The Development of WeChat Mini Programme for Tourist Navigation Services and Behavior Analysis

By

Li Yi Siang

A REPORT

SUBMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfillment of the requirements

for the degree of

BACHELOR OF COMPUTER SCIENCE (HONS)

COMPUTER SCIENCE

Faculty of Information and Communication Technology

(Kampar Campus)

May 2019

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DECLARATION OF ORIGINALITY

I declare that this report entitled "**THE DEVELOPMENT OF INTERACTIVE DASHBOARD FOR MALAYSIA TOURISM**" is my own work except as cited in the references. The report has not been accepted for any degree and is not being submitted concurrently in candidature for any degree or other award.

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Name : _____

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ACKNOWLEDGEMENTS

I would like to express my sincere thanks and appreciation to my supervisor, Dr Liew Soung Yue who has given me this great opportunity to participate in this mobile application development project. It is my first step to establish a career in mobile application development field. I really appreciate it and wanted to say thank you. Thank you, Dr.Liew.

Furthermore, a special thanks goes to my teammate, Lye Kean Ping, who develop and investigate the application and issue together, gave suggestions during the project discussion. Finally, an honorable gratitude goes to my beloved families and friends for understanding and supporting me in completing this project.

ABSTRACT

This project is aim to develop WeChat Mini Program with the purpose of promoting the Tourism in Kampar, Malaysia. WeChat Mini Program that use the services provide by WeChat, which provide the same functionality as what a mobile application does. It consists of two main modules in this WeChat Mini Program, which is the "Tourist Navigation Services" and "User Behaviour Analysis". Tourist navigation services are explain as the ability that detect a user's location and provide navigation services. In terms of user behaviour analysis its will make use of the development of WeChat Mini Program to capture the behaviour of the user through their travelling route, mini-program using experience and also the data collected by capture the metadata from the uploaded images.

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LIST OF ABBREVIATIONS

APP	Applications
KHAN	Kampar Heritage and Nature
API	Application Programming Interface
GPS	Global Positioning Services
WIFI	Local area wireless technology
WCMP	WeChat Mini Program
WXML	WeiXin Mark Language
WXSS	WeiXin Style Sheet
JS	JavaScript
RMB	Renminbi or Chinese Yuan
MYR	Malaysia Ringgit
FYP	Final Year Project

Chapter 1: Project Background

1.1 Problem Statement

Travel and tourism industry has raise rapidly over the years. It is expect to augment further to an estimate $260.5 billion within the next decade from the currently stands which is at $147.7 billion. (Source World Travel and Tourism Council) In Malaysia, travel and tourism industry has become one of the major contributor to the national economy. In year 2018, RM84.1 billion are being contribute by tourism sector which up by 2.4 % compared to RM82.2 billion the previous year, said Tourism, Arts and Culture (MoTAC) Minister Datuk Mohamaddin Ketapi. However, he also said that there is a slight drop in international tourist arrivals, namely, from 25.9 million in 2017 to 25.8 million in 2018 and the per capita expenditure of the tourists rise 2.9 % from RM3, 166 to RM3, 257.

From the currently situation stands it is clearly show the necessary of implant an accomplishments in order to improve the tourism and travel industry in Malaysia. Digitalization is evident in all industries and sectors, and the tourism industry is no exception where technology has disrupted the old order of things and completely reinvented the ways to explore traveling. Despite there are multiple tourism application had published on the digital market in variety platform nowadays. However, there is insufficient enough for the users today. For example, users always limited by phone device memory space in order to use or download the tourism application.

Besides that, due to the rapid development of the country, small town or countryside area are always been ignored and forgotten. Yet there always exist a tourism value on those location or places. Kampar, a city that located in the state of Perak, Malaysia. It is an historical location which been once named as tin village in past century due to its primary industry in those time, tin mining. Due to its greatness's characteristic Kampar can say to be one of the potential town to transform into a tourism-based attraction.

1.2 Background and Motivation

The World Economic Forum (WEF) has placed Malaysia Tourism 26th spot in Travel and Tourism Competiveness Report. (New Straits Times 2017) In addition, Malaysia Tourism is also the biggest contributor to the Malaysia economic (Tang, 2013). Only talking about Year 2016, 26.8 Million of tourists visited Malaysia and created 82.1 billion of receipts in Ringgit Malaysia. Comparing from ten years before 2016, which is 2006, the arrival of tourists was only 17.55 million and only 36.3 Billion of Ringgit Malaysia receipts was received (Tourism Malaysia 2016). From the statistic above, Malaysia Tourism economy has improved rapidly throughout the years, even until now.

Furthermore, it is important to strengthen the Malaysia Tourism, at the same time the Malaysia economy, in order to improve the Malaysians' living standards and contribute to lower unemployment rates. From the Information and Technologies (IT) perspective, to strengthen the Malaysia Tourism is not chatter in this century. Smartphone and personal computer with the assistance of internet, social media, browse engine etc. Mobile Application are the most common way to implement those accomplishments in handheld devices. However, one things that are taking concern is that handheld devices are always memory space limited and mobile application are memory consumption. In order to overcome that problem, Tencent has launch a feature called "WeChat Mini Programs" in year 2017.

WeChat started in year 2011 as a chat messenger and now there are transform into the most popular social media application in China. WeChat provide its user so many features and services which to achieve the concept of all in one places. For example, it offers Messaging, Official Accounts, Moments, WeChat Pay payment services, City Services, Heat Map, Friend Seek, News Search, WeChat Out and with the addition of WeChat Mini Programs.

WeChat Mini Program is an app within an app. It provide a platform for service providers to create and launch their own services and program within the WeChat application. There are no further downloads are required and does not needed a free storage spaces in order to use the services. All the user need is just the WeChat application and a WeChat account. It develop in their specific programming language which is a JavaScript framework developed by Tencent.

1.3 Project Objectives

This project's main objective is to build a more accessibility and convenience platform to access the features and information in order to promote and enhance tourism of Kampar. WeChat Mini Program are the platform that going to develop in this project which due to it characteristic that user does not required to download any application software into their devices in order to using the tourism services will be developed.

As the scope of the project the tourist navigation system will be, develop which it will connect with the third party navigation application such as Baidu maps or Google Maps in order to provide navigation services. Besides, as the implementation of the tourist navigation system, it also aim to track the route of the user travel from time to time.

On the other hand, the mini program itself also act as an information gathered resources. Which user are able to check and browse for the tourist related details such as accommodation, food, attraction and else information within Kampar area.

Finally yet importantly, this project will be focus on capture the user behavior through the location tracking and most frequently search result. While user using the service that provided by the WeChat Mini Program their interested information would be capture from time to time to provide a tools for enhancing the specific area or activities by determined user favorable behavior. The data achieved will then be analyze and to discover new business model in future.

1.4 Proposed approach

In this project, WeChat Mini Program are proposed and launched in order to promote the tourism industry of Kampar town. By completing the project, a WeChat Mini Program named visit Kampar will be build and publish. WeChat Mini Program is an application inside another application. It provide superiority of does not require download where user able to use the services and features supported when there is a WeChat accounts and the WeChat application itself. WeChat is not only just a social media application but also a bridge of communication and transaction between services provider and user. For example in this project, the visit Kampar mini program is known as a platform that use to be provide tourism services within Kampar town and retrieve the user surfing and travel data. In the program, it consists of variety of features such as navigation services, mini games, reward services, information provider and review and ratings services.

In the term of display language, the visit Kampar WeChat mini program are fully develop in mandarin language. This is to avoid the language shock issue and produce a more familiar platform for the China tourist as well as the local chinse citizen. We believe that it will able to promote the tourism of Kampar town and boost the economy of small town area by attract the focus and visitation of them to this place.

Finally yet importantly, it would be the behavior analysis and data collect process. The user's app-usage behavior and travel route are record to the server from time to time. It aim to use for the analysis process in the future time by determine the user's travel behavior and their likely interested content. Sever that are going to implement in the project would be the WeChat Developer Cloud.

1.5 Highlight of Achievement

In this project, that are several achievement have been made throughout the development stage. The first achievement was the successfulness in development of a functional WeChat Mini Program. At the end of the development phase, visit Kampar WeChat mini program are capable enough to display and show the tourist related information of Kampar town. For example, user are available to browse for the hotel, attraction and food o restaurant information by using the mini program.

