

Lab 4 Submission

CLONS5 (SEP2)

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Functional Requirements

1. The System should display information about car parks and ERP gantries around the user's current position
 - 1.1. User must be able to share their geographic location with the system using the following methods:
 - 1.1.1. Manually marking their position by clicking on a map
 - 1.1.2. Share their location continuously, automatically providing updates as the User moves around
 - 1.2. The System must display information about car parks in a 5km radius around the user
 - 1.2.1. The system must display the number of available lots in base 10
 - 1.3. The System must display information of all the ERP gantries
 - 1.3.1. The system must display operating hours in 12 hour format
 - 1.3.2. The system must display fees payable in Singapore Dollars (SGD)
 - 1.4. The data displayed in points 1.2 and 1.3 should not require user interaction to get updated information, but update automatically as the User moves
2. The System must display live images of traffic conditions of expressways, Woodland and Tuas checkpoints.
 - 2.1 Users must be able to access live images of Woodlands

checkpoint traffic conditions.

2.2 Users must be able to access live images of Tuas checkpoint traffic conditions.

2.3 Users must be able to access live images of expressways.

3. The System must alert users of road incidents

3.1. The System must highlight road incidents on the map

3.2. User must be able to clearly distinguish road incidents on the map

3.3. When a new incident is reported, the system must alert the user by:

3.3.1. Playing an audible notification

3.3.2. Display information about the incident in a popup

Non-Functional Requirements

Reliability	In case data sources are unavailable, old data will be returned.
Performance	<ol style="list-style-type: none">1. Prevent excessive load on external APIs2. The user must be able to load the System fully within 15 seconds.3. The system must display updated information within 10 minutes of publication.
Accessibility	The System must be accessible on both desktop and mobile devices.
Privacy	The system should not store User locations.

Data Dictionary

<u>Term</u>	<u>Description</u>	<u>Entity Class</u> (Refer to Lab 2 documentation)
<i>User Location</i>	Current geographical position of the user relative to the map. May change dynamically as the user moves around.	-
<i>Car park</i>	A designated location for drivers to park their vehicles. Payment for parking of the vehicles depends on how long the vehicle is parked for.	Carpark
<i>Expressway</i>	A major stretch of road in which there are no traffic lights and more lanes than usual. The speed limits on expressways are also higher than on regular roads.	-
<i>ERP Gantries</i>	Short for Electronic Road Pricing. ERP gantries are overhead gates on expressways under which vehicles pass through. Upon passing through the ERP gantry, credit is deducted from the vehicle's Cash Card.	ERPGantry
<i>Rates</i>	Used for ERP gantries, rates define the amount of money or credit the user needs to pay in order to use the car park or pass through the ERP gantry. Rates for car parks are listed for use per hour, and rates for ERP gantries are rated for each time the vehicle passes under it.	-

<i>Traffic Condition</i>	Current state of the roads in Singapore. Examples of changes to traffic conditions include road accidents, traffic congestion, breakdowns, and road closures.	-
<i>Road incident</i>	An event that may cause congestion on the roads for a period of time. Includes accidents, breakdowns, or unscheduled road works.	TrafficAlert
<i>Images of Traffic conditions</i>	A photo that displays the condition of the road. It shows the user whether the road is congested or clear. It may also display accidents or vehicle breakdowns on the road.	TrafficImage
<i>Woodlands and Tuas Checkpoints</i>	Immigration checkpoints in Singapore with immigration officers that control the flow of vehicles travelling into Singapore or vehicles travelling out of Singapore. They are major areas for drivers who are looking to travel out of Singapore.	-
<i>LTA DataMall</i>	Platform operated by the Land Transport Authority where data is published.	-
<i>Data.gov.sg</i>	Platform operated by GovTech where data is published.	-

Use Case Description

Use Case ID:	CLONS5-UC1		
Use Case Name:	Car Parks Information		
Created By:	Joel	Last Updated By:	Joel
Date Created:	31/8/2020	Date Last Updated:	04/11/2020

