this manual http://www.edmonton.ca/programs_services/documents/Edmonton_SmartTravelApp_UserManual_Android.pdf

- Click this button and the app will take you to the SmartTravel Terms of Service http://www.edmonton.ca/programs_services/apps_mobile/smart-travel-terms-of-use.aspx
- SmartTravel has won the 2016 Intelligent Transportation System (ITS) Canada 'Best New Canadian Commercial/Industry/Academic Technology Innovation/R&D Award' https://www.itscanada.ca/news/index.html?id=76

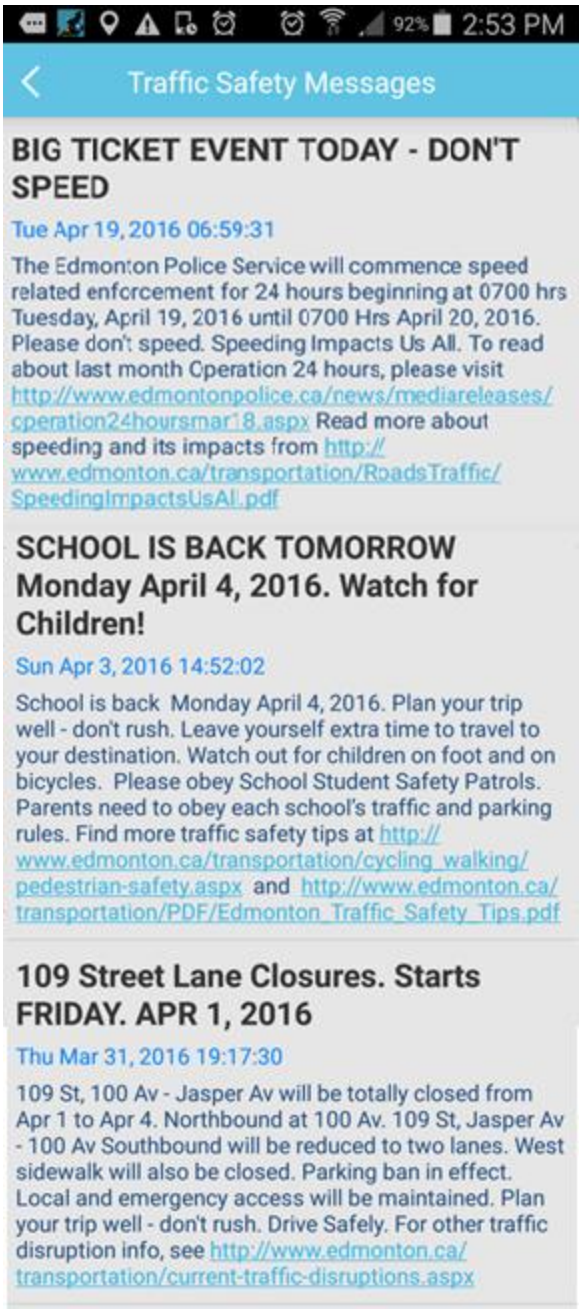
Push Notification

The SmartTravel app sends important traffic safety related information to the users through its push notification system. Push information includes, but is not limited to, real-time traffic disruptions, reminders of seasonal events (back to school, adverse weather, etc.), enforcement, and education campaigns. Push messages may contain a link to a specific website that will allow the user to dig further into the information; for example: a link to the City of Edmonton traffic disruption map or City of Edmonton website.

When the app manager (OTS) sends a traffic safety related push notification, SmartTravel's icon and a message will appear in the status bar. The short message will appear in your phone as shown in the screenshot below.