Besides, the second major achievement in this project was the development in the tourist navigation system. With accomplish of this achievement, user are able to browse for the nearby attraction in the mini program. Furthermore, it also support in apps maps viewing and drag the mark point for look up locations information as well as to set destination. Moreover, in order to provide a better user experience, user can just to turn up their navigation tools with a single press on the attraction information pages. In order to build a more perfect mini program and better user experience that are some simple features had been developed such as user login, calendar, authorization settings and phone's details detection.

The third achievement in this project is the development of the travel album. In this travel album user are provide the features such as upload their favorable pictures into the mini program. This is then further develop which the user are able to write description on the photo uploaded and the metadata will be obtain automatically while the picture is uploaded. For example, the captured location, date and time had been recorded for further analysis purpose in the future.

Last but not least, another achievement is the behavior analysis and data collection. The Mini Program had always recorded user's information such as name, sex, region, language and type of phones while user log in to their WeChat account. Besides, the metadata of the uploaded image for travel album in the mini program will be export and the image's capture location are use as the user favorable travel route plotting materials. Furthermore, user using experience and behavior are always been record while the program launch For example, page of user more likely to visit, average time of duration that stop on the page, and per capita duration.

1.6 Report organization

In this project, the reports has begun with Chapter 1 which describe the problem statement, background and motivation of the project, objectives of doing this project and the method that are propose in order to achieve the objective of this project. Besides, this chapter also describes what have been achieved throughout the development stage of this project.

In Chapter 2, some of the research has been done on the technology and the related topic that are going to involve in the project. It consisted ten literature reviews that include the surveying on the existing tourism mobile application, information on tourist related website, review on the WeChat Mini Program development tools, the usage of navigation system and else.

In Chapter 3, the system design of the proposed program has explained in detail. Firstly, it state and describe the architecture of the software implemented. Furthermore, it explained the whole development process of the Visit Kampar mini program. The process is separate into little part in order to enhance the simplicity of the process explanation. For example architecture for the program, overview of the development process and flow chart for each features are described.

In Chapter 4, the programming tools and language have been introduced. Besides, methodology and general work procedures of the visit Kampar mini program are explained and page arrangement for the mini program are well listed and elaborate.

In Chapter 5, the implementation issue and challenge has been fully elaborate and discussed. It classified into two part of the challenges which is technical and non-technical.

In chapter 6, the tourist navigation features were explained and emulate. In addition, data collection related topic are also discuss in this chapter.

In Chapter 7, conclusion throughout the project is being mention and elaborated.

Chapter 2 Literature Review

2.1 Review on Tourism Mobile Application

Due to the rapid increase in global users have bring the mobile computing become a dominant platform in software engineering. According to the world application market it's say that there are more than 2 million mobile application are currently available for mobile users which generally in social networks, travels, communications, games, multimedia and utility. The increase in mobile application development and user highlights the needs for efficient, effective and standardized development process, which include Effort estimation, functional sizing measurement to quantify the quality of mobile application. In this review we will focus on travel-related mobile application. Tourism application represents an unprecedented opportunity to promote and provide the destination visitor information, booking services and some travel-friendly features such as tourist navigation services and voucher redemption.

From the developed tourism specific apps, its proving that to be best examples of provide detailed tourism information to the tourist when in-location. User can simply access to a rich, interactive guide to the tourism offer and features with just a simply touch the icon on their mobile devices. As from the comparison of few major tourism and travel mobile apps in China such as Ctrip, Qunar, TongCheng, Tuniu, Elong and Lvmama, GPS navigation services is no doubt become the most important features in the tourism mobile application which nearly all of the application that researched support this features. With the available of this services, users are able to where they are in relation to all the restaurants, attractions and events around them. Besides, photo sharing, travel records and offline guided tour is a very useful function to provide great attraction to the tourist.

Instead, there exist an issue on most of the mobile application that on the market currently which is the improvement of the user interface. In a four inch or greater screen phone devices it is very challenging to show all the content to the user. This might affect the user's experience when the interface is too complex, and the un-clarity of the navigation provided which then will brought a great inconvenience to the user.

2.2 Review on SWOT Analysis on Mobile Application

SWOT is an abbreviation that has become a proper name. This name represent for strength, weakness, opportunities and threats. It is an analytical framework that use to draw out the whole picture, analyze the problem due to the situation and search for the most efficient and best solution. SWOT analysis is a tool that not only help in identifies the internal influences but the external influences as well. Most of the times human are always ignore the key aspect that mentioned by SWOT while planning which cause the loss of the opportunity to take the real advantages. SWOT analysis does not necessarily provide a solution but it does lend a hand on analyze the key issues that affect your idea.

In the development of mobile application, SWOT is usually been offered and implement before getting start the development process. By implement this services, there are more easily for them to look out of the box and understand the requirement and idea of the project more deeply. Besides, it can also help in identifies the weakness of the idea which will guide them from avoiding the failure and deter threats. Furthermore, it able to help in spotting the more competitive strength and exploit opportunities for the idea that have been planned. However SWOT are not a universal solution, it just one though critical step of your idea planning. SWOT analysis did not have a priority scale which it cannot provide a final decision instead of just generates the idea. Some of the moments the idea and information that created by SWOT might be useless.

While conducting SWOT analysis into the mobile application, it is important to clear that strength and weakness are often internal. Meanwhile, opportunities and threats are due to external influences such as market and competitors. In determine the strength of a mobile application, clarify all the characteristic of the app idea are needed. Search for the strength that concerning the competitors in the same field and for those similar characteristic are classify as a necessity. For the determination in weakness of a mobile application, comparison are required. There is no limitation for the perfection, compare the weak sides of the competitor’s applications and analyze its challenge as well as the solution. By research deeply to the strength and weakness of the mobile application it

is possible to generate an opportunity from it. Strength and weakness that founded can be further analyze and improve them to become a new opportunities.

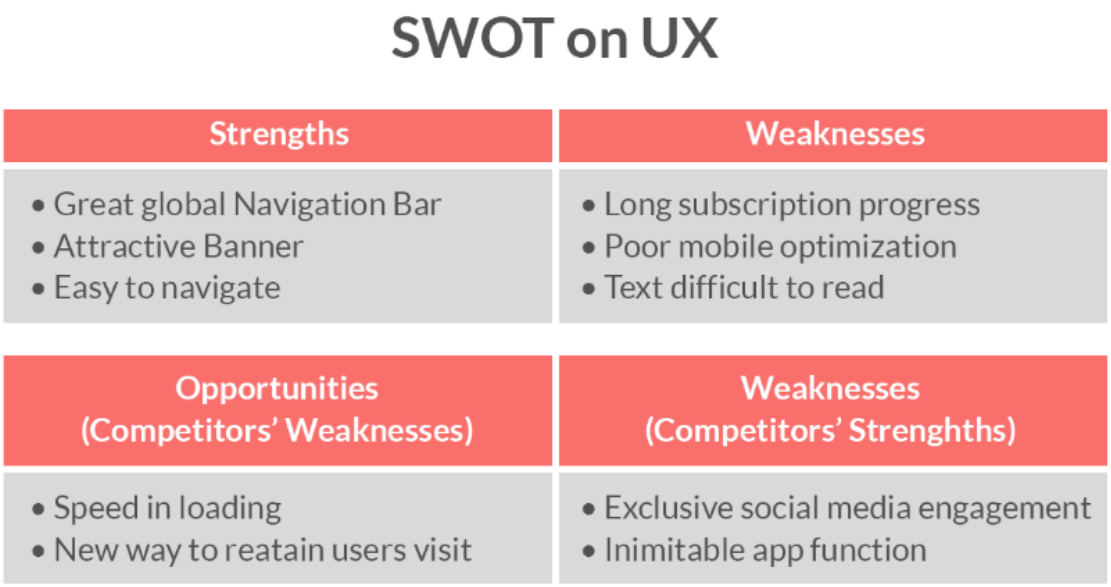


Figure 2.2.1 Comparison of SWOT on UX

2.3 Review on Mobile Application Data Collection- Data Sharing

Data sharing is one of the common data collection method. It is the practice of making research data available to other investigators or institutions for the purposes of social scientific research. Data-sharing can occur through informal data exchange among data owner, and formal data exchange through data archives and repositories.