Actor:	User, LTA DataMall, Data.gov.sg
Description:	The System will allow users to view the number of available parking lots available on the map.
Preconditions:	<ul style="list-style-type: none"> - Data is available from LTA DataMall and Data.gov.sg - User has an internet connection
Postconditions:	Car parks information are marked on the User's map
Priority:	High
Frequency of Use:	High

Flow of Events:	<ol style="list-style-type: none"> 1. The System request permission for user location to access current location 2. If the user has grant this permission, System will access to User's current location 3. The System loads the latest information from LTA DataMall and Data.gov.sg 4. The System filters the information for car parks in a 5km radius around the User's location 5. System displays available parking lots on a map.
Alternative Flows:	<p>AF-S2 - User did not grant permission</p> <ol style="list-style-type: none"> 1. The system runs Step 3 2. The system runs Step 5 to display all the available parking lots on the map.
Exceptions:	Nil
Includes:	Nil
Special Requirements:	Nil
Assumptions:	Nil
Notes and Issues:	Nil

Use Case ID:	CLONS5-UC2		
Use Case Name:	ERP Gantries Information		
Created By:	Justin	Last Updated By:	Justin
Date Created:	31/8/2020	Date Last Updated:	04/11/2020

Actor:	User, LTA DataMall
Description:	The System will allow users to view the locations of ERP gantries and the tolls for each gantry.
Preconditions:	<ul style="list-style-type: none"> - Data from LTA DataMall is available. - User has an internet connection.
Postconditions:	ERP gantries and the corresponding toll rates (at the current moment in time) are marked on the User's map
Priority:	Medium
Frequency of Use:	Medium
Flow of Events:	1. The System loads the latest information from LTA DataMall

	<ol style="list-style-type: none"> 2. The System marks all ERP gantries on a map, displaying toll rates on the map marker if applicable 3. The System automatically updates the marker based on the current time
Alternative Flows:	Nil
Exceptions:	If data is not available from the external data sources, the System will display past data that was cached.
Includes:	Nil
Special Requirements:	Nil
Assumptions:	Nil
Notes and Issues:	Nil

Use Case ID:	CLONS5-UC3		
Use Case Name:	View Images Of Traffic Conditions		
Created By:	Wei Hong	Last Updated By:	Wei Hong
Date Created:	31/8/2020	Date Last Updated:	04/11/2020

Actor:	User, LTA DataMall
Description:	System will display road traffic conditions using traffic images.
Preconditions:	<ul style="list-style-type: none"> - Data source is available. - User has an internet connection.
Postconditions:	Images of traffic conditions will be shown
Priority:	High
Frequency of Use:	Medium
Flow of Events:	<ol style="list-style-type: none"> 1. User selects a specific road to view the road's traffic image.

	<ol style="list-style-type: none"> 2. System will retrieve traffic images from LTA DataMall 3. The traffic image retrieved will be displayed to the user.
Alternative Flows:	Nil
Exceptions:	If data is not available from the external data sources, the System will display past data that was cached.
Includes:	Nil
Special Requirements:	Nil
Assumptions:	Nil
Notes and Issues:	Nil

Use Case ID:	CLONS5-UC4		
Use Case Name:	Alert Of Road Incidents		
Created By:	Lin Xiang	Last Updated By:	Lin Xiang
Date Created:	31/08/2020	Date Last Updated:	04/11/2020

Actor:	User, LTA DataMall
Description:	Users will be alerted of new incidents on the road
Preconditions:	<ul style="list-style-type: none"> - Data is available from LTA DataMall - User has an internet connection.
Postconditions:	<ul style="list-style-type: none"> - Incidents are shown on the map - Users are informed of incidents
Priority:	High
Frequency of Use:	Low
Flow of Events:	<ol style="list-style-type: none"> 1. The System will periodically check for new traffic incidents by loading information from LTA DataMall

