UTM
UNIVERSITI TEKNOLOGI MALAYSIA

Human-Computer Interaction (SECV2113)
2024/2025 Semester 1
Phase 2: Establishing Requirements

Group 1: TOO

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1.0 Introduction

We, TOO, have decided to make a non-profit app that will be able to help users discuss the issues in public facilities around our country that University Students, Office Workers, and Personnel with Special Needs have faced. Our main objective is to improve the usability of existing services around Malaysia, particularly through some systems that were split into several applications, such as the public transport availability checking system, the complaint filing system, and the AI chatbot that can be integrated into the applications due to the rise of AI functions currently. The target user has been chosen to provide valuable opinions for the applications through user testing, further assuring that our application can perform properly.

1. Moovit

Moovit can check the availability of most of the public transportation in Malaysia, including Buses and MRT. It is used widely by people who are traveling around by public transportation, as it is optimized for checking public transportation only. There is also the bus tracking function, however it is locked behind a paywall.

2. i-Tegur

i-Tegur, previously known as i-Kepoh, is an application released by the government themselves. It is used for reporting any public problems that are faced by the user, such as damaged roads and broken lampposts.

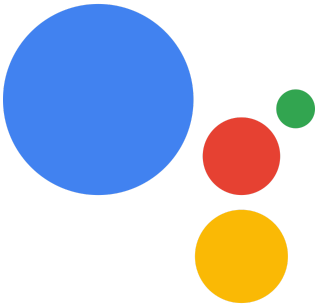
3. Google Maps

Google Maps has the function to check the availability of public transportation and provide live traffic conditions. It is a shame that these two functions cannot be combined to give a more accurate ETA for public transportation planning. Chatbot assistance is also integrated into the application, making it easier for people to navigate around the app.

4. MyRapid Pulse

MyRapid PULSE has a few important features for the bus and rail system in Malaysia, however, it is exclusively for the public transportation provided by the company only. The features include a journey planner, the arrival time of trains and buses with a full schedule, and a report page that redirects the users to their WhatsApp live chat, their hotline, or their email.

5. Google Assistant



Google Assistant uses AI to understand human requests, process information, and conduct tasks such as answering inquiries, sending messages, creating reminders, and controlling devices via voice or text input.

6. Microsoft Bing (Copilot)

Bing Copilot employs AI to help with a variety of tasks, including as answering questions, summarizing information, developing suggestions, and providing correct and contextual responses to research.

The three tasks that we had chosen for observation from the existing system are:

- Bus planning system
  The bus planning feature will help users know where they should hop on the bus, the time of departure, and the time of arrival.

- Report problem system
  The i-Tegur app gives us a platform to report any public-related problem directly to the relevant department. This is important to ensure the quality of public facilities is always on par.

- AI Chatbot
  The AI Chatbot feature can give the user an easier way to navigate the application and answering some simple question within the app.

