Lab 1 Submission

CLONS5 (SEP2)

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Functional Requirements

1. User must be able to share their geographic location with the system
    1.1. User must be able to share their location by clicking on the map
    1.2. User must be able to share their location continuously (live updates)
    1.3. The System should display points-of-interest around the user's current position
        1.3.1. Information about car parks around them
            - Availability
            - Rates
        1.3.2. Information about ERP gantries around them
            - Timings
            - Rates
2. The System must allow user to view images of traffic conditions along expressways and the Woodlands & Tuas checkpoints
3. The System must inform users of road incidents
    3.1. The location of the incidents should be plotted on the map
    3.2. The system should notify users that a new incident has been reported

Non-Functional Requirements

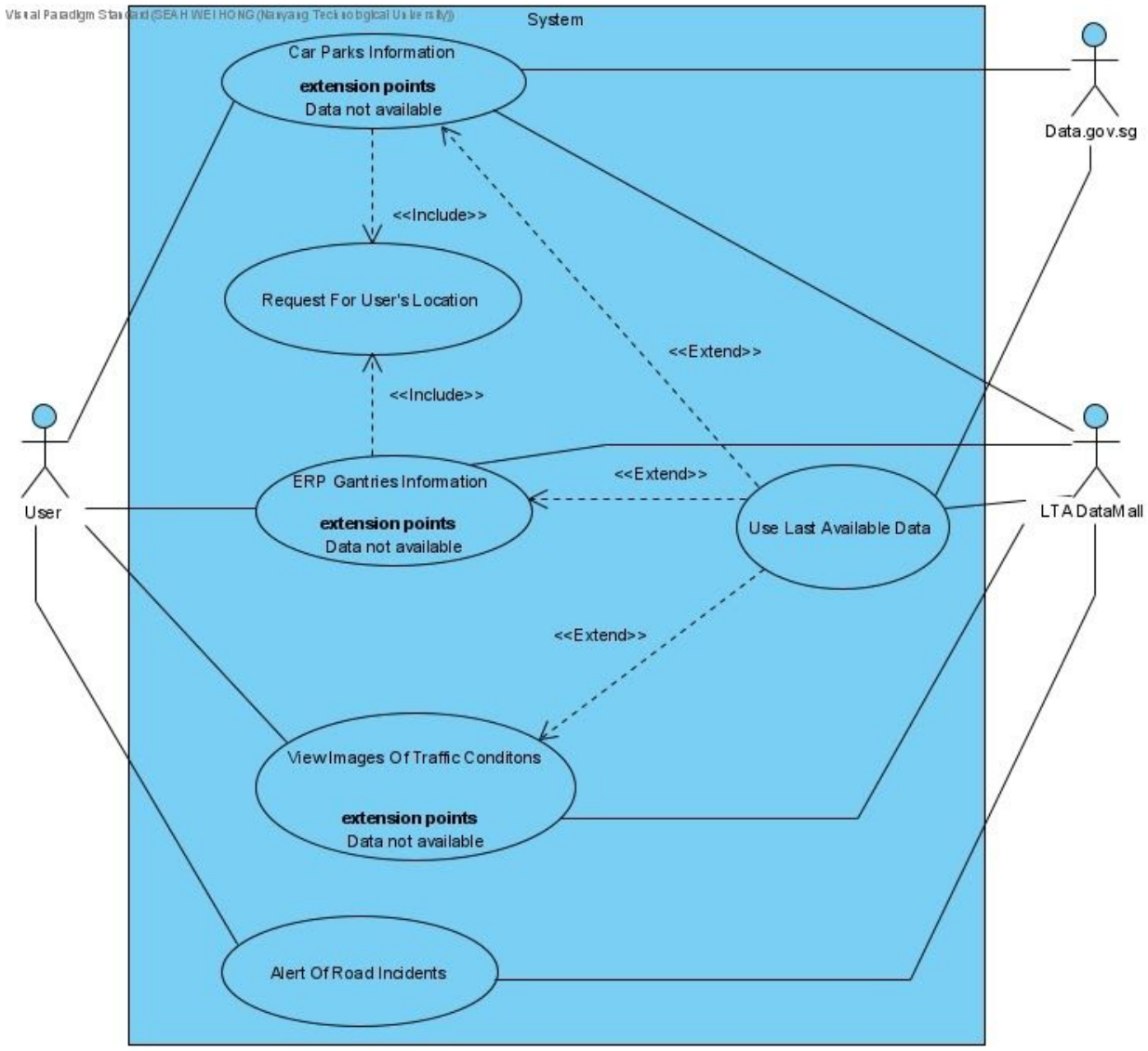
1. Data from the data sources should be cached to prevent excessive load.
2. In case data sources are unavailable, old data will be returned.
3. The system must display updated information within 10 minutes of publication.
4. The user must be able to load the System fully within 15 seconds.
5. The System must be accessible on both desktop and mobile devices.