	<ol style="list-style-type: none"> 2. When a new incident is reported, the System will display the location on a map and alert the user with a notification. 3. A marker will pop up indicating the location of a new incident has happened. 4. If the user selects the notification, pan to the marker of the incident 5. Icon will disappear if the incident has been resolved.
Alternative Flows:	<p>AF-S4 - User did not selects the notification</p> <ol style="list-style-type: none"> 1. The system runs Step 5
Exceptions:	Nil
Includes:	Nil
Special Requirements:	Nil
Assumptions:	Nil
Notes and Issues:	Nil

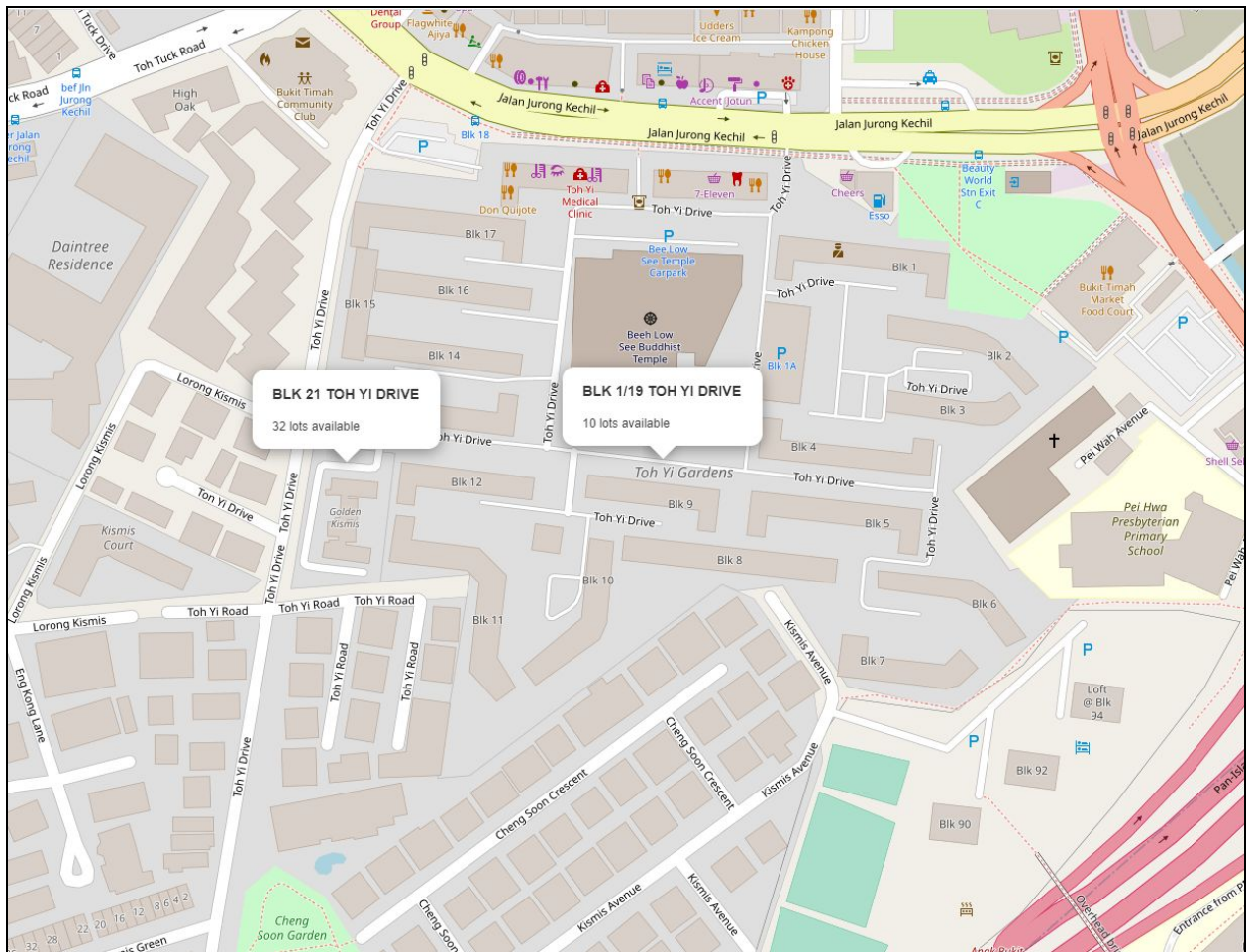
Use Case ID:	CLONS5-UC5		
Use Case Name:	Use Last Available Data		
Created By:	Jaryl	Last Updated By:	Jaryl
Date Created:	31/08/2020	Date Last Updated:	04/11/2020