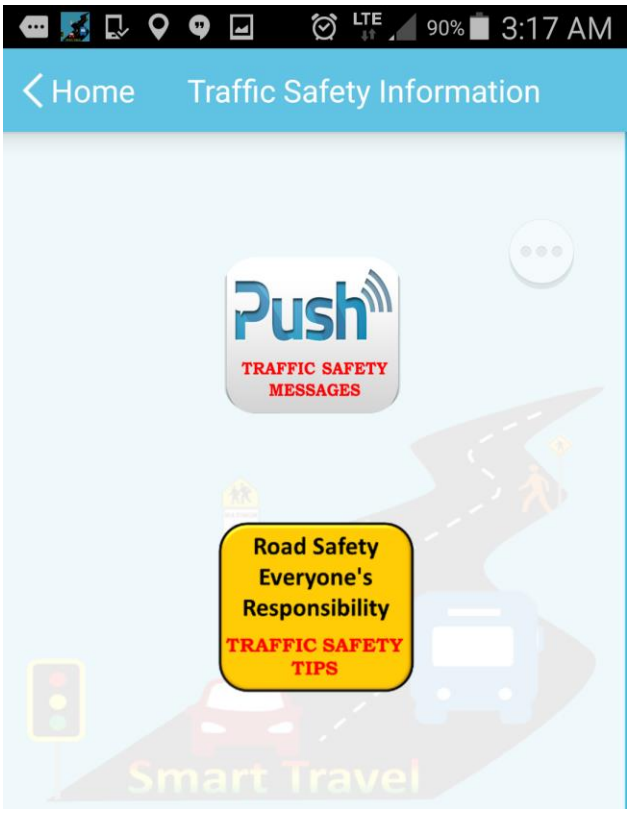


You can click this message and it will bring you to the traffic safety message page of SmartTravel, as shown below. This page will show all messages that were sent in the last 7 days with a limit of 20 messages (i.e., if there were more than 20 messages sent in the last 7 days, only the latest 20 messages will be displayed).



You can also click the Traffic Safety Information icon on the app homepage 

to see either the push messages or traffic safety tips.

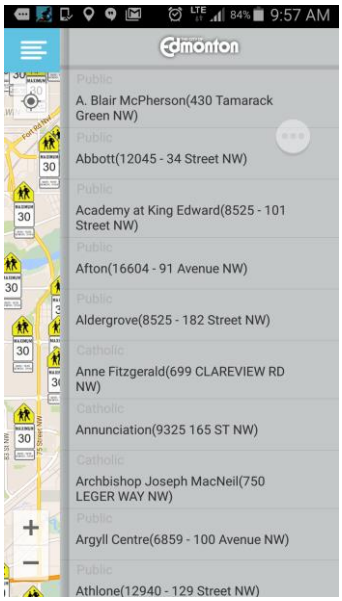


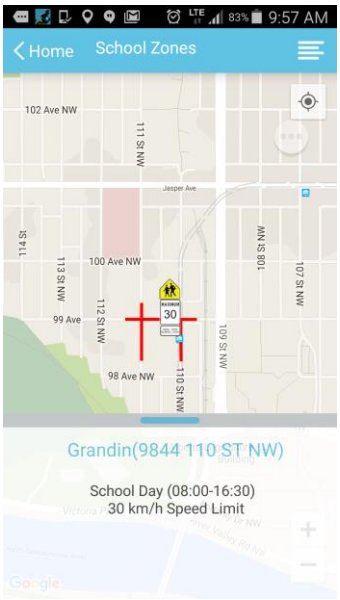
Maps

When you are not driving, you can browse the app to see maps of school zones, speed limits, and high-collision locations in the City of Edmonton.

School Zones

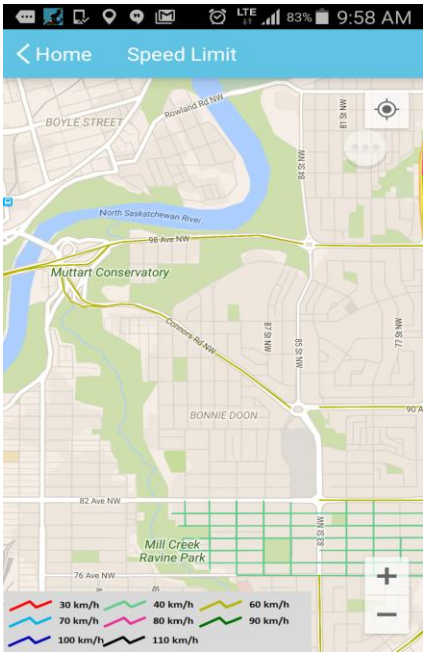
When you click the School Zones icon, the app will show you a map of school zones in the City of Edmonton. To see which road segments are part of a school zone, you can either click the school zone icon in the map or click the list button (at the top right of the app window) and select the school you are interested in. This school zone map is created based on the City of Edmonton Speed Zone Bylaw (Bylaw 6894).





