TEAM 1 ICT-2102 Assignment 2

Description

Our objective is to create a travel-planner application that will help commuters to find the shortest or fastest route from their location to their destination by taking public transport, whilst taking road congestions into consideration. If the shortest route is detected to be congested, whenever possible, the application will suggest an alternative route that would require less travelling time. Additionally, the application can show users when a bus/train is overcrowded, allowing the user to opt for an alternative travelling option instead, if available. This application would be most useful for commuters who take public transports daily during rush hour period.

Currently, working adults and students who travel in the morning lack a convenient medium to find out if there is a traffic jam in the route they are about to take, nor are they able to see the current capacity load of the bus or train.

Examples: gothere.sg, google.com.sg/maps, onemap.sg, streetdirectory.com

Task Analysis

Our main goal of the task analysis is, to find the shortest or fastest route to a destination with the use of a travel application.

The task analysis is as follows:

Task 1: Select current location and desired destination

Actions:

- Go into the application
- Use GPS to detect current location (Optional)
- Enter location
- Enter destination

Task 2: Find routes to destination

Actions:

- Press ‘Search’

Task 3: Evaluate all available routes generated and select the best option to travel

Actions:

- View displayed routes
- View travelling time for each route available
- Get travelling direction for the most favourable route

Currently, there are multiple existing travel applications in the market. We have decided to use the existing applications to do the task analysis. The existing applications have its benefits and drawbacks.

The existing applications, as observed through the task analysis, are easy to use. Users are able to find the best route, by analysing the traveling time displayed beside the available routes. As per the task analysis, the users are able to fulfil tasks 1, 2 and 3 without any difficulties.

However, the existing applications lack comprehensive congestion data to inform the users if the route or transport is crowded to travel on. This could be analyzed from the results, retrieved from the questionnaire. It also lack in ways to check for the waiting time of the bus/travel arrival, especially when users need to switch/transfer among different transport operators of the same mode, such as SMRT or SBS Transit.

Elicitation methods

Our team has decided that an approach consisting of two elicitation methods, where we perform ***Direct Observation*** and provide a ***Questionnaire*** to the participants, would be most ideal. Collectively, both elicitation methods should help us gain a deeper understanding for the user requirements and behavior.

Justification:

The reason for conducting a direct observation first is so that we are given the opportunity to observe the users’ behavior when they are operating the current system (a.k.a. our ‘*prototype*’). This allows us to avoid making the same mistakes by highlighting any existing design flaws that could direct users to perform counter-productive actions, which would only hinder and deteriorate the user’s experience with the application. We would also like to take the chance to note down key features that are essential for a positive user experience in a travel and make sure that it is not overlooked in our future implementation.

However, performing observations on its own only allow us to study user's physical behavior and might not help in answering some other doubts we have regarding their thoughts and preferences. Therefore, designing a questionnaire is a quick and easy way for us to wrap up any doubts unanswered. It would be a fairly simple process of setting questions on an online-survey platform and analyzing the results after gathering the responses needed. It is also a less time consuming method for our team (which is an important factor given our time constraint), compared to interviews for example, which would require us to invest time and manpower to conduct each one.

Procedure:

Our approach would have us put our participants through direct observation to begin, by first asking them to simulate the scenario where they are trying to find the quickest way home from where they are now. Participants will be able to choose any website that they would usually use in this scenario, or a suggestion can be provided by us if needed. General guideline for the observation is to have our participants complete task 1 through 3 that was identified in the Task Analysis. Our team would then take note of their general usage behavior whilst highlighting anything conspicuous throughout the whole simulation.

Following the observation, the same participants will be given a questionnaire to complete. The questionnaire would pose questions regarding their current practices and thoughts on the existing travelling planner system. This questionnaire will also be offered to our peers outside of the observation participants to complete, in an attempt to garner more response and have a better dataset to analyse with.