Actor:	LTA DataMall, Data.gov.sg
Description:	If data is not available, use last available data
Preconditions:	Nil
Postconditions:	Old data will be returned to the User
Priority:	High
Frequency of Use:	Low
Flow of Events:	<ol style="list-style-type: none"> 1. The System will cache data from the external data sources 2. If the external data sources are not available, the System will show the last available data to the User
Alternative Flows:	Nil

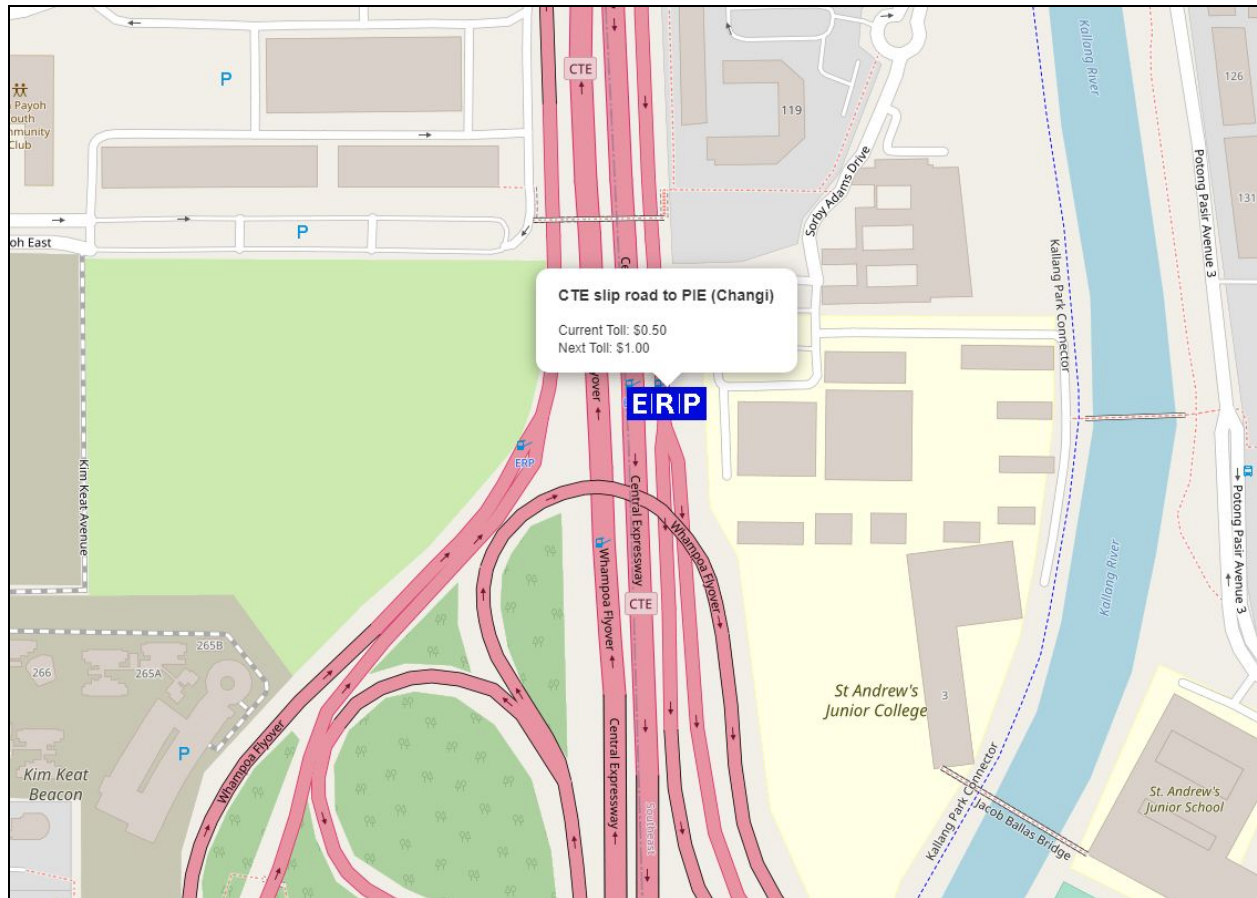
Exceptions:	Nil
Includes:	Nil
Special Requirements:	Nil
Assumptions:	Nil
Notes and Issues:	Nil