Data that collected by data sharing technique generally more precisely, large in scale, and sustainable. In most of the mobile application, user have to insert their personal information and data while register and log in to their account. From time to time, the application itself will store the data for a long period of time until it is no longer important and relevant. Therefore, the data that obtained from the mobile application will be large in scale. Besides, data sharing also involve the track of user's experience on using the mobile application. When the user agree with the terms and condition of using the apps, the permission of the application to track the usage of the application has been granted. This data is then collected and there might use it to conduct their own data analysis on their user to figure out the user behavior and then to make a more precisely and effective prediction and suggestion to their user.

However, data sharing technique must be in a situation of agreement of both side. There for if there exist a number of user which are not willing to share their details and agree with the usage term then the user might not able to use the apps. The main reason is due to legal and privacy issue. The legislation of Malaysia which is Personal Data Protection Act 2010 (PDPA) has mentioned that a data user is prohibited from processing personal data of a data subject without consent. Therefore, a mobile application developer could be sued in a legal due process if they are found sharing their data illegally.

2.4 Review on Impact of Mobile Application on tourism industry

Smartphone play a significant role in mediating the touristic experience (Wang, Park and Fesenmaier, 2012). This cause a situation where there are less differentiation among the tourism and daily life as travel-related activities, from obtain inspired on a social media to getting flight rate information on the go are now very common to exist without any physical barriers to the end-consumer. Therefore, it is claimed that the implement of smartphone into daily habits produce a great effect and consequently affect the modern tourism behavior (Wang, Xiang and Fesenmaier, 2014).

Previously, people are normally use the guide books and checking magazines or periodicals for planning their trips. Tourist are always highly depends on the booking agency and reservation stores in order to make purchase their transportation ticket such as rail and train as well as for booking their hotel room and get the tourist catalog. The development of mobile application has change the situation. Tourist can browse for all the information right from "go" by using the mobile devices. Besides, it also provide a more detailed information browsing experience which tourist can look for 360 degree view of the rooms, video, images and also the accommodation and attraction review from other user. Furthermore, it also provide a more economic and convenience platform where tourist can book and purchase their ticket online without paying any service added charge and also able to grab the promotion on time to time on hand.

Due to the high demand of user on mobile application, the tourism apps are further evolve and developed with many value added features and services. For example, to search for the attraction nearby, to provide geo-location navigation services, cashless travel with implement of e-wallet and else. The development in mobile application has brought a more efficient and convenience platform to the tourist for raise the quality trips regarding planning, searching and travelling stages.

2.5 Review on WeChat Mini Program

In China, WeChat has been categorized as one of the most used communication apps and is say to be the first social media apps in China. To the global, WeChat is not just an apps but it also consist of a lot of features such as sends texts or vocal messages, take photos and videos, send locations to friends, pay for shopping, make an appointment to the doctors and many others. WeChat itself claim that they has bring all the most useful features in Chinese's life in one single app. Since January 2017, WeChat has proudly introduced their brand new features which is WeChat Mini Programs.

WeChat mini programs is also knows as a "sub-application" which is one app inside another. Therefor with the appearance of this brand new features user will no longer need to download an apps for using specific services because it might already available in WeChat itself. The purpose of the WeChat mini programs has went through a very great response is because of its convenience. Mobile application are always spend up a lot of storage in order to download the apps and this will cause the user have lesser memory storage to store their personal files such as photos and video. WeChat mini program are claimed to be less storage space spending, more convenience and faster speed. On the other hand, the amount of cost that require to develop a WeChat Mini Program are usually lower than develop a native app.

However there are some limitation has been revealed from the study of the WeChat Mini Program. First was the limited size of a WeChat Mini Program. There are only exists an amount of 10 MB can be use up while developing a WeChat mini programs. However this 10Mb does not included the pictures, music and videos that can be hosted on a server. As a result, some of the features that required larger number of memory are required to link and access to the third party apps instead of just in-built inside the WeChat mini programs.

2.6 Review on cashless travel

Living style for the world today have been greatly influenced and surround by internet. Through the internet related technological innovations such as big data, e-commerce and Internet of Things (IoT), it improve the simplicity of the launching the daily task. Not only that, it also give a huge improvement on many industries for example tourism. The rapid growth on e-wallets are useful in development of tourism industry which it allow the cashless electronic transactions. Therefore, it simplicity the process of payment hassles on travelling. For examples, when comes to travelling the most frequent happened hassles definitely would be the foreign exchange. Instead of spending the time to search for ATM machine or money changer, e-wallet will obsolete this time consuming process.

In year 2018, china tourist has become the Thailand's largest tourism market. It follow by the situation where more and more Thai merchants started to implement e-payment systems such as WeChat Pay in order to cater the tourist from China. Besides, in order to promote the cashless travel concept, local government has done some effort on this such as implement the e-wallet system into local transport systems in order to raise the tourist experience. By integrating this on public transport it bring a great convenience to the tourist and might create a seamless system for the western tourist.

However, by integrating and promoting cashless travel it does arise some problem on it which there are too many e-wallets apps are available on the market. Tourist are probably needed to install a list of different apps in order to make the payment through specific e-wallet and so with the merchants too. Merchants are not expected to own all the different types of e-wallets as well. Therefor in China, most of the tourist and the common man are typically using the WeChat Pay as their tools of making payment transaction since it has claim that WeChat are generally own everyone for Asian citizen

2.7 Review on Tourist Behavior Analysis

Smartphones and tablets has become an integral components for a tourist to look for information support during the trips todays. As to detect the user's location from a mobile application, technology platform such as internet, radio signals and global positioning system (GPS) data are frequently been chosen to be use. A well location services are always offer a better travel experience while in trips which by provide a more comfort, memorable and informative trip. Furthermore, the hybrid of mobile technologies with GPS antenna has created new seed s of tourist. For example the tourist route planner, dynamic change of tourist route and else.

With exists of the technological innovations that influences from the geographic information systems and GPS, it shows a significant changes on the behavior of tourist and preferences. Therefore, a new method of analytic on behalf of the human behavior have been in created. With the use of GPS signals, it is possible for the application to track the movement of the tourist within the city and indeed the data that have been tracked will helps in determine the most popular tourist route and facilities.

Besides, the data that have been obtained through the tracking from the GPS navigation system are useful in the doing data analytic. More accurate and precise suggestion and promotion are trust to be able to deliver to the tourist more efficient. For example, the number of the user click on certain page are always been tracked as well as the location of the user. This data can be further analyze and then implement data processing on it which could be a useful big data in the future.

2.8 Review on Big Data

In the recent years, big data is a common term around the Information Technologies (IT) world. Big data indicates a massive amount of data, not kilobytes or gigabytes, but it is in terms of terabytes or petabytes of data. In addition, the data can be in many forms, structured and unstructured. For instances, structured data are from websites, blogs, and etc. They can be retrieved easily, but it is only 25% of total data (Rajendra Akerkar, 2012). However, unstructured data are spread around the internet. They can be in the form of photos, videos or data from Facebook.

Big data benefits the not only to enterprise, but also to community, government and etc. For instance, Alibaba applied the concept of precision marketing, which has a direct relationship with big data. With massive amount of customers' data, a company is able to make a precise prediction towards the marketing strategies and promoting strategies for not only present but also future (Yang, Pan & Song 2014). Moreover, big data also benefits for management by:

- Reducing the cost and increasing revenue,
- Improving the product and facilities,
- Boosting the operational effectiveness,
- Improving in the innovation processes and
- Expanding of new products and markets.

(Leeflang, Verhoef, Dahlström, & Freundt, 2014; Silva & Campos, 2014; Minelli, Chambers, & Dhiraj, 2013; Ohlhorst, 2013).

Big data can be described with 5 characteristics, which is The Five V.

- The first V is volume, as mentioned above, the volume refers to terabytes or petabytes of data, and the data will be increased rapidly from time to time, because of continuation of data collection.
- Next V is velocity, the speed of processing the data, from data collection until data visualization.
- Nevertheless, Veracity refers to the messiness or accuracy of the data
- Another V to take into account is Value, Having big data is no good enough, until it becomes value. (Marr 2014)

- The last V is variety, the mixture of data types and formats from various sources.