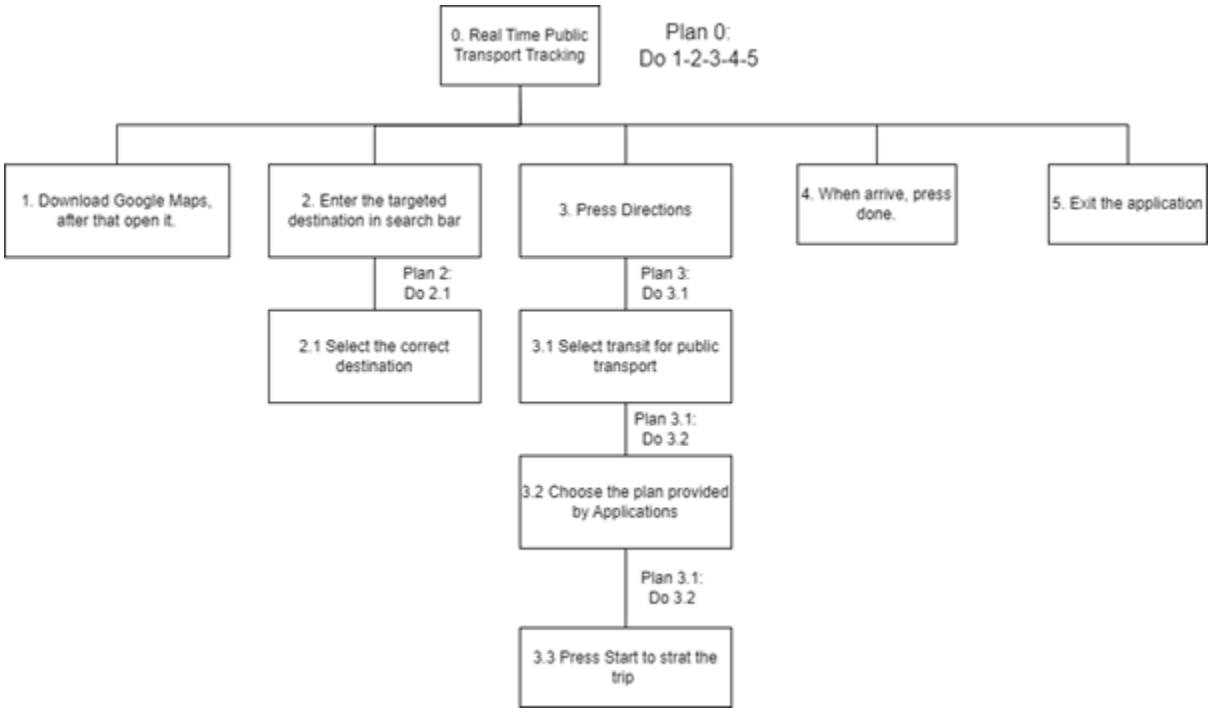
2.0 Derivation of HTA

a) HTA for Task 1 - Bus planning system

User 1: University Students

Video Link: https://youtu.be/qD4wn9DuB9A

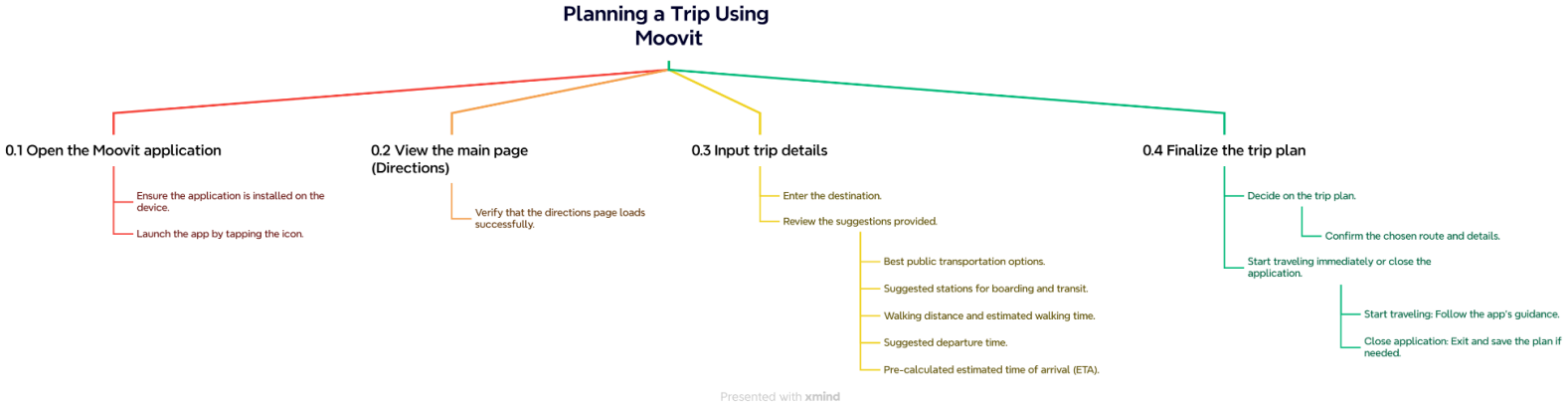
Firstly, user will open Google Maps application without the need for registration. User can straight away use Google Maps to get as fast as possible. After that, user will use the search bar to search the destination they want to go. During this process, user can choose their desire way to go to the destination. For public transport, we choose transit to get the information for the public transport. Google Map will provide the detail information needed to get the public transport like the time needed for user to walk to the bus stop and bus current schedule and Estimated Time Arrive(ETA) for the bus. After that user can save the trip and start the trip guidance.



User 2: Office Workers

Video Link: https://youtube.com/shorts/wfPaIj_Ndws?feature=share

For Task 1, the office workers will start by opening up the Moovit application, and the main page, which is directions will show up, prompting them to key in where they wanted to go. They need to input the destination, and it will gives the user the best suggestion on which public transportation to use and where they should get on, and if there is any change of transportations needed, the station for transit will be shown alongside. It will also give them some details like the distance they will be walking and the estimated time to finish the walk. The time of leaving are also suggested, and the estimated time of arrival will also be pre-calculated, of course, without taking in the live traffic conditions. After the office workers are done with planning their trip, they can choose to start their travelling immediately, or exit and close the application.



User 3: Personnel with Special Needs

Video Link: https://youtu.be/H6OkYu0xOX4

To use Moovit for public transport checking, user need to open the Moovit application, make sure that the phone is connected with internet and open the location tracking. Then, at the bottom, user can choose either search for destination/station/lines. Enter the desired data and select the most appropriate result from the suggestions. For instance, we check by searching the line, after choosing the desired line, Moovit will then show the route detail of the particular line, included all the stops ETA, arrival updates and direction. The user can tap on the route to view detailed directions and stops. Then, user can track the real-time updates, monitor live updates on vehicle location and ETA. User will then to the nearest stop/station using the app's map feature and board the bus as per the provided schedule. After broading the bus, follow the final directions to reach your destination. Exit the app once the journey is complete.