UI Mockups

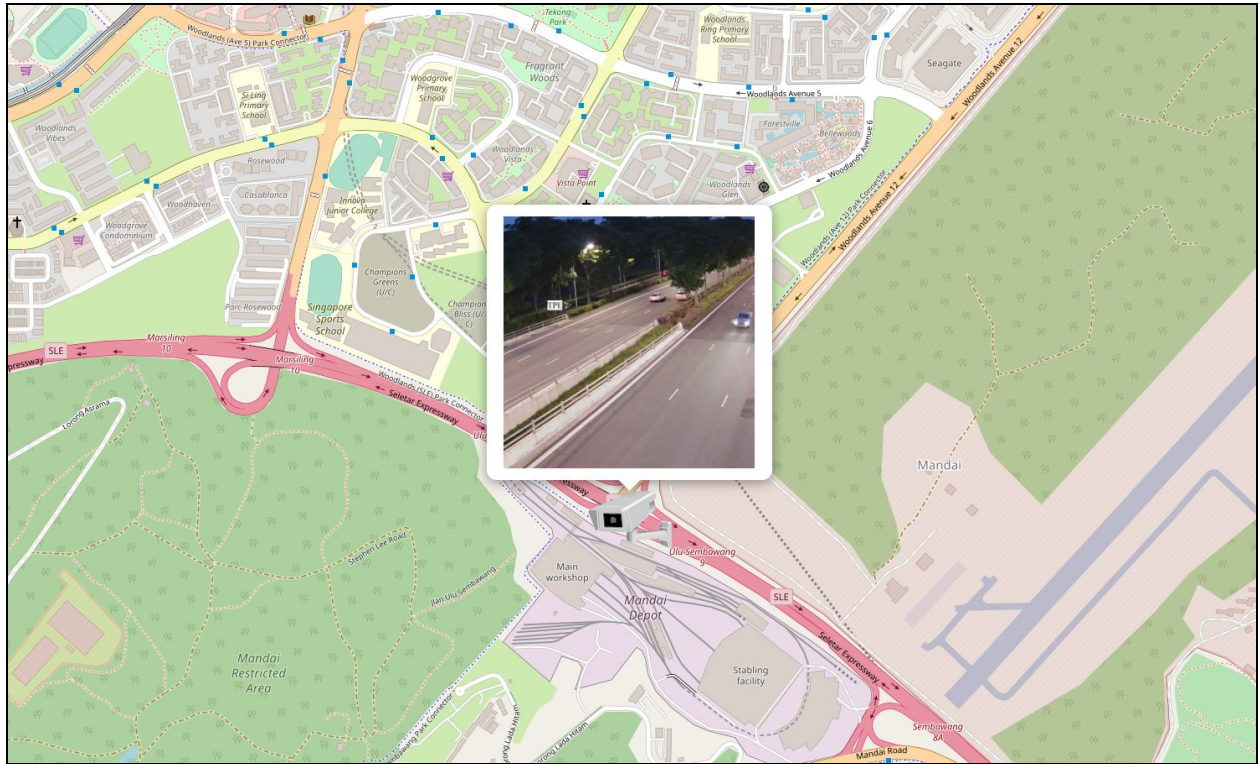
Mockup of how car parks around the user will be marked on a map



Mockup of how ERP gantries will be marked on a map



Mockup of how traffic images will be shown on the map



Mockup of how alerts will be displayed