(Rajendra Akerkar 2012).

By reviewing to the official portal of Ministry of Tourism And Culture Malaysia, limited data are found on the portal. For instance, the hotel data, limited hotel information is found on the portal and is listed without updated hotel pricing. In addition, the registered travel agencies information is not up to date. This proven the data collected is not processed and not automatically updated or analysed. Or in the worst case, the data is not even collected and stored. This problem is very critical to the industry of tourism in Malaysia. The most important data is held by the government and only the government has the right to access those data, for example the tourist details, hotel booked, and travelling intention.

This data is again very critical to the industry of tourism in Malaysia, because after the data undergoes the processes as mentioned, it becomes a powerful and advantageous tools, in order to improve the Malaysia Tourism. More specifically, Malaysia can have a more detailed flow of the tourist's itinerary or even the tourist's mentality of travel. If the Malaysia government got such a powerful tools on hand, undeniable the Malaysia Tourism will be improved rapidly, by precisely advertising, tourism attraction improvement, tourism attraction condition forecasting and etc.

This tools can also be used by the community via the internet, which will make the community convenient and travel more efficiently to provide the user a personalised experience. Social media and internet tools are instrumental in enabling Smart Tourism Destinations to develop such dynamic connections, as technologies enable them to network. Social media has been considered as a useful and rich source of tourist information (Miah 2016).

On the other hand, the processes mentioned above has their own challenging part in order to apply them. The following questions are the problem that the project will face.

- Where is the source of the data?
- What data should be collected?
- How is the data storing and cleaning process to be done?

- How the data analytic can be perform?
- How to visualize the data?

2.9 Review on Mobile Navigation System on Tourism

In the decade that fulfill with modern technology and application, GPS (global positioning system) has become the common profile to exits in the mobile devices for the activity of the information services in order to determine the location of tourists. It's become necessary to has information processing function for the current location of the tourist in an application. The application that without such function has become less popular, because tourists is often unable to determine their location during the trips. There are some well know example of mobile algorithm for tourist that are based on GPS data such as navigation systems, route planners, augmented reality systems and computer travel guides.

Scientists of the International Association of Engineers (IAE) has created a navigation system that helps to determine the information on the relevant route (Nakatani Y., Tanaka K., Ichikawa K. 2010.). This approach allow tourists to create and modify their own trip by select the preferable tourists' sites to visit. The optimal route that included with the object related is then generated and displayed on the mobile devices. Therefore, digital maps and GPS information has become the most important aspect throughout the trips.

There are a lot of information technology developments has done in the field of navigation systems. One of the most attractive developments was the water vehicles' navigation systems. This developments has been further consolidated while the succeed of the scientists of University of Munich to produce information system that support safe travelling in mined waters. (Babel L. Zimmermann T. 2014.). This system support an essential feature which is the particularly centimeter accuracy of the coordinate calculations and best route selection criteria by determine the need of safety condition and duration of trips.

Inspect in the field of tourism information system, GPS navigation technique has been widely use in planning indoor routes. This is further proved while the tourists sites is usually have complex spatial structure and tourist are always facing the problem of getting lost when they are not clear with elements of objects and spaces without the assists of professional guide(Zeimpekis V., Giaglis G.M., Lekakos G. 2013.)

2.10 Review on Location Positioning of Smartphone Devices

2.10.1 GPS-based Positioning

Global positioning system (GPS) claimed to be the dominant technology to define user location on the smartphone device. Theoretically, GPS is a mature technology and free services that allow user to use it without limitation. This is because GPS is a public accessible technology, user are able to obtain their current location information through satellite positioning services. Mobile devices nowadays are commonly support the capability to receive the GPS signals with its built-in GPS receiver. By this the signals that generate from the GPS satellite will be able to transmit to the mobile devices through the GPS receiver. In order to overcome the calculation for the position of GPS receiver, four or more satellites are needed. On the other hand, the data that has dispatch by the satellite which include the location information and the present time and this data is use to undergoes the positions' calculation process which named as trilateration.

As show in the figure 2.10.1 below the receiver will detect the distance from it to satellite A, then determine whether it will be placed somewhere on the red circle. Similar procedure is then define in satellites B and C, the location will be calculated by intersecting the three circles. As mentioned before four or more satellite is needed to undergo the calculation process, besides the usage of the three satellite that have mentioned before. To overcome any clock errors among the satellite's clock and the GPS receiver clock another satellite is used and I also known as fourth satellite. This is important due to the little distinction of the clock can brings to serious failing in location determination process. As from the research, type of GPS receiver leads to greatest effect on determine the position accuracy. Normally the GPS receiver on the market now is having an accuracy of about ±10 meters. However, there is a limit of the GPS based positioning technique which it will only works well when there is in an outdoor environment. (Griffin, 2011)

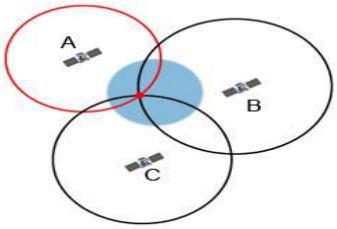


Figure 2.10.1.1 Overview of trilateration process (physics.org, 2014)

2.10.2 WiFi-based Positioning

From the review of GPS based positioning technique, it is proved that GPS-based positioning has provide a great performance while in outdoor environments. However, it is not functional well when there is in close up environment condition such as underground subway (tunnel), building and etc. It is important for the systems to achieve and obtain user's position when they are not in an outdoor situation. This is because to make sure there is not lost of position tracking situation happened and to make the navigation application to keep on track the user while in any environments instead of just outdoors. As claimed by a researcher, there are possibility to achieve the realization of indoor positioning system due to the mobile devices nowadays are commonly fulfill with Wi-Fi adapter and major of the modern buildings have Wi-Fi access points todays. (Shah & Shah, 2014)

Several Wi-Fi placement methods such as Nearest Access Point, Received Signal Strength Indication (RSSI) and Trilateration have been implemented and implemented to determine the user's indoor location. Nearest Access Point is one of the easiest techniques to justify the location of customers depending on the user's closest access point. This method, however, provides a low precision rate, but it does not involve complicated calculations and activities on the other side.

Received Signal Strength Indication (RSSI) is also one of the technique that has been use for Wi-Fi positioning. This technique determine user's location by measure the distance between the sensor and the nearby access point with depends on the strength of signal that received. It can also be used to deduce the distance to the points of access. To determine the signal strength loss, devices will measure and calculate the Wi-Fi access point output energy level and the user's signal strength. The free space path loss equation is the technique that the system uses to calculate the distance to a

particular access point. It will collect the position and distance from three or more access points and then calculate the place using an algorithm called Trilateration. Trilateration is an algorithm which similar to the GPS-based positioning technique, systems will calculates a location by intersect the three circles.

Chapter 3: System Design

3.1 System Architecture

In this project, while formulating the system architecture, layered architectures have been implemented in and act as the system architecture throughout the project. In such case, layered architecture for the visit Kampar WeChat Mini Program have been separate into three layers. Layered architecture is a set of techniques and patterns that implement into the system in order to develop the fully structured mini program based on industry and vendor specific standards. The layered system architecture of the WeChat Mini Program is show in Figure below.