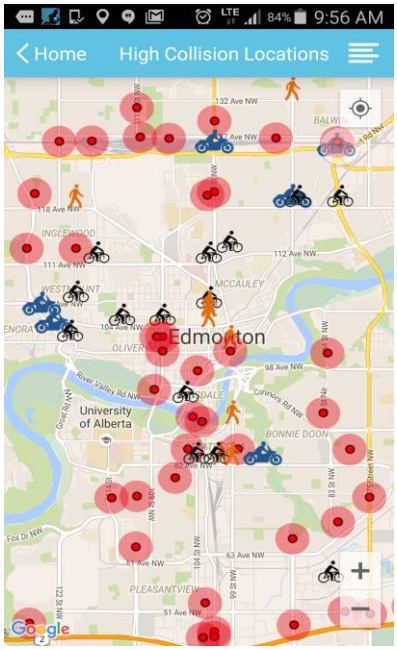
Speed Limit

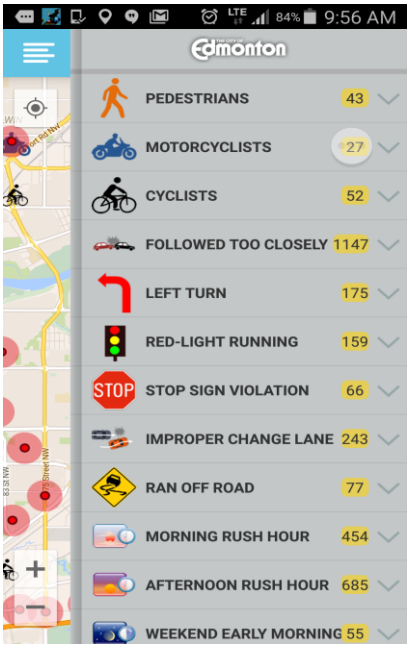
When you click the Speed Limit icon, the app will show you a map of Edmonton's roadways with different colours representing different speed limits. The default colour from Google Maps is used for a speed limit of 50 km/h (this speed limit is not listed in the legend). This speed limit map is created based on the City of Edmonton Speed Zone Bylaw (Bylaw 6894). Verbal alerts about speed limit changes are created based on this data. Temporary speed limits, for example due to special events or construction, will be neither shown in this map nor identified in verbal alerts.



High-Collision Locations

When you click the High-Collision Locations icon, the app will show you locations on Edmonton's public roadways with high-collisions caused by a variety of reasons and involving various road users, such as: followed too closely, red-light running, stop sign violations, pedestrians, cyclists, and motorcyclists.





The current collision data used in this app is based on aggregated 2013-2014 collision data extracted from the Motor Vehicle Collision Information System (MVCIS), a database of motor vehicle collisions that occur on public roads in the City of Edmonton, maintained by OTS. The information in the database is collected from the provincial Collision Report Form, which is completed by members of the Edmonton Police Service either on paper at the scene of the collision or electronically at the front counter of a divisional or community police station. The database reflects all reported collisions on public roadways that result in property damage of $2,000 or greater, as well as any collision that results in a minor or major/serious injury or fatality.

The collision data used in this app will be updated annually to reflect the last two years of data.

Collection of Driving Data

The SmartTravel app has a feature to collect and store speed, acceleration (collected by the accelerometer sensor), angular velocity, and orientation (collected by the gyroscope sensor) of your smartphone. The collected data will be used for statistical analysis to identify if the SmartTravel app has a significant impact in changing driving behaviours. The analysis will be done based on the aggregated data of all users and not per-individual basis. Users will have the option to choose not to participate in this analysis by turning this feature off, and in that case the above data will not be collected.