Findings from the HTAs for Task 1

Users found it very easy to use Google Maps because there is no need for registration of the account to use the app. They can get the answers they needed from the app in a simple way by simply choosing the “Transit” in the selection and provided much information at the same time. However, users also noticed that estimated time arrive (ETA) provided in the Google Maps was not always accurate and does not have real-time updates for the buses. They will need to prepare for spending more time on waiting the Public Transport as the provided time in the app is not the real-time update of the transport but only the schedule of its operating time.

Moovit was a widely used application for trip planning with public transportations, as it is optimised for that. The frustrations that user had felt during the testing process is quite low, but not zero. First, the amount of advertisements is too much, sometimes in the way of user navigating around, causing them to misclick it. The other downside is that the tracking function is locked behind the paywall, which might annoys some user base.

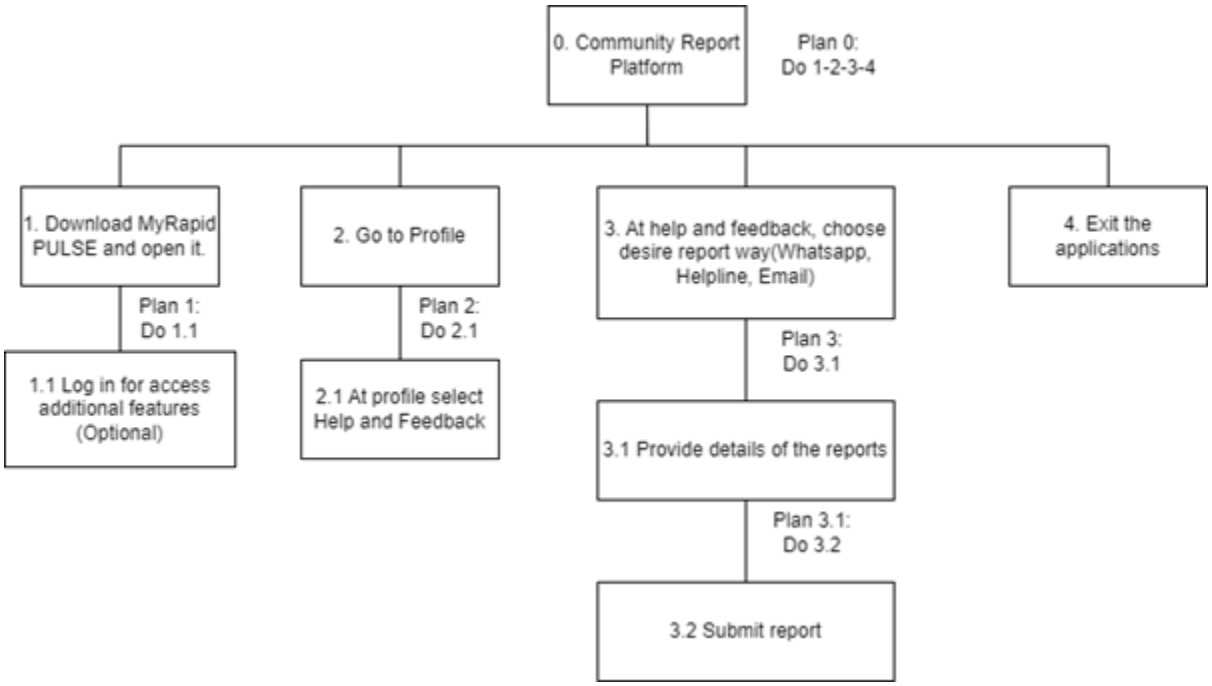
Other than that, the instructions and suggestions gave by the application during trip planning are most of the time accurate and suitable, and you can choose other given options if you think you have to spend to many fare on the suggested route. The walking distance provided is accurate too, only if the calculated walking time can be more humane as it is to fast for normal humans. The details that it shows are clear, which is necessary for the users that was not yet familiar with the public transportations.