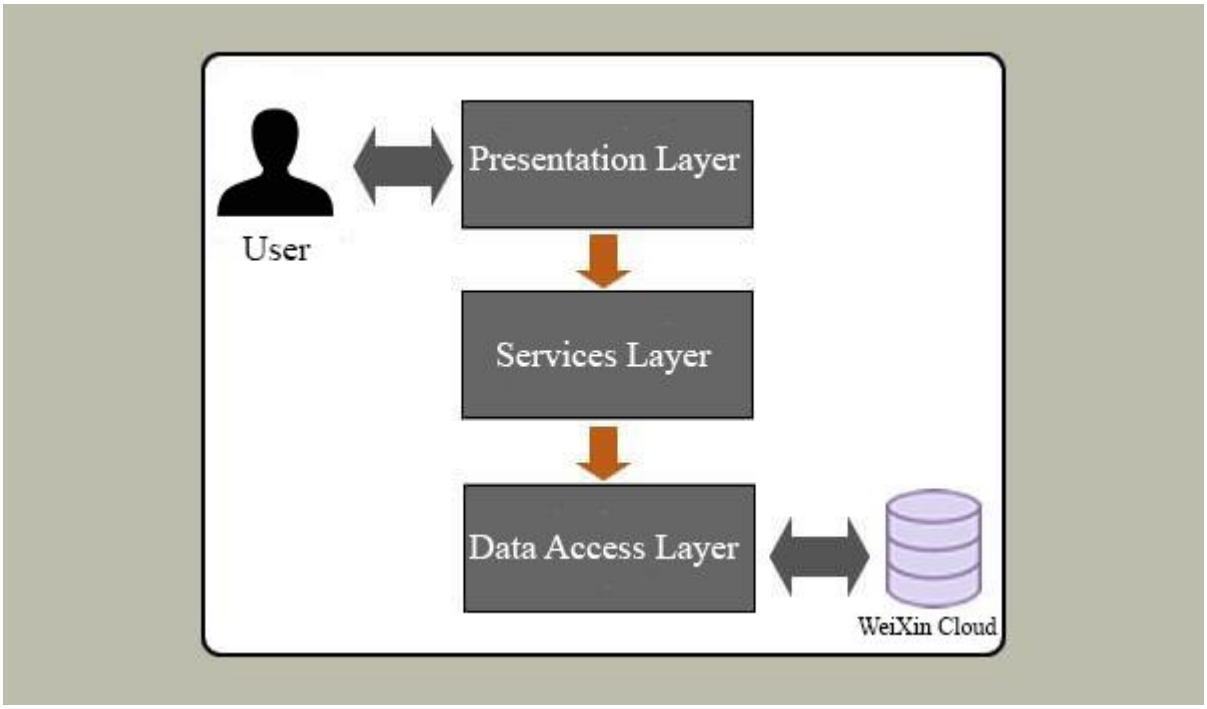


Figure 3.1.1 Show the layered system architecture of the WeChat Mini Program

For the presentation layer it is primary focus on how the application would be presented to the end user. While designing this layer, user or client type are determined correctly in order to create a more compliant program. Besides, the deployment constraints has to be take note as well while developing. The other prerequisite for designing this layer is implement the accurate data information and put in place a strong data validation technique so that your app can be protected from invalid data information.

For the services layer, its concern on the services that going to provide to the user such as logging, browsing, caching, validation, security and exception management. In this phase, the tasks is usually separate into various categories in order to reduce the complexity of this layer.

Data access layer is the layer that will meets the WeChat mini program requirements and facilitates secure data transactions. Thus, the system that design in this layer are require the capable to scale in the future as the business requirements might change. Besides, all the data access functionalities are encapsulate inside this layer and it handles all CRUD (Create, Read, Update and Delete) operations and data sources. Least privilege are encourage to be implement in this layer in order to avoid any data stealing and enhancing the safeness of the data access mechanisms.

3.2 System Development Overview

In this project, there are a lot of works and effort that has been contribute in order to achieve the objective and also deliver the best result which to fulfill the expectation of this project. For further details, system design of this project has been categorized into 4 major parts which is preparation, coding, compiling and uploading, testing.

3.2.1 Preparation

In this project, various basic knowledge are required in developed the WeChat Mini Program. Firstly, comparison and reviewed between the tourism applications are done with the aim of determination of the features and information that are required to implement in the project. Few tourism related application and program are account into a research by comparing the strength and weakness of the application provided. SWOT analysis was also implement and undergoes during this phase, then for those features that exists in every apps are categorize as a must function and not the extra one. The common features between the application is listed out and add into the features development list. For example, the basic function such as log in, review, rating and navigation are seem to be necessary and common in term of a tourism application. Besides, study of WeChat mini program and various platform is undergoes in order to acknowledge the most suitable and efficient platform. In this project, WeChat Mini Program have been selected as the developing platform as it provide the superiority such as does not require download, lower development cost and faster development process. After all, the research process done, it comes to the pre-development process.

In this stage, development software provided by Tencent (IDE Integrated Development Environment) has to be download and install in order to do all the code and preview your mini-program. Besides, a developer account are necessary to register and create on WeChat Open Platform in order to get approval on the linkage of WeChat back-end account. After the account registration process, a registered company is required for verification process in order to getting access as a WeChat mini program developer. On the other hand, after registered as a WeChat Mini Program's developer, a cloud environment is created in order to enable the cloud development capabilities. The cloud environment contains independent database instances, storage spaces, and

cloud function configurations. Each environment has a unique environment IDs, and the initially created environment automatically becomes the default environment.

3.2.2 Coding

In this project, the major development stage are carried out with the coding phase. For the very first step, developer have to acquire the App ID of WeChat Mini Program. This is because as the restriction of WeChat, developers cannot directly use the App ID of the service number or subscription number instead they need to log into the mini program development account (微信公众平台) that provided by WeChat. Then, while WeChat account is logged in the WeiXin's developer open platform, developers can start using the WeChat development tools by scanning the QR code with their WeChat account and then an APP ID is required to insert in order to build a project.

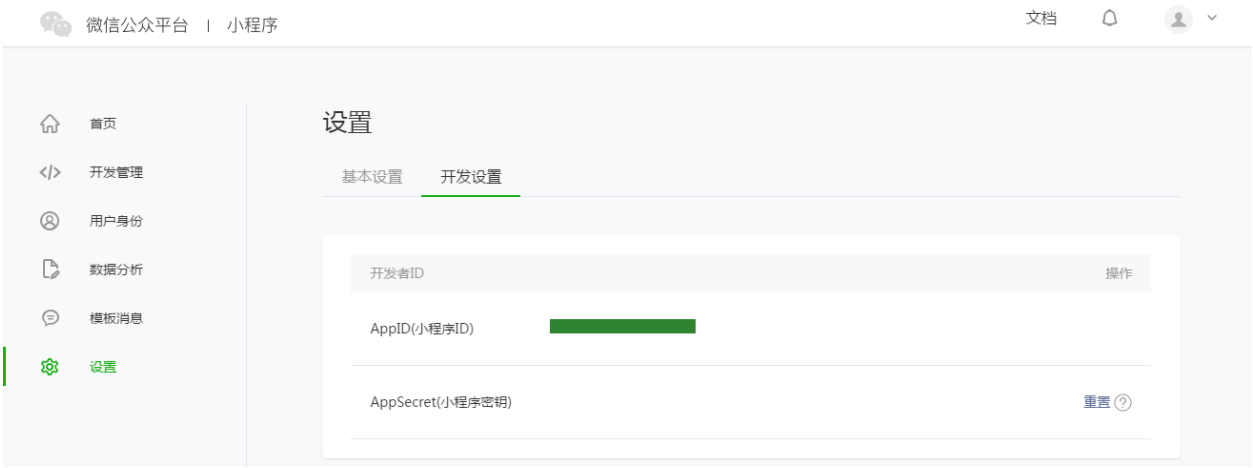


Figure 3.2.2.1 shows that the WeiXin's developer open platform and the appID obtained

After coding environment has been successfully set up, coding phase is ready to be conducted. In the coding phase of development a WeChat Mini Program, there are four types of language and files that are mainly use which is WXML (WeiXin Mark Language), WXSS (WeiXin Style Sheet), JSON and JS (Java Script). WeChat Mini Program development code are define in their own specific programing language. However, in fact, there are similar but with just a little minor differences to the Android development language such as Java, CSS and HTML. JS, which indicates as the script file of a mini program, in this file app services is implement and coded. In this file, wide range of APIs are available such as synchronous storage and synchronous read local.

Besides, the JSON file which indicates configuration file in WeChat Mini Program. Developers are able to configure the mini program at a macro level. It can configure and determine which pages of the mini program consists of, configure the background color of the mini program, decide the navigation panel's style and set up default title for the mini program. WXSS file indicates style sheet, which use to be set up the style rule for the pages. It determine how the components should be displayed on the screen. Furthermore, WXML is indicates as the layout file. It is mainly used for the overall interface or layout design of the page.