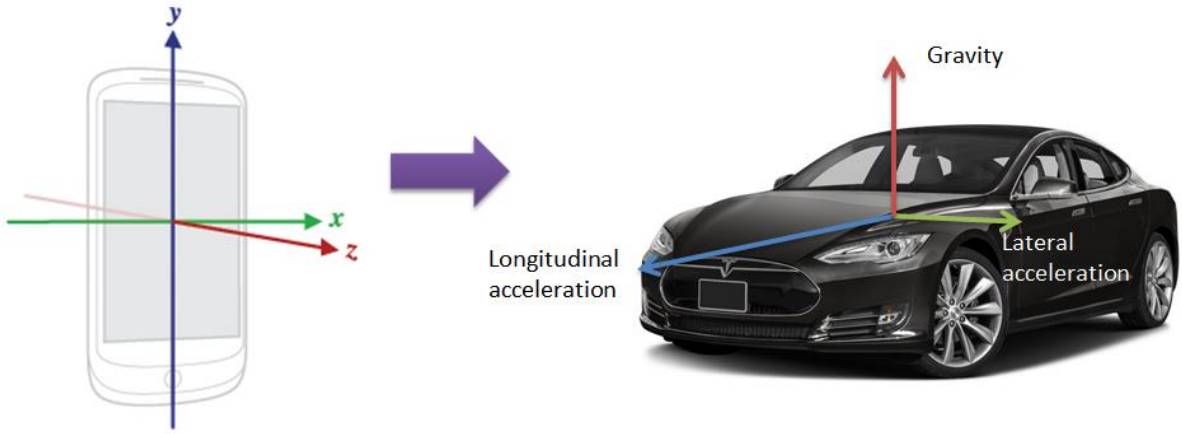
Sample of GPS sensor data with speed information is shown below. GPS data will be collected once per second.

A	B	C	D	E	F	G	H	I
DEVICEID (This device does not correspond to any personal info, including phone number)	**OSVERSION (Operating System Version for either Android or iOS)**	**APPVERSION (SmartTravel app version)**	**DATE_COLLECTION (The date & time stamp when driving data was collected)**	**LONGITUDE**	**LATITUDE**	**SPEED (m/s)**	**DIRECTION**	**DATE_POST (The date & time stamp when driving data was downloaded from the phone and uploaded into server at the University of Alberta; the data is downlaoded and uploaded only when wifi connection is available)**
2BDFD193-18A5-45CB-BDDC-293BE09A8A1E	5.1.1	1.0.14	20160709 16:33:12	-113.4998742	53.48030009	18.91	109.0999985	20160709 18:24:36
2BDFD193-18A5-45CB-BDDC-293BE09A8A1E	5.1.1	1.0.14	20160709 16:33:13	-113.4995989	53.48025146	18.28	109.9000015	20160709 18:24:36
2BDFD193-18A5-45CB-BDDC-293BE09A8A1E	5.1.1	1.0.14	20160709 16:33:14	-113.4993417	53.48017957	18.14	113.1999969	20160709 18:24:36
2BDFD193-18A5-45CB-BDDC-293BE09A8A1E	5.1.1	1.0.14	20160709 16:33:15	-113.4991242	53.48010654	18.31	114.8000031	20160709 18:24:36
2BDFD193-18A5-45CB-BDDC-293BE09A8A1E	5.1.1	1.0.14	20160709 16:33:16	-113.4988799	53.48003139	18.12	115.0999985	20160709 18:24:36
2BDFD193-18A5-45CB-BDDC-293BE09A8A1E	5.1.1	1.0.14	20160709 16:33:17	-113.498649	53.47996488	17.7	114.4000015	20160709 18:24:36