Data Dictionary

User Location	Current geographical position of the user relative to the map. May change dynamically as the user moves around.
Car park	A designated location for drivers to park their vehicles. Payment for parking of the vehicles depends on how long the vehicle is parked for.
Expressway	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.
ERP Gantries	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.
Rates	Used for car parks and 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.

Traffic Condition	Current state of the roads in Singapore. Examples of changes to traffic conditions include road accidents, traffic congestion, breakdowns, and road closures.
Road incident	An unfortunate event that may cause congestion on the roads for a period of time. Includes accidents, breakdowns, or unscheduled road works.
Images of Traffic conditions	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.
Woodlands and Tuas Checkpoints	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.
LTA DataMall	Platform operated by the Land Transport Authority where data is published**.**
Data.gov.sg	Platform operated by GovTech where data is published.

Use Case Diagram



Use Case Description

Use Case ID:	CLONS5-UC0		
Use Case Name:	Request for User's Location		
Created By:	Jaryl	**Last Updated By:**	Jaryl
Date Created:	31/8/2020	**Date Last Updated:**	2/9/2020

Actor:	User
Description:	Request for the User to share their location
Preconditions:	User has an internet connection
Postconditions:	The System will have access to the User's location
Priority:	High
Frequency of Use:	Low
Flow of Events:	1. The System will request for the user to continuously share their location 2. The user has to decide to grant this permission

Alternative Flows:	If the user does not grant permission in Step 2, the System will prompt the User to manually select their location on a map.
Exceptions:	Nil
Includes:	Nil
Special Requirements:	Nil
Assumptions:	Nil
Notes and Issues:	Nil

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:**	2/9/2020

Actor:	User, LTA DataMall, Data.gov.sg
Description:	The System will allow users to view the number of available parking lots in, and the hourly rates of car parks around their location.
Preconditions:	- Data is available from LTA DataMall and Data.gov.sg - User has an internet connection
Postconditions:	Car parks around the User are marked on the User's map
Priority:	High
Frequency of Use:	High

Flow of Events:	1. The System retrieves user location using the included use case *Request for User's Location* 2. The System searches for car parks around the User's location 3. System displays availability and rates of car parks on a map.
Alternative Flows:	Nil
Exceptions:	If data is not available from the external data sources 1. The System will display the message "Fresh data not available! Past data will be used instead." 2. The System will invoke the use case *Use Last Available Data* to retrieve data 3. The System will display the past data with the message "Data was retrieved (x) minutes ago"
Includes:	Request for User's Location
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:**	2/9/2020

Actor:	User, LTA DataMall
Description:	The System will allow users to view the locations of ERP gantries and the tolls for each gantry.
Preconditions:	- User must give permission to the application for it to gain access to the user's geographical location. - Data from LTA DataMall is available. - User has an internet connection.
Postconditions:	ERP gantries around the User are marked on the User's map
Priority:	Medium
Frequency of Use:	Medium

Flow of Events:	1. The System retrieves user location using the included use case *Request for User's Location* 2. The System searches for car parks around the User's location 3. The System marks ERP gantries around the User on a map 4. If the User clicks on the marker, the icon will display the toll and the time until the gantry is inactive
Alternative Flows:	Nil
Exceptions:	If data is not available from the external data sources: 1. The System will display the message "Fresh data not available! Past data will be used instead." 2. The System will invoke the use case *Use Last Available Data* to retrieve data 3. The System will display the past data with the message "Data was retrieved (x) minutes ago"
Includes:	Request for User's Location
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:**	2/9/2020