In this project, the most essential approach for the coding phase is to create an app page, which include app.js, app.json and app.wxss. App.js is the mini program script code that use to monitoring and process lifecycle function (生命周期函数), indicate the cloud storage (云开发) and declaring global variables (全局变量).

```
//app.js
const config = require('config');

App({
  onLaunch: function () {
    // 展示本地存储能力
    var logs = wx.getStorageSync('logs') || []
    logs.unshift(Date.now())
    wx.setStorageSync('logs', logs)

    // 登录
    wx.login({
      success: res => {
        // 发送 res.code 到后台换取 openId, sessionKey, unionId
      }
    })

    // 获取用户信息
    wx.getSetting({
      success: res => {
        if (res.authSetting['scope.userInfo']) {
          // 已经授权，可以直接调用 getUserInfo 获取头像昵称，不会弹框
          wx.getUserInfo({
            success: res => {
              // 可以将 res 发送给后台解码出 unionId
              this.globalData.userInfo = res.userInfo, console.log(res.userInfo)

              // AV.User.loginWithWeapp().then(userInfo => {
              //   this.globalData.userInfo = userInfo;
```

Figure 3.2.2.2 shows the app.js file that writing on process lifecycle function

```
29                //   this.globalData.userInfo = userInfo;
30                // }).catch(console.error);
31
32                // 由于 getUserInfo 是网络请求，可能会在 Page.onLoad 之后才返回
33                // 所以此处加入 callback 以防止这种情况
34                if (this.userInfoReadyCallback) {
35                  this.userInfoReadyCallback(res)
36                }
37              }
38            })
39          }
40        }
41      })
42
43
44      wx.cloud.init({
45        traceUser: true,
46        env: 'project1-19ep9'
47      })
48    },
49    onShow: function () {
50      success: ({ userInfo }) => {
51        // 更新当前用户的信息
52        user.set(userInfo).save().then(user => {
53          // 成功，此时可在控制台中看到更新后的用户信息
54          this.globalData.user = user;
55        }).catch(console.error);
56      }
57    },
```

Figure 3.2.2.3 shows the app.js where initialize the cloud server

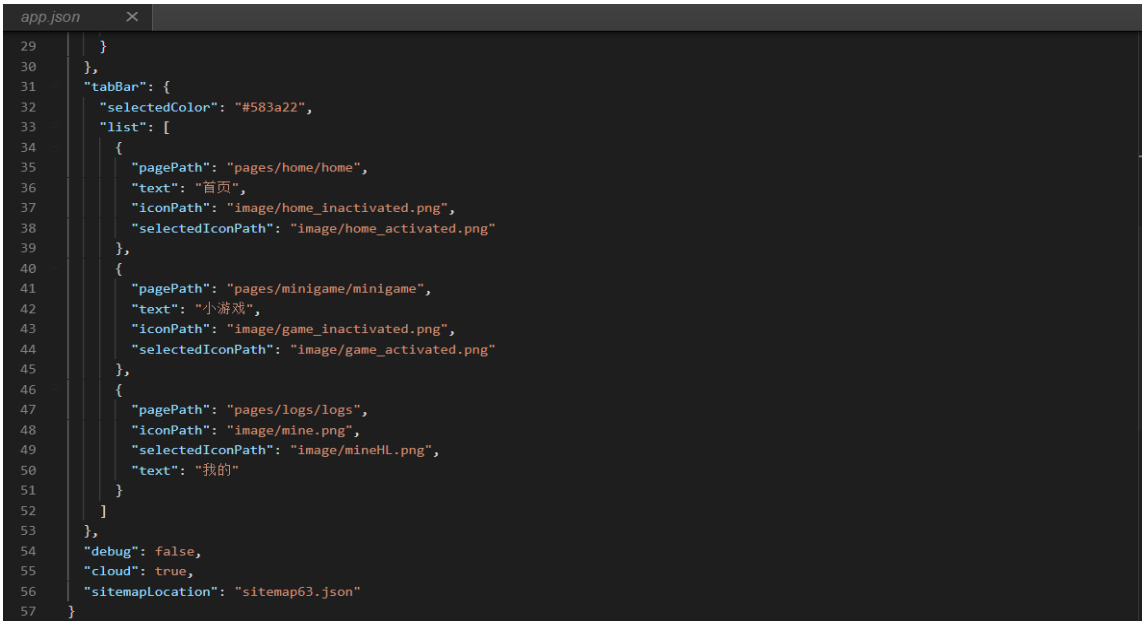
```
53          // 成功，此时可在控制台中看到更新后的用户信息
54          this.globalData.user = user;
55        }).catch(console.error);
56      }
57    },
58
59    // 获取当前设备信息
60    getDeviceInfo: function (callback) {
61      var that = this;
62
63      if (this.globalData.deviceInfo) {
64        typeof callback == "function" && callback(this.globalData.deviceInfo)
65      } else {
66        wx.getSystemInfo({
67          success: function (res) {
68            that.globalData.deviceInfo = res;
69            typeof callback == "function" && callback(that.globalData.deviceInfo)
70          }
71        })
72      }
73    },
74
75    globalData: {
76      userInfo: null,
77      user: null,
78      deviceInfo: null
79    }
80  })
```

Figure 3.2.2.4 shows the app.js where the global data is declared

App.json file is the global configuration of the entire WeChat Mini Program. In this file, pages have been determined and configure. Besides, it can decide the mini program's background colors; implement navigation bar style and design, set up the default title of mini program and specific route direct for the tabbar.

```
app.json
{
  "pages": [
    "pages/logs/logs",
    "pages/home/home",
    "pages/shake/shake",
    "pages/shake_detail/shake_detail",
    "pages/popUp/popUp",
    "pages/attraction/attraction",
    "pages/attr_detail/attr_detail",
    "pages/food/food",
    "pages/food_detail/food_detail",
    "pages/hotel/hotel",
    "pages/hotel_detail/hotel_detail",
    "pages/upload/upload",
    "pages/minigame/minigame",
    "pages/sysinfo/sysinfo",
    "pages/calender/calender",
    "pages/about/about"
  ],
  "window": {
    "backgroundTextStyle": "light",
    "navigationBarBackgroundColor": "#583a22",
    "navigationBarTitleText": "WeChat",
    "navigationBarTextStyle": "black"
  },
  "permission": {
    "scope.userLocation": {
      "desc": "你的位置信息将用于小程序位置接口的效果展示"
    }
```

Figure 3.2.2.5 shows the app.json file of Visit Kampar Mini Program where the page is determined



```
app.json
    }
  },
  "tabBar": {
    "selectedColor": "#583a22",
    "list": [
      {
        "pagePath": "pages/home/home",
        "text": "首页",
        "iconPath": "image/home_inactivated.png",
        "selectedIconPath": "image/home_activated.png"
      },
      {
        "pagePath": "pages/minigame/minigame",
        "text": "小游戏",
        "iconPath": "image/game_inactivated.png",
        "selectedIconPath": "image/game_activated.png"
      },
      {
        "pagePath": "pages/logs/logs",
        "iconPath": "image/mine.png",
        "selectedIconPath": "image/mineHL.png",
        "text": "我的"
      }
    ]
  },
  "debug": false,
  "cloud": true,
  "sitemapLocation": "sitemap63.json"
}
```

Figure 3.2.2.6 shows the app.json file where the tabbar is set up and declared.