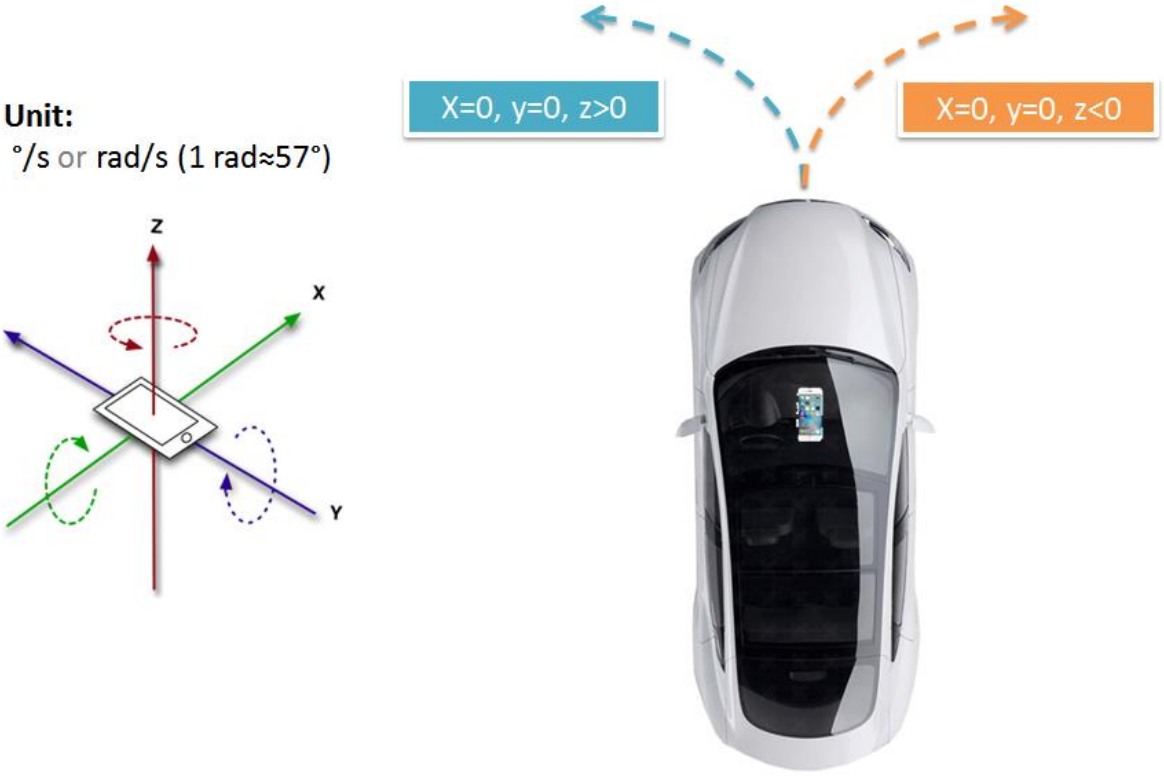
Sample of accelerometer and gyroscope data are given below. Sensor data will be collected 10 times per second.