Actor:	User, LTA DataMall
Description:	System will display road traffic conditions using traffic images.
Preconditions:	- 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:	1. User clicks on the camera icon beside the road name 2. System will retrieve traffic images from the data source

	3. The traffic images will be displayed in a pop up box
Alternative Flows:	Nil
Exceptions:	If data is not available from the external data sources 1. The System will display the message “Fresh data not available! Past data will be used instead.” 2. The System will invoke the use case *Use Last Available Data* to retrieve data 3. The System will display the past data with the message “Data was retrieved (x) minutes ago”
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:**	2/9/2020

Actor:	LTA DataMall
Description:	Users will be informed of new incidents on the road
Preconditions:	- Data is available from LTA DataMall - User has an internet connection.
Postconditions:	- Incidents are shown on the map - Users are informed of incidents
Priority:	High
Frequency of Use:	Low
Flow of Events:	1. The System will periodically check for new traffic incidents 2. If a new incident is reported, the System will display the location on a map and alert the user.

	3. An exclamation icon will pop up indicating a new incident has happened. 4. The User can click on the icon to view details of the new incidents. 5. Icon will disappear if the incident has been resolved.
Alternative Flows:	Nil
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:**	2/9/2020

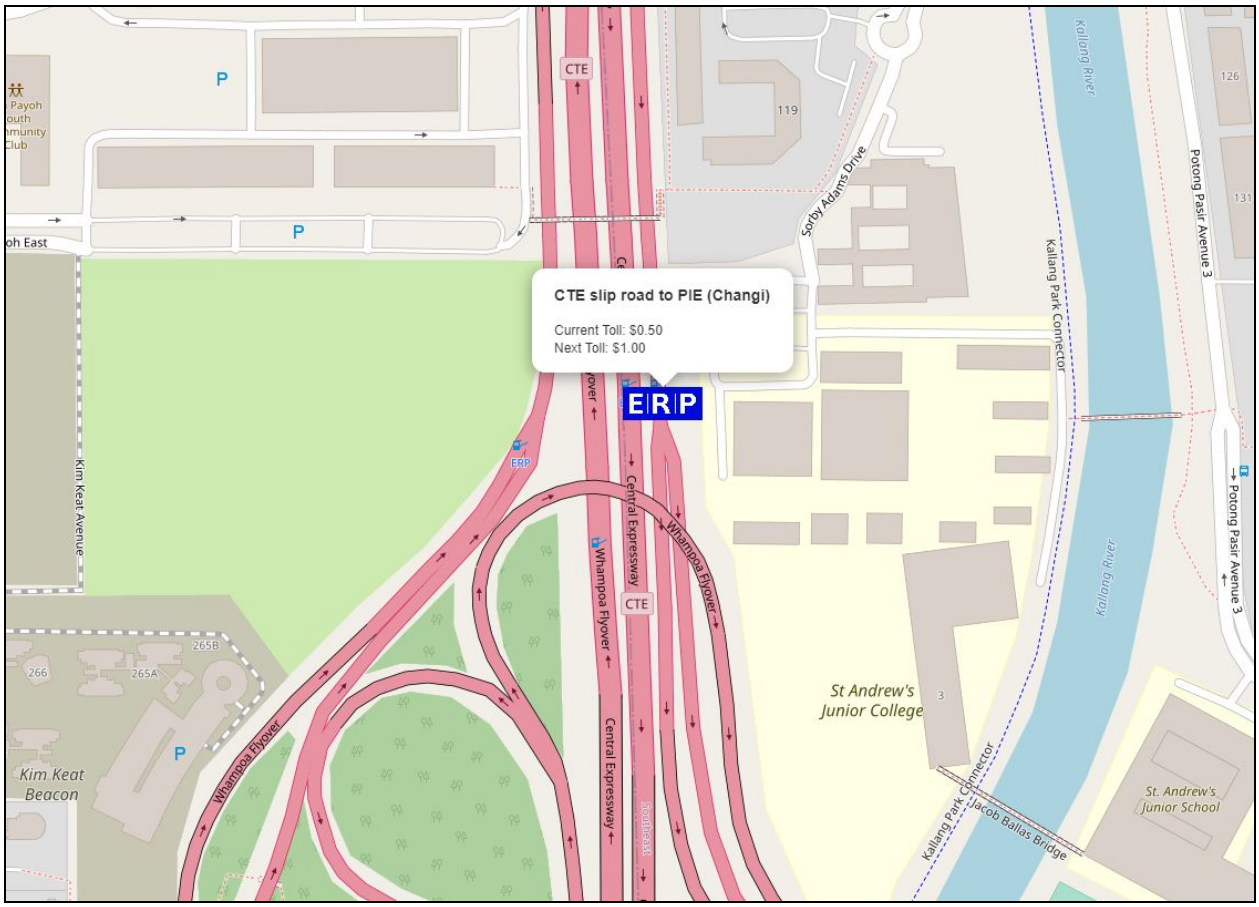
Actor:	LTA DataMall, Data.gov.sg
Description:	If data is not available, use last available data
Preconditions:	Nil
Postconditions:	Old data will be returned to the User
Priority:	High
Frequency of Use:	Low
Flow of Events:	1. The System will cache data from the external data sources 2. If the external 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

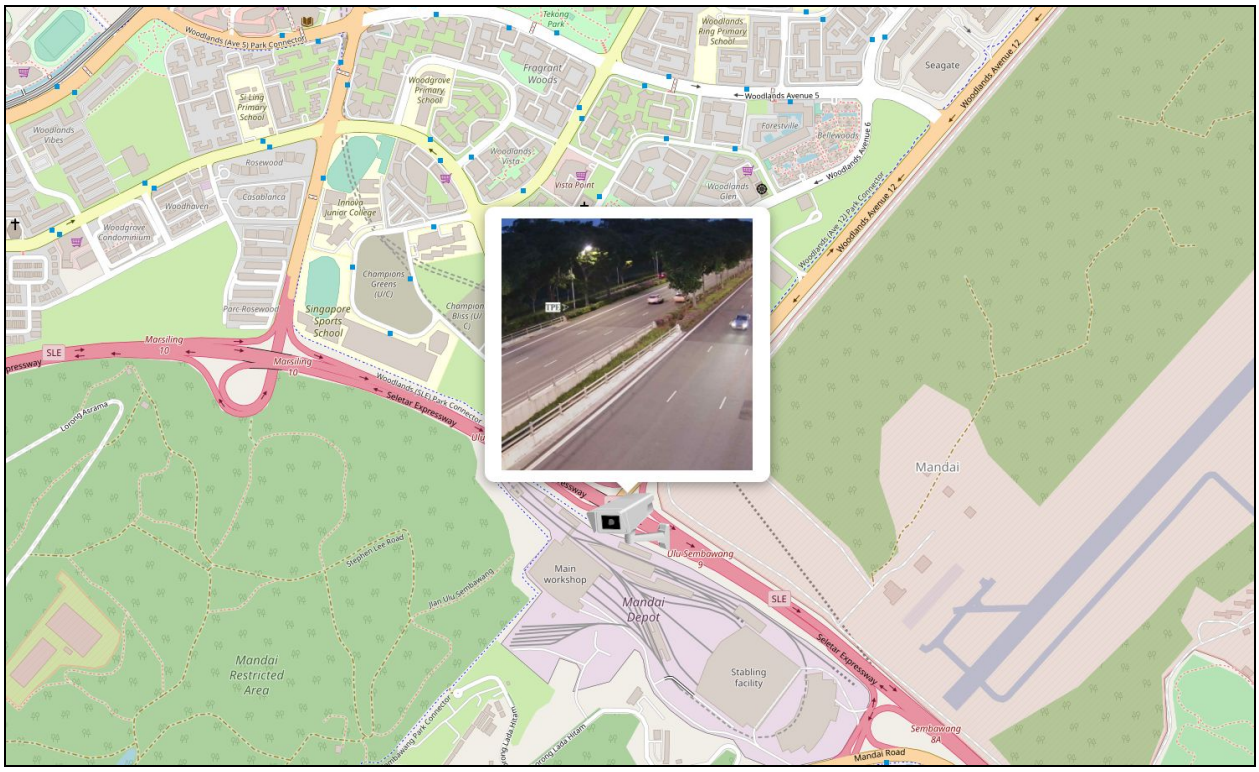
UI Mockups

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