b) HTA for Task 2 - Report Problem System

User 1: University Students

Video Link: https://youtu.be/Ra7evN9D5l8

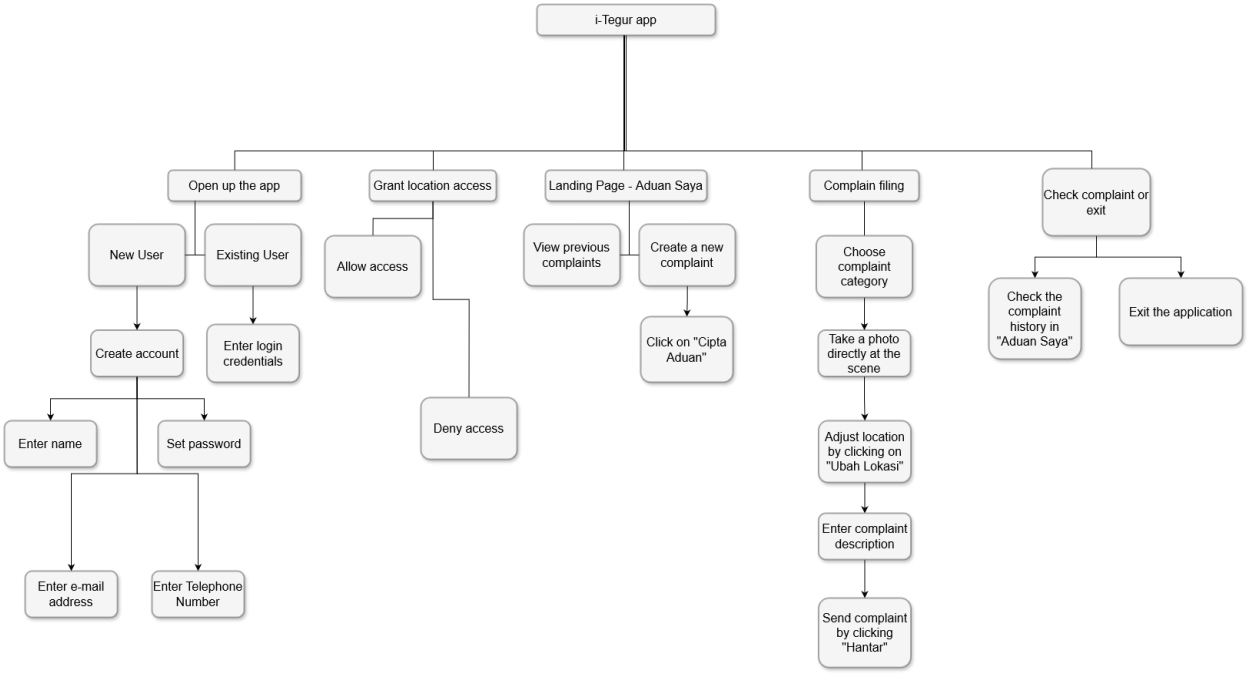
First, user will open MyRapid PULSE app. User can use the app without registration to use the feedback features but for the more features like My preferences will need user to register the account. After open the app, user will go to Profile and select Help and feedback section. At there, user can choose to use WhatsApp, Helpline and Email to make their report by providing the details for the situation they have met.



User 2: Office Workers

Video Link: https://youtu.be/BRuF2R1pAV0

For task 2, the office worker has to open up i-Tegur, and the user will be required to login to their account. For new users, they need to create an account first by giving informations on their name, e-mail address, telephone number, and a password. After logging in, the app will ask the user to give access to their location service. The landing page will show “Aduan Saya”, which will show the complaints that if the user have made it before. To create a new report, click on “Cipta Aduan” on the corner of the page. On the new complain page, the office workers will choose the category of complain that they want to make. After the category is chosen, the user will be given a choice to upload the photo by taking it instantly at the scene, with the maximum of three photos. The location of the photo taken or the current site can be change by clicking “Ubah Lokasi”, if the location detected is not accurate. The user will fill in the description of their complain by writing in the “Keterangan Aduan” space. When all the details have been given, the office worker can click on “Hantar” to send the complain. The complain will show up on the “Aduan Saya” page. The relevant departments will take action as soon as possible.



User 3: Personnel with Special Needs

Video Link: https://youtu.be/RcbggJWQ428

Firstly, open the i-Tegur mobile application, register a new account if is a first time user. Then, make sure the GPS is enabled for location service. At the right corner, select “Cipta Aduan” and choose the type of issues to being reported. After choosing the category, take picture and upload as the evidence of the issue, ensure the attachment are clear and relevant. Next, fill in the details to describe the issue. Check the date and make sure to set the accurate location. Lastly, user have to review all the details entered and submit the report, the user will receive a confirmation notification after submit. After the submission, user can track the report at the dashboard “Aduan Saya” to monitor the progress of the submission. Users can efficiently report community issues with sufficient details and track the resolution progress, ensuring accountability and better service delivery.

Findings from the HTAs of Task 2

MyRapid PULSE provide an easy to access way for users to make the report without going anywhere or searching way to contact the specific department of the report. User could straight away use the features without the need of account registration and start the report as soon as possible. The provided ways of report which are WhatsApp, email or hotline let users able to choose the best way for them to make the report.

Even though it is simple to use, but it still not convenient enough to meet current user satisfaction. The current report method focuses on individual issues reporting that was not have the good features provided by community report platform such as shared visibility of reports or public tracking issues. Uses had no way to track the status of their submitted reports which will make fell uncertain about the reports they made was received or start fixing or not.