A	B	C	D	E	F	G	H	I	J	K	L	M	N
DEVICEID (This device does not correspond to any personal info, including phone number)	OSVERSION (Operating System Version for either Android or iOS)	APPVERSION (SmartTravel app version)	DATE_COLLECTION (The date & time stamp when driving data was collected)	ACC_X (Accelerometer data for x-axis)	ACC_Y (Accelerometer data for y-axis)	ACC_Z (Accelerometer data for z-axis)	GYR_X (Gyroscope data for x-axis)	GYR_Y (Gyroscope data for y-axis)	GYR_Z (Gyroscope data for z-axis)	DATE_POST (The date & time stamp when driving data was downloaded from the phone and uploaded into server at the University of Alberta; the data is downlaoded and uploaded only when wifi connection is available)	ACC_X_L (Accelerometer data on x-axis after removing the gravity)	ACC_Y_L (Accelerometer data on y-axis after removing the gravity)	ACC_Z_L (Accelerometer data on z-axis after removing the gravity)
D299FDD8-F65D-495B-AD6F-B54407DF2E83	9.1	1.2.0	07-JUL-16 07.12.26.088000 PM	-0.373367	-0.249756	-0.883591	0.008284	0.004263	0.017216	07-JUL-16 07.24.29.000000 PM	0.059546	-0.007791	-0.010662
D299FDD8-F65D-495B-AD6F-B54407DF2E83	9.1	1.2.0	07-JUL-16 07.12.26.178000 PM	-0.382965	-0.251572	-0.879913	0.000915	-0.004239	0.013912	07-JUL-16 07.24.29.000000 PM	0.023848	-0.005885	-0.001521
D299FDD8-F65D-495B-AD6F-B54407DF2E83	9.1	1.2.0	07-JUL-16 07.12.26.269000 PM	-0.416443	-0.247894	-0.873856	-0.011902	-0.002219	0.017074	07-JUL-16 07.24.29.000000 PM	0.001878	-0.001289	-0.00327
D299FDD8-F65D-495B-AD6F-B54407DF2E83	9.1	1.2.0	07-JUL-16 07.12.26.362000 PM	-0.418884	-0.250427	-0.892456	0.001016	-0.018059	0.007355	07-JUL-16 07.24.29.000000 PM	-0.00415	-0.006534	-0.015808
D299FDD8-F65D-495B-AD6F-B54407DF2E83	9.1	1.2.0	07-JUL-16 07.12.26.452000 PM	-0.42337	-0.246689	-0.852661	0.016913	-0.011496	0.012671	07-JUL-16 07.24.29.000000 PM	-0.005292	-0.00293	0.022434
D299FDD8-F65D-495B-AD6F-B54407DF2E83	9.1	1.2.0	07-JUL-16 07.12.26.546000 PM	-0.422836	-0.248795	-0.866043	-0.011042	0.024388	0.008661	07-JUL-16 07.24.29.000000 PM	-0.005707	-0.003347	0.009033
D299FDD8-F65D-495B-AD6F-B54407DF2E83	9.1	1.2.0	07-JUL-16 07.12.26.640000 PM	-0.420761	-0.237183	-0.881714	-0.004604	0.008527	0.023397	07-JUL-16 07.24.29.000000 PM	-0.004352	0.003124	-0.001133
D299FDD8-F65D-495B-AD6F-B54407DF2E83	9.1	1.2.0	07-JUL-16 07.12.26.732000 PM	-0.449615	-0.227829	-0.862366	-0.01503	-0.022502	0.00282	07-JUL-16 07.24.29.000000 PM	-0.022108	0.007838	0.003449
D299FDD8-F65D-495B-AD6F-B54407DF2E83	9.1	1.2.0	07-JUL-16 07.12.26.822000 PM	-0.452744	-0.230331	-0.862701	0.012537	-0.004164	-0.005584	07-JUL-16 07.24.29.000000 PM	-0.025776	0.010388	0.013683
D299FDD8-F65D-495B-AD6F-B54407DF2E83	9.1	1.2.0	07-JUL-16 07.12.26.921000 PM	-0.470718	-0.232986	-0.86264	0.009328	-0.008474	-0.00573	07-JUL-16 07.24.29.000000 PM	-0.022497	0.004248	0.00925