Observation Results

Participant	Observation	Remarks
1 (Google Map)	● Able to do tasks 1, 2 and 3 without any difficulties ● Able to locate current location via GPS setting ● Able to identify fastest route from available MRT/Bus options ● Able to view desired travelling route	● Showed frustrations regarding the options shown on the map ● Routes shown on google map are based on a mixture of bus and train ● User prefers to view routes with only train services as well

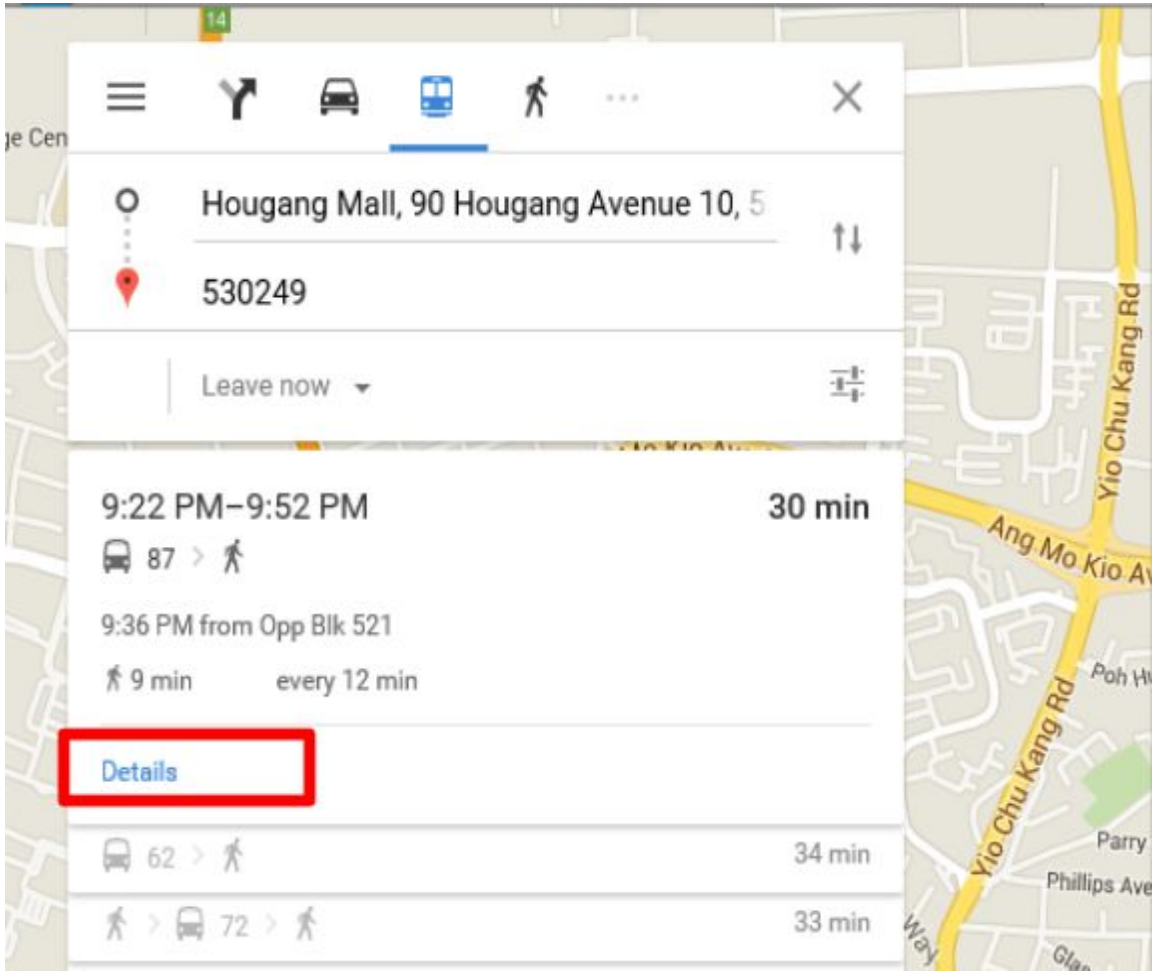
2 (gothere.sg)	● Able to do tasks 1, 2 and 3 without any difficulties ● Able to locate current location via GPS setting ● Able to identify fastest route from available MRT/Bus options ● Able to view desired travelling route	● Seemed satisfied with the web application ● Didn't show any extreme emotions ● No complaints

3 (Google Map)	● Able to complete tasks 1, 2 and 3 easily.
	● Did not use GPS to auto detect location, instead opt to type in current location manually.
	● Filtered to show only directions by public transport.
	● Evaluated each travelling route generated in detail
	  ○ Mouse hovered through the travelling time and walking distance for each option
	  ○ Expanded first route option shown to see full details
	  ○ Expanded remaining options shown to only see summarized details
		● Seemed at ease with the interface.
		● Seems like first route option caught most of participant's attention, only briefly looked through the other options.
		● User seems to weigh the walking distance as one of the important factors for a route.