Moreover, app.wxss file is the common stylesheet for the entire mini program. Style rules are declared in app.wxss and can be use in the page component's class attribute. The app.wxml does not exits due to it does not need an interface layout for the declaration process of the mini program.

app.wxss

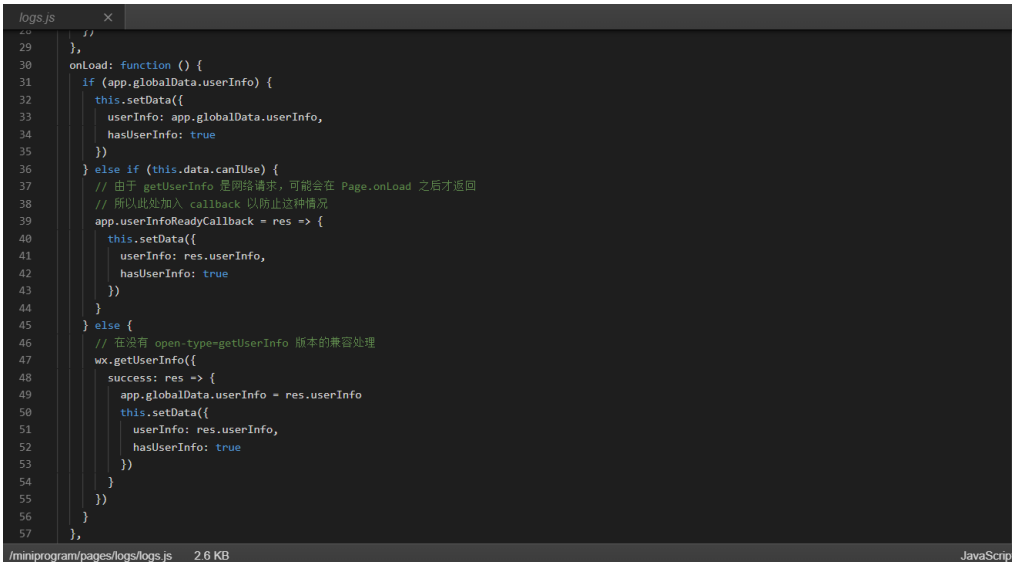
```
/**app.wxss**/
.container {
  height: 100%;
  display: flex;
  flex-direction: column;
  align-items: center;
  justify-content: space-between;
  padding: 200rpx 0;
  box-sizing: border-box;
}

.separator {
  padding-bottom: 10px;
  border-bottom: solid #462f1d;
}

.td {
    width:40%;
    justify-content: center;
    text-align: center;
    font-size: 10pt;
}
.th {
  width: 40%;
  justify-content: center;
  display: flex;
  height: 5rem;
  align-items: center;
}
```

Figure 3.2.2.7 shows the app.wxss file

Besides creating the directory of app, another page that are coded was the logs page. In this directory, there are four file consists on it which is logs.js, logs.json, logs,wxml and logs.wxss. In the file, logs.js, various API is used such wx.getUserInfo, wx.getStorage, wx.navigateTo, wx.stopPullDownRefresh and wx.openSetting. Data and variable have been declared at the first of the pages's coding. Function such as viewPersonInfo, login, viewSystemInfo are created in this pages. The main function of this page is to create a user login interface, display user-info and implement those common features such as calendars, phone details checking, setting configuration and respond to the interactive events.

```
logs.js
const app = getApp()

Page({
  data: {
    motto: '金宝',
    userInfo: {},
    hasUserInfo: false,
    canIUse: wx.canIUse('button.open-type.getUserInfo'),

    cells: [
      [
        { title: '手机信息', text: '', access: true, fn: 'viewSystemInfo' },
        // { title: '清除缓存', text: '', access: false, fn: 'clearStorage' }
      ],
      [{ title: '日历', text: '', access: true, fn: 'viewCalender' }],

      [{ title: '关于', text: '', access: true, fn: 'viewAbout' }],

      [{ title: '授权设置', text: '', access: true, fn: 'viewSetting' }]
    ]

  },
```

Figure 3.2.2.8 shows the JavaScript file of logs page that declare the data to show on screen



```
logs.js
  },
  onLoad: function () {
    if (app.globalData.userInfo) {
      this.setData({
        userInfo: app.globalData.userInfo,
        hasUserInfo: true
      })
    } else if (this.data.canIUse) {
      // 由于 getUserInfo 是网络请求，可能会在 Page.onLoad 之后才返回
      // 所以此处加入 callback 以防止这种情况
      app.userInfoReadyCallback = res => {
        this.setData({
          userInfo: res.userInfo,
          hasUserInfo: true
        })
      }
    } else {
      // 在没有 open-type=getUserInfo 版本的兼容处理
      wx.getUserInfo({
        success: res => {
          app.globalData.userInfo = res.userInfo
          this.setData({
            userInfo: res.userInfo,
            hasUserInfo: true
          })
        }
      })
    }
  },
/miniprogram/pages/logs/logs.js  2.6 KB  JavaScrip
```

Figure 3.2.2.9 shows the JavaScript file of logs page that implement the wx.getUserInfo API

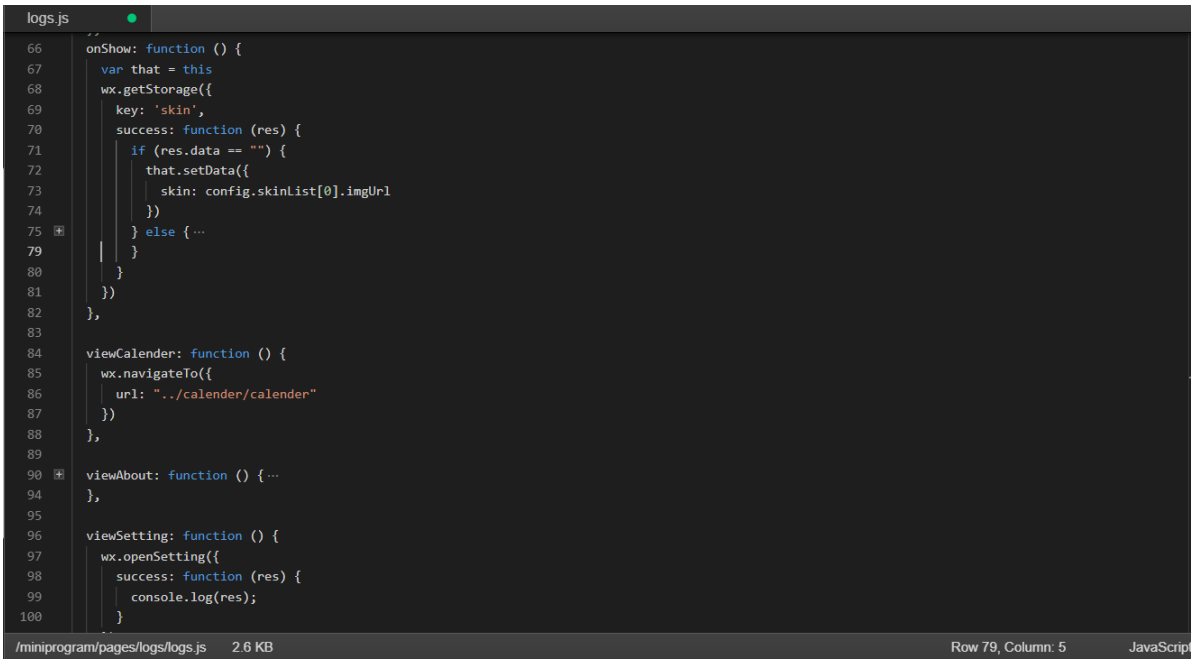


Figure 3.2.2.9 shows the JavaScript file of logs page that implement the wx.getStorage API

On the other hand, logs.wxss file are not necessary in some case due to the style sheet will be shared the same attribute with app.wxss if they are having the same style rules. Hoevewe, in this case the logs.wxss is creted and implemented due to the new rules are declared for this page and a wxss file is imported for aim to create list on screen.

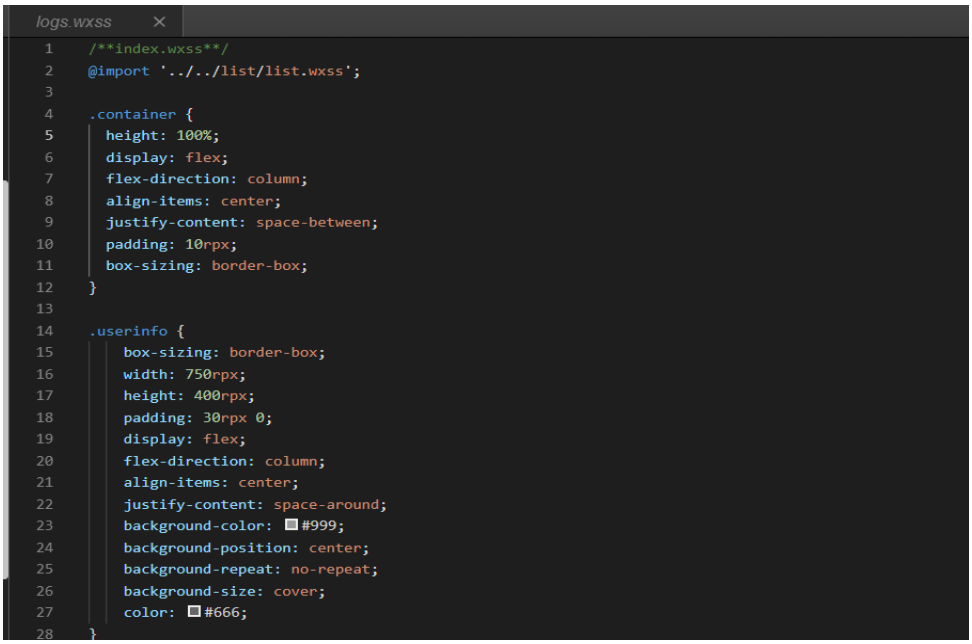


Figure 3.2.2.10 shows the logs.wxss file

Furthermore, the configuration file index.json are not necessary to be created in this case. This is because the common page's app.json will cover over other page's style rules by default. Index.wxml is the file that use to create the page structure, bind data and process functions.. In the project, <view>, <block>, <image> and <text> are implemented.