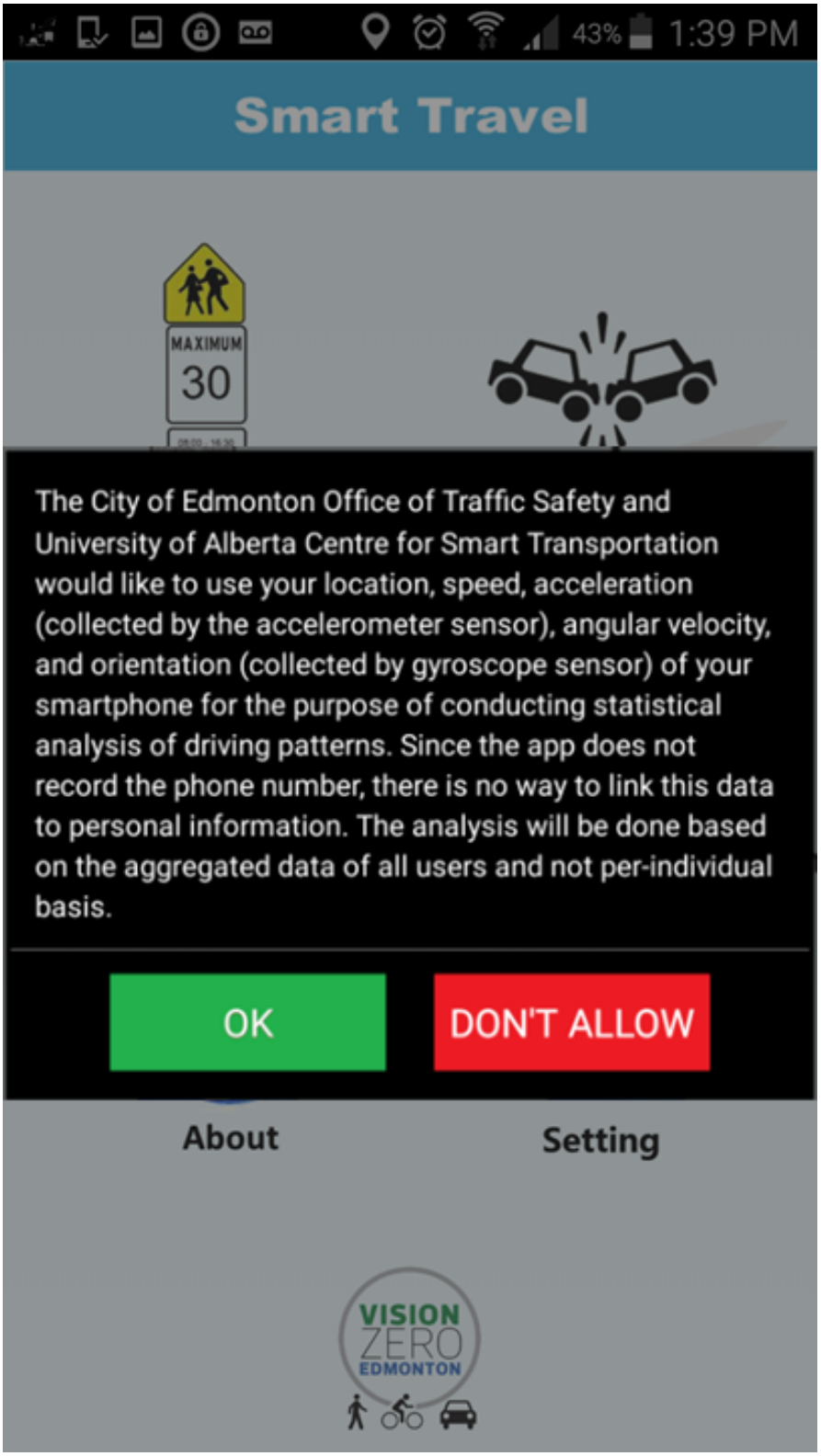
The x, y and z-axis coordinates of acceleration sensor are shown below.



The x, y and z-axis coordinates of gyroscope sensor are shown below.



When a user first opens the app, a dialogue box, as shown in the figure below, will pop up to give you the option to either consent to disclosing driving data collection for the purpose of statistical analysis or disallow it.



You can change your consent at any time by going into Setting and turn the data collection option on or off, as shown in the two figures below.

When you are not driving with a speed of at least 20 km/h for 30 minutes, the driving data will not be collected. The 30 minutes is meant to account for slow traffic and temporary stops.

Collected data will be temporarily stored in the smartphone's local disk. Local copies will be removed after the data are uploaded to the server. The data are uploaded into server only under Wi-Fi environment to avoid using your mobile phone data. Therefore, when you first installed SmartTravel, it asked you to give access to "Wi-Fi Connection information". This access enables SmartTravel to identify whether your location has Wi-Fi connection. The maximum data that will be stored in the local disk are 50 MB. When data size reaches the threshold, the earliest stored data will be replaced with the new data.

Uninstall SmartTravel

In case you want to uninstall SmartTravel, press the "SmartTravel" icon for a while and drag it to "uninstall" appeared in the top or uninstall it through cell phone's setting menu.