4 (SBS Journey Planner)	● Able to complete tasks 1, 2 and 3 by following steps shown on the website. ● Looked around but the app seemingly does not provide GPS auto-detection function, typed in current location manually. ● Starting/ending points are bus stops which must be selected by user. ● Slightly extended process of defining start and end points compared to other web-apps ● Between option to filter based on shortest travelling time or walking distance, travelling time option was selected. ● When different route options are generated, user evaluates first option and closed the site without even looking at the other options.	● Directions provided are only by bus and no other mode of transport. ● Website has relatively simple layout and clear flow of direction for the journey planning process is shown, resulting in the user finding the way to each step of the process easily. ● User had ignored all other directions shown other than the first, assumes that system has accurately filtered the options based on his preferences hence the first is the best.
5 (Google Map)	● Able to do tasks 1, 2 and 3 without any difficulties ● Able to locate current location via GPS setting ● Able to identify fastest route from available MRT/Bus options ● Able to view desired travelling route	● Seemed at ease with the interface. ● Seems like first route option caught the participant's attention, only briefly looked through the other options. ● User seems to weigh the shortest time as one of the important factors for a route.

6 (Google Map)	● Able to complete tasks 1, 2 and 3 easily.
	● Did not use GPS to auto detect location, instead opt to type in current location manually.
	● Filtered to show only directions by public transport.
	● Evaluated each travelling route generated in detail
	  ○ Mouse hovered through the travelling time and walking distance for each option
	  ○ Expanded first route option shown to see full details
	  ○ Expanded remaining options shown to only see summarized details
		● Seemed at ease with the interface.
		● The participant analysed each of the route and chose the route that has less walking distant despite having the longest time.
		● User seems to weigh the shortest walking distant as one of the important factors for a route.