The report features from i-Tegur is quite complete, only a few adjustments can be made on it. First of all, the user interface looks very outdated, well this is due to the app not being maintained and no new versions are rolled out timely. This has caused some devices to not be able to download the application, specifically Android 12 or above. The photos from local gallery not being able to upload is frustrating too, as not many people will report the case on sight since they might be on the way to somewhere.

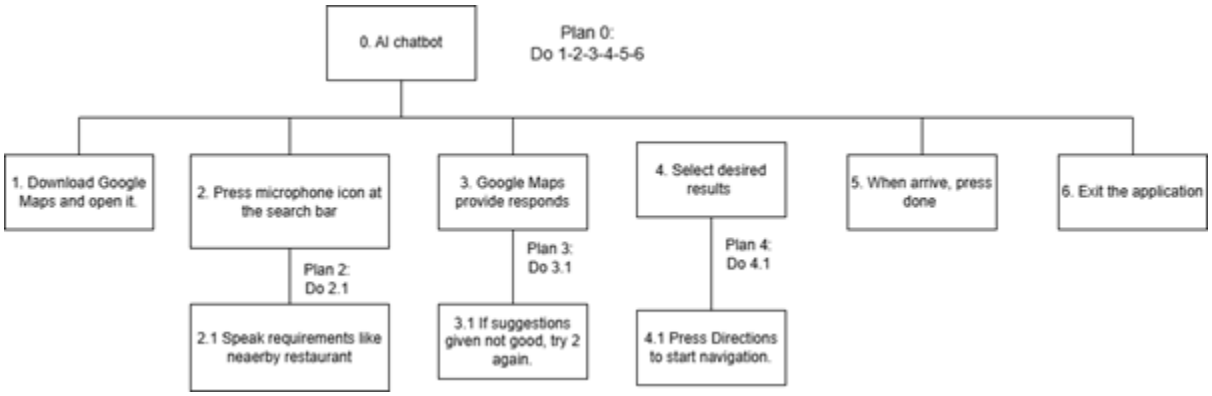
According to the user, the reports will be taken seriously, which is a nice thing to hear. The broken facilities might be a long term inconvenience if it is not fixed as soon as possible.

c) HTA for Task 3 - AI Chatbot

User 1: University Students

Video Link: https://youtu.be/XSDBJnO4ZJw

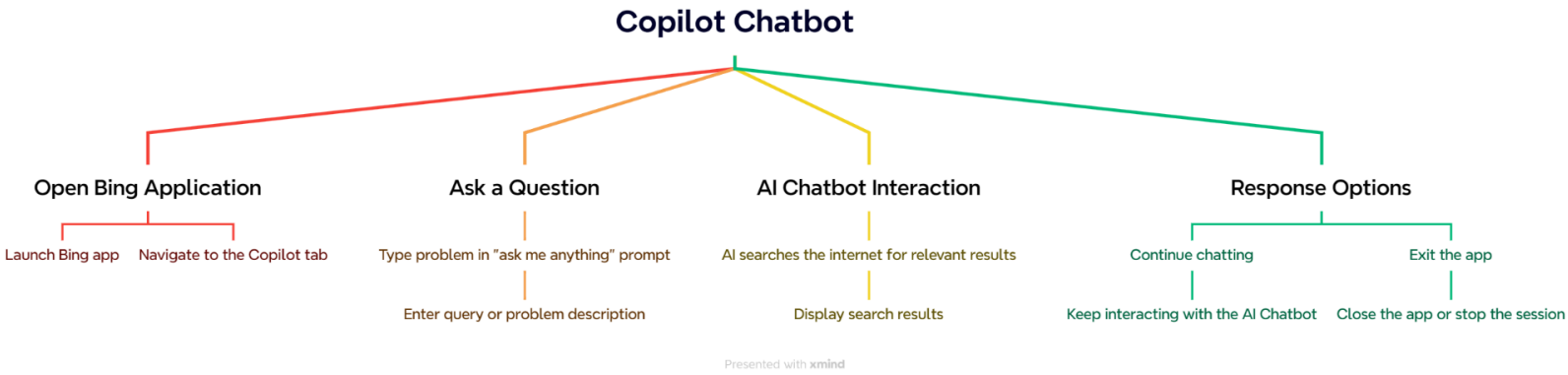
At the beginning, user will open Google Map app. The Google app could be used without registration. After that, user can click on the microphone icon to start the chatbot assistance. At the moment, user will start speaking their requirements. After user finish the speaking, Google Map will provide the guidance to go to user desired destination.