logs.wxml

```
<!--index.wxml-->

<import src="../../list/list.wxml" />
<view class="container">
    <view class="userinfo" style="background-image: url
(https://img3.stockfresh.com/files/r/robynmac/m/99/1908996_stock-photo-grunge-travel-background.jpg)">
    <button wx:if="{{!hasUserInfo && canIUse}}" open-type="getUserInfo" bindgetuserinfo="getUserInfo"> 登录微信账号 </button>
    <block wx:else>
      <view class="userinfo" style="background-image: url
(https://img3.stockfresh.com/files/r/robynmac/m/99/1908996_stock-photo-grunge-travel-background.jpg)">
        <image src="{{userInfo.avatarUrl}}" class="userinfo-avatar"></image>
        <view class="user-nickname">
          {{userInfo.nickName}}
          <block wx:if="{{userInfo.gender == 1}}">
            <view class="user-sex-male"></view>
          </block>
          <block wx:elif="{{userInfo.gender == 2}}">
            <view class="user-sex-female"></view>
          </block>
        </view>
        <view class="user-location">{{userInfo.province}},{{userInfo.city}}</view>
    </view>
    </block>
  </view>
  <view>请用户先行登录，否则小程序里的部分功能将会不能使用，谢谢合作。</view>
  <template is="list" data="{{cells: cells}}"/>
</view>

```

Figure 3.2.2.11 shows the logs.wxml file that use to create structure output

Morever, as a part of the project album's directory have been created in order to provide travel album features. In this directory, it contain 4 file which album.js, album.json, album.wxss and album.wxml. For album.js, wx.cloud.uploadFile and wx.chooseImage have been implemented in order to provide support for the upload and download images features to server. Database has been initialize in this file and to work with the command such as db.collection.get and db.collection.add. Besides, myexif.js file has been imported to the album pages in order to track down the metadat of the pictures uploaded which use for behavior anlysis in the future.

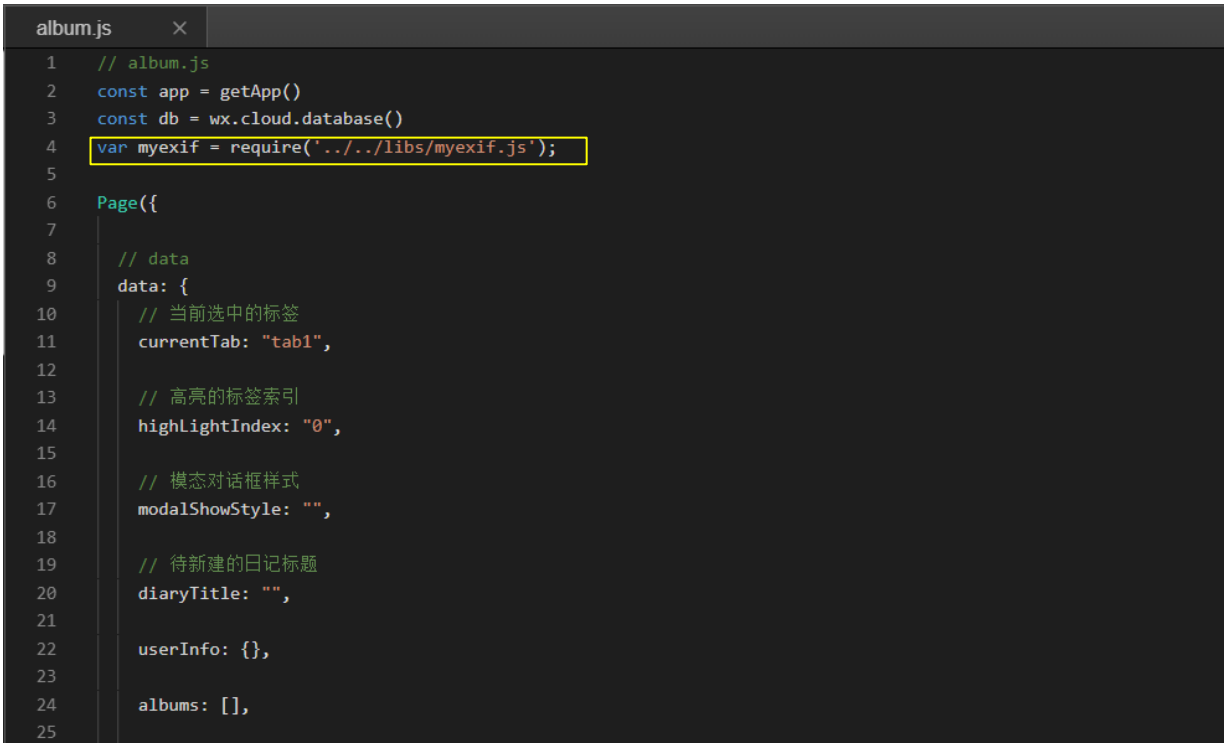


Figure 3.2.2.12 shows the JavaScript file of travel album where myexif.js is imported to obtain the metadata

album.js

```
163   //获得知道上传的是哪张图片呀， 所以我们使用的是本地的图片路径来展示，即imagePath
164   imgChoose: function () {
165     // 选择图片
166     var that = this;
167     wx.chooseImage({
168       count: 1,
169       sizeType: ['compressed'],
170       sourceType: ['album', 'camera'],
171       success: function (res) {
172
173         var array = wx.getFileSystemManager().readFileSync(res.tempFilePaths[0]);;
174         var r = myexif.handleBinaryFile(array);
175         console.log(r);
176
177         wx.showLoading({
178           title: '上传中',
179         })
180
181         const filePath = res.tempFilePaths[0]
182         that.setData({
183           imgUrl: filePath
184         })
185         // 上传图片
186         const cloudPath = "album/"+that.data.count + filePath.match(/\.[^.]+?$/)[0]
187         console.log(cloudPath)
188
```

Figure 3.2.2.13 shows the JavaScript file of travel album where the upload image function is implemented

album.js

```
191         wx.cloud.uploadFile({
192           cloudPath,
193           filePath,
194           success: res => {
195             console.log('[上传文件] 成功：', cloudPath, res)
196
197             app.globalData.fileID = res.fileID
198             app.globalData.cloudPath = cloudPath
199             app.globalData.imagePath = filePath
200
201           },
202           fail: e => {
203             console.error('[上传文件] 失败：', e)
204             wx.showToast({
205               icon: 'none',
206               title: '上传失败',
207             })
208           },
209           complete: () => {
210             wx.hideLoading()
211             wx.showToast({
212               icon: 'none',
213               title: '上传成功',
214             })
215           }
216         })
```

Figure 3.2.2.14 shows the JavaScript file of travel album where the upload function is then further develop to connect with the server.

myexif.js

```
var debug = false;
var root = this;
var ExifTags = {

    // version tags
    0x9000 : "ExifVersion",             // EXIF version
    0xA000 : "FlashpixVersion",         // Flashpix format version

    // colorspace tags
    0xA001 : "ColorSpace",              // Color space information tag

    // image configuration
    0xA002 : "PixelXDimension",         // Valid width of meaningful image
    0xA003 : "PixelYDimension",         // Valid height of meaningful image
    0x9101 : "ComponentsConfiguration", // Information about channels
    0x9102 : "CompressedBitsPerPixel",