7 (Google Map)	● Able to complete tasks 1, 2 easily. ● Did not use GPS to auto detect location, instead opt to type in current location manually. ● Filtered to show only directions by public transport. ● Experienced problems on evaluating each travelling route generated in details.	● Seemed okay with the interface although facing some problems in checking for full details of the route. ● Not aware that by clicking on “Details” will be able to show up the full details of the route. ● User perceives there may be other things to interact with to check for full details. ● The participant analysed each of the route and chose the route that is the fastest to reach the destinations - never look into whether are there any long distance walk required for the chosen route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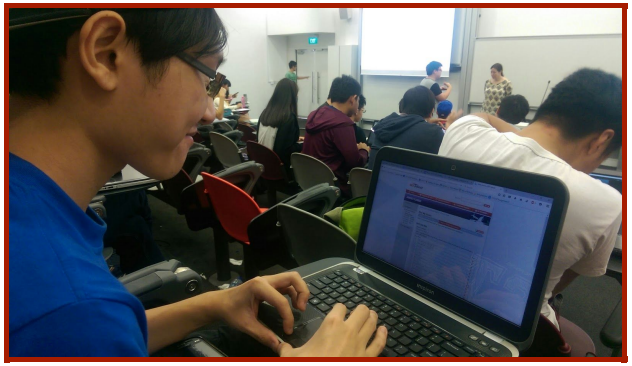
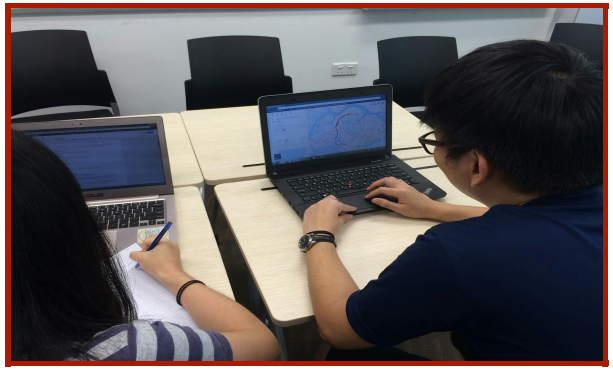
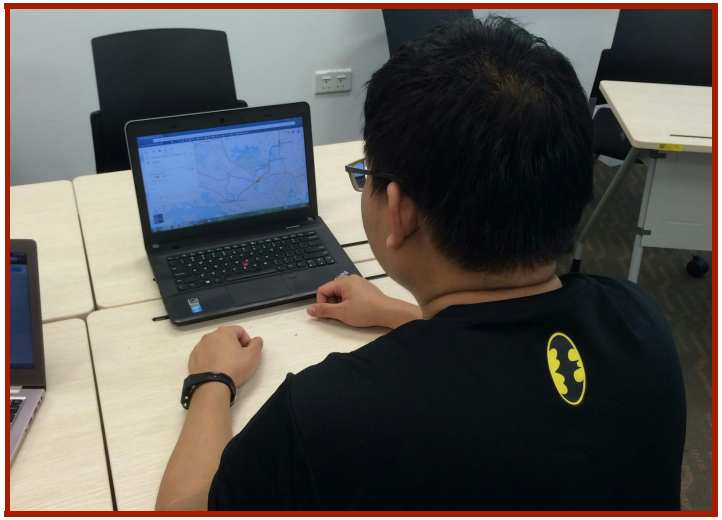
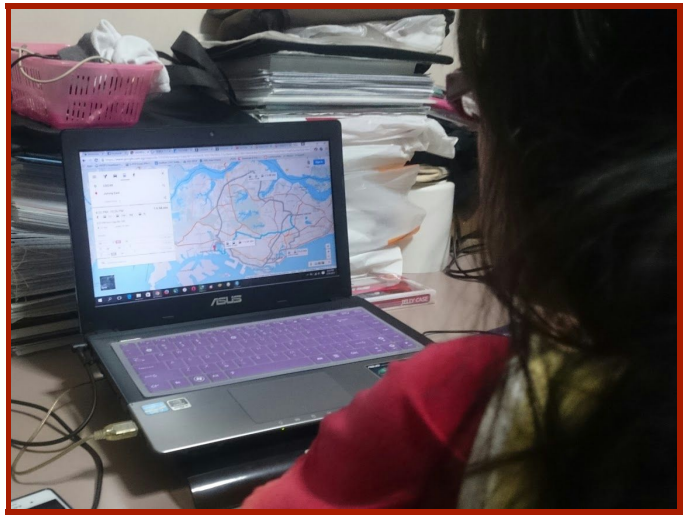
Phillips Ave

Photos during Observation:









User needs and Design Principles

Based on our elicitation methods, the following are the user needs and design principles we have identified as fundamentals to our system.

User Needs

1. Find shortest or fastest directions to destination
    1.1. Directions should consist of clear and simple steps
    (e.g. what bus to take, where to stop, walking direction and distance etc.)
2. Provide reliable results with congestion in consideration
    2.1. If congestion is detected in the regular route, factor that in (e.g. affects time taken).
    2.2. Show a better alternative route if available
3. Filter options to list routes generated based on users' preference(s)
    3.1. First route option displayed should be the closest option to what the user is finding.
4. Compatibility across multiple platforms. Even though we're creating a web application, it should be able to adapt to mobile devices as well; for example, the layout should be compatible on both devices.
5. Compliance, the web application should be able to do what the user desires and not otherwise.

Design Principles

Web layout should be simple and uncluttered, bearing only the essentials. The hope is that by reducing the number of unnecessary elements (e.g. meaningless buttons, overwhelming variations of coloured text) in our design, we can reduce false affordance that users might have clicked on in an attempt to perform an nonexistent action. With lesser distraction on the webpage, the key elements (actual affordance) should be more visible as well. Step by step through each phase of the task process, we would preferably like to provide some form of mapping to guide the user We want the flow and structure of the application usage to be clear and simple to follow for the user, so that they can complete the task in the minimal amount of time.

Implications of learnings on Task analysis that affects our design

One of the implications that could affect the design is the application may not be able to provide comprehensive and up to date data of congestion, as congestion can be also unpredictable at times. Thus, it heavily depends on us to find the available and reliable congestion data that we could utilize for the web application.

Appendix A

Questionnaire

Q1. Do you use a map for directions?

Q2. Which website do you go to when you need help with directions?

Q3. Does the current application allows you to view the level of congestion?

Q4. Would you like to have an application that reflect on congested area?