User 2: Office Workers

Video Link: https://www.youtube.com/shorts/WowAtWJaSSg

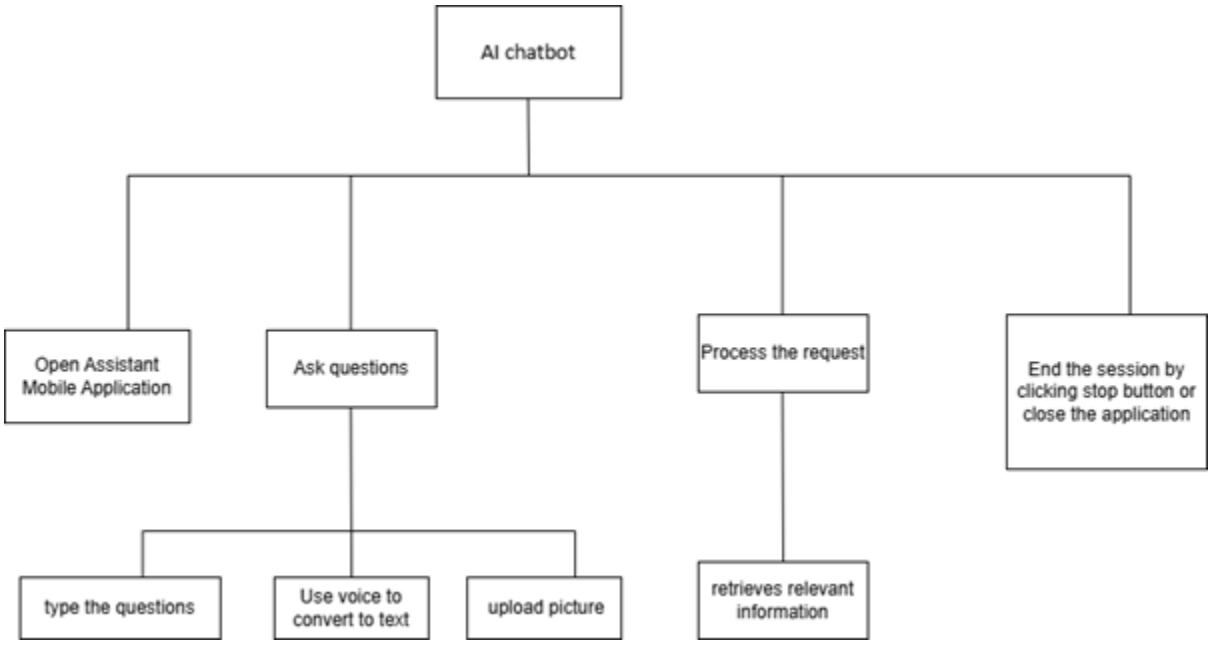
For task 3, the office worker will try out Copilot by clicking into the Bing application. They will need to navigate to the Copilot tab. At the bottom of the page, where user will be prompted to “ask me anything”, the user’s problem can be typed in there.The AI Chatbot will search through the internet and show the most relevant and accurate results by the given inqueries. After getting the result, the user can choose continue chatting, or simply exit the app.



User 3: Personnel with Special Needs

Video Link: https://youtu.be/oNxpechShiM

Using Google Assistant as an AI chatbot involves several simple steps to interact and achieve a desired outcome. First, the user open the Assistant mobile application. The user then states their request clearly, such as asking for the weather, setting a reminder, or finding directions. Google Assistant will process the request and then retrieves relevant information, and provides a spoken or visual response. If the instruction is unclear, the Assistant may ask follow-up questions to refine its understanding. Users can interact further by giving additional commands or ending the session by saying "Stop" or closing the app. Throughout the interaction, the chatbot ensures natural language understanding, quick response times, and context-aware replies to enhance user satisfaction.



Findings from the HTAs of Task 3

Google Maps chatbot provide a great solution for the users who need guidance at some not familiar places. As mentioned above, Google Maps does not need to log in to use the features provided and users could easily start using AI chatbot once they start the app. Speaking into the chatbot is easy and chatbot reply to users' questions very quickly.

There are still issues when using this feature as the chatbot sometimes will give incomplete reply to users' questions like avoiding the toll. This makes users have to think a better route to the destination on their own.

AI chatbots or just AI assistant has become a regular function now as it has been promoted widely. Copilot and Google Assistant are two of the most widely used AI systems nowadays. Copilot, designed for office professionals, offers a formal approach to solving issues, integrating with Bing to deliver accurate results. However, its reliance on tab navigation and typing can feel less natural for those who prefer voice input. On the other hand, Google Assistant provides an inclusive hands-free experience for users with special needs, especially those with mobility or vision impairments. While it effectively interprets natural language, it can misinterpret complex or unclear requests, requiring multiple clarifications and causing frustration.

Each chatbot serves its audience well but has room for improvement: Google Maps should address user-specific preferences, Copilot could add voice input for better accessibility, and Google Assistant could handle ambiguous commands more effectively.

3.0 Design Requirements

Based on the information and requirements that had been gathered through interviews. We had noticed some area of improvements to address the problems facing by the users. This will definitely improve their user experience and make all the actions seamlessly, bringing the true convenience.

Firstly, real-time GPS tracking is essential to provide users with accurate and timely updates about public transportation. Users should receive notifications regarding delays, cancellations, or route changes to avoid unnecessary waiting times. The system will give extra feature include information specific to accessibility, such as elevators, ramps, or priority seating, catering to users with special needs. Additionally, integrating route optimization for multi-leg journeys will enhance user convenience, particularly for commuters navigating complex transit systems.

Secondly, we need to have a quick and efficient report system. In order to streamline the reporting process, the application must ensure that workflows are intuitive. This will allow users to report issues with minimal effort. The ability to upload multimedia evidence, such as photos and videos, adds detail description to reports. Moreover, a tracking system that provides real-time updates on the resolution progress will increase user trust and engagement. The app should also allow users to save draft reports and retrieve past submissions easily, ensuring seamless management of ongoing or frequent issues.

Next, we have the AI chatbot. The AI chatbot must be designed to understand natural language queries and handle context-sensitive conversations. For accessibility, features like text-to-speech and voice input should be implemented. The chatbot should proactively assist users by providing recommendations or alternative options based on their preferences and previous interactions. The chatbot should be able to provide quick and accurate responses to a variety of questions to achieve peak efficiency.

In short, the proposed application aims to deliver a seamless, inclusive, and efficient experience for all user groups by addressing these design requirements in detail. This approach improves usability and fosters a sense of community and trust among users.

Gathering Requirements - User Analysis

1.0 Proposed Tasks

Our proposed prototype will be a mobile application. There are a few useful features within the prototype that is focus improving the user experience on the services that strives to enhance the lifestyle of the citizens of Malaysia.

1. Real-time public transport tracking
   One of the common problems faced by user is the lack of accurate and up-to-date information about the public transport. This feature should help users to track public transport current locations and ETA of the public transport. This is a great way to let users able to manage their time in the best way without wasting time on waiting for the public transport with uncertainty.

2. Community Reporting Platform
   The environment around our home is important as we will be the one who access it the most. Any unresolve malfunctioned or broken public facilities should be reported to the relevant department in order for them to have the time to come up with an solution and take action as soon as possible. The evidence photo should have an upload from phone option instead of taking it at the spot, the location detected should be accurate, and the description must be a required thing to submit within the report. The implementation of this system into a mobile application that has a good user interface and maintained regularly is the best way for us to keep our surroundings nice and comfortable.

3. AI Chatbot
   An AI chatbot is integrated to assist users with diverse inquiries and navigation within the application. The purpose of AI chatbot is to provide quick responses to queries related to public transport, reporting processes, and accessibility options, improving overall user engagement. The chatbot can also proactively suggest solutions based on user preferences and history. For example, suggest the best route and give details about the chosen bus.

2.0 Persona

Heng Hao Yan

Hao Yan is a currently Year 2 student in University Teknologi Malaysia (UTM). He lives with his family at the residential area near to UTM Skudai Campus which only takes 7-15 minutes for him to come to UTM Skudai Campus. At his Year 1 study, he always uses public transportation which is the bus as the main way of him to come to school as this is a cost-effective option for him. However, during the time is use bus as the main way he comes to school, he had encountered many problems such as inconsistent bus schedules that made him stress at every morning to arrive at the bus stop as soon as possible and sometimes need to waste time waiting for the bus. The unreliable Estimated Time Arrive (ETA) also caused him to be late for class. He also felt uncertain about the report of the problems he faced because there was no way for him to track the report progress.

Due to these issues, Hao Yan decided to drive to campus by his own in Year 2. Although self-driving is convenient way for movement, he sometimes still considers using public transport again during busy day or when fuel costs are high. He is now looking for the app that can help him to solve the problem he met in the best efficiency.

Lee Wei Harng

Lee Wei Harng is a project manager who is currently working as a consultant for AIA. He graduated from Universiti Teknologi Malaysia, and received a Bachelor's Degree in Civil Engineering. Project management has always be his domain, and he has work a long time in that position. He is an attentive and responsible office worker, who is always reminding himself to be on time to work. As there is a MRT station right behind his condominium, that is also running the same MRT line as the station nearby his office, he has start taking the train to his job daily. By taking public transportation, not only he can avoid any congestion on the way to his office, which is positioned in the centre of Kuala Lumpur, the carbon emission by a car can also be reduced.

As he needs to be punctual, he had tried planning his trip to his office using some existing systems, however the user interfaces and the slight innaccuracy has made him feel the inconveniences. As a result, he just follow his regular routine and try to reach the station before the last train that will caused him to be late for work. On his way from home to office and the back, he had noticed some problems that made him feel frustrated, especially when the side walk for pedestrian is broken and not fixed for a long time everyday he passed by. As he still needs to take the route again and again, he had wondered if there is anyways that he can report this to the local council easily, without going into the office. He had used some apps that were released by the government before, but they were always lacking some features and he does not have the best user experience. The lack of AI chatbot integrated into current systems has been a bit annoying too, when sometimes he needs to find a restaurant that was very specific and the internet searching or in-app searching just does not give the best option.

Mah Wilson

Mah Wilson is a 20 years old UTM student, who currently studying Bachelor of Computer Science (Network and Security). He used to have leg injury and lost his ability to walk temporarily. He uses a wheelchair and relies on accessible public transport. He needs to take public transport to go outside of campus for groceries shopping.

Since he need to use public transport, so if there is any delay services or inaccessible platforms would be difficult for him. It would be annoying and causing inconvenience to him as he needs to wait for hours for the bus. He also find that there is lack of information about issues such as broken infrastructure, faulty services and images to help the relevant authorities address problems effectively. He also feels inconvenienced with the application that is not user friendly, slow responses and didn't provide any navigation within the application.

3.0 Scenario

Persona 1 from user group.

Persona: Heng Hao Yan, Year 2 Student, wants to track the accurate bus schedule to avoid the frustration of wasting time waiting for bus or missing the bus due to uncertain time of bus arrive.

User Goal: User could get the real-time update of the public transport location and situation and able to make the report as easy and visible as possible for everyone.

Tasks:

- Open the application
- View real-time update information of the desired public transport
- Use reporting system that is progress visible for every user to report issues met.

Heng Hao Yan who lives near UTM Skudai Campus and relies on public bus to go to campus. However, he often feels angry and nervous because the bus schedules are unpredictable, making him waste time waiting at bus stop or miss the bus but not knowing it. This made him wanted to make complain about the issues he met but he always feels unsure for the report he made is being in progress or not as there is not a clear way for him to know the report progress.
Hao Yan is looking for a solution for these issues because he as a public transport user does not suppose to has these issues. He is searching for an application that provides real-time public transport schedule updates with accurate Estimated Time Arrive (ETA) that could be useful for planning his trips to at the best efficiency without wasting time waiting for the public transport. Hao Yan also need a community report platform provided by the a[[that allows him to report the issues he faced and the report details and progress will be visible to let all the user of the application knows so that every user could track the latest status of the reported issues.

Persona 2 from user group.

Persona: Lee Wei Harng, Project Manager, wants to report the broken public facilities or side walk to avoid any inconvenience happening to him or the others on his way to office.

User Goal: User could report his problem easily in the prototype that has an optimised and neat user interface, also make public transportation tracking more accurate.

Tasks:

- Open the application.
- Navigate to the submit report interface.
- Use evidence photo that were in the device's library, write description, provide accurate location data.

Mr. Lee Wei Harng has often found himself in a situation where the side walk is nearly inaccessible, due to all the rummage that has happen to it. As he is walking around the city, the road is mostly busy, thus it is quite a risk to walk on somewhere that is not specifically for the pedestrains. The reporting process for the obstruction is quite forgettable, sometimes he would just take the photos from his phone and forgot that the reporting application does not allow the user to upload from their local file.

Mr. Lee had planned to make a report to inform the local council regarding the broken side walk, causing the pedestrians have to risk themselves walking on the bustling road. He opened the i-Tegur application and choose the right category, and used the in-app camera function to take a few evidence photo of the disrupted area. He also wrote the clear descriptions, in order for the authorities to understand the complaint clearly. Finally, he pin-points his accurate location, which is crucial for the relevant department to know where they should go for the fixing. After submitting his complaint, he gets to see the process on it, whether any actions has been taken by the authorities.

Persona 3 from user group.

Persona: Mah Wilson, 20 Years old, who is facing difficulties with application that is not user-friendly and didn't provide accessible features for personnel with special needs

User Goal: To check accessible transport routes and report an inaccessible building entrance.

Tasks:

- Open the application
- Get real-time updates on accessible transport availability.
- Use the AI chatbot to inquire about wheelchair-accessible bus services.
- Ask the AI chatbot for the best route and provides details about the bus and destination

Mr. Mah Wilson, a student who has facing difficulties to use application that is not user-friendly and didn't provide accessible features for personnel with special needs. He find difficulties to go out for groceries trip with bus every single time. He couldn't get the accurate ETA of bus, and he need to waste hours for waiting. Moreover, as he is a persona with special needs, he need to know whether the bus has provide accessible features for user like him, sometimes he finds the ramp too steep and also struggles to board the bus due to insufficient space for his wheelchair.

Mr Mah trying to solve these issues since he was tired of poor services every single time. He was trying to find an application that do provide real time bus schedule update with accurate ETA. This will eventually save his time and energy and really bring the convenience to him. Moreover, he need an AI chatbot to assist him with diverse inquiries and navigation within the application. It should provide quick responses to queries related to public transport, reporting processes, and accessibility options, by showing the images of accessible features for user with special needs. The chatbot can also proactively suggest solutions based on user preferences and history, therefore he can estimate the time he need to take the bus without wasting time.