Q5. Would you like the current capacity load of the bus/train you are going to take to be shown?

Q6. What are the some other features you want to see in your ideal transportation application?

Q7. What features would you rather eliminate from the current application you use?

Questionnaire link:

https://docs.google.com/forms/d/1oGUR9vES4DKIaA8EYzUxPfw7Pd8LgOGGmtExkSVx8o4/viewform?usp=send_form

Results

Q1	Q2	Q3	Q4	Q5	Q6	Q7
Yes	google.com.sg/maps	No	Yes	Yes	Shortest route possible. Able to show congested road if in case of accident or etc. Able to make alternative route if the actual route is congested.	
Yes	gothere.sg	No	Yes	Yes	nil	longest time taken to travel
Yes	google.com.sg/maps	Yes	Yes	Yes	Based on google maps,they should show the fare also?	nothing at the moment
Yes	google.com.sg/maps	Yes	Yes	Yes	Friends that is taking the same bus as me.	All are of value.
Yes	google.com.sg/maps	No	Yes	Yes	Able to show roadblocks due to event like F1 show bus route during road closure	N/A
Yes	google.com.sg/maps	No	Yes	Yes	show real time accurate result, such as shortest route during route closure	Only show singapore.

Yes	google.com.sg/maps	No	Yes	Yes		
No	onemap.sg	No	Yes	Yes	Able to track the intended bus service location, something similar to cab app when passenger can track the booked taxi.	None
Yes	google.com.sg/maps	Yes	Yes	Yes	Maybe show what has happened that caused the traffic jam	Nil
No	google.com.sg/maps	Yes	No	No	more accurate time of arrival	Nil
Yes	gothere.sg	No	Yes	Yes		
Yes	gothere.sg	No	Yes	Yes	1) Roads to avoid, real-time information on road closures/ accidents 2) Estimated traveling time from one point to another via (motor/)bike/ car/ bus and train 3) Possible ERP charges and carpark entries or nearby free parking lots 4) Bus stops with high traffic so that I can be suggested to walk to a bus stop before it 5) Speed cam areas	None

					6) Triangulated landmarks to mark intended location (for example, Ngee Ann will be triangulated by UniSIM, Bukit Timah Plaza and Sunset Way) so that first-time travellers can refer easily back and forth from irregular GPS and your coordinates) If developing for taxis: 1) Areas where taxis cannot stop or risk getting fines 2) Shortcut routes suggested by fellow taxi drivers 3) Areas with most densely populated waiting lines If developing a joint app to connect taxi drivers to customers 1) A dynamic map where passengers can clearly mark out where they're waiting at 2) Three auto generated routes to reach from passenger's intended pickup to intended drop off - passenger will choose his preferred route while waiting for cab	

					3) Map of nearest major bank ATMs for in case passenger is cashless	
No	i don't go to any website	Yes	No	No	Number of Single and Available CHIOBU in the transport vehicle	Advertisements obviously.
Yes	google.com.sg/maps	No	Yes	Yes		
Yes	google.com.sg/maps	No	Yes	No	Which mode of transport is the cheapest and fastest	
Yes	gothere.sg	No	Yes	Yes	Graph depicting traffic pattern	Subscription fee
Yes	google.com.sg/maps	Yes	Yes	Yes	arrival time of bus, train customizable preset for users to modify based on the buses that is frequently taken	none
Yes	google.com.sg/maps	No	Yes	Yes	Accurate arrival time	
No	gothere.sg	Yes	Yes	Yes		
Yes	google.com.sg/maps	Yes	Yes	No		
Yes	google.com.sg/maps	No	Yes	Yes	Any available seats.	Nothing to eliminate.

Yes	google.com.sg/maps	Yes	Yes	Yes	Current location of bus	None
Yes	google.com.sg/maps	No	No	Yes	Display various way to travel from one location to another	-
Yes	google.com.sg/maps	No	No	Yes		
Yes	google.com.sg/maps	No	Yes	Yes	Fare	
Yes	google.com.sg/maps	No	Yes	Yes		
No	google.com.sg/maps	Yes	Yes	No	Sometimes when i want to check the time for the bus arrival, it does not show up despite me turning on the mobile data.	Reduce the need of having to turn on the GPS when the user intends to check the direction from point A to point B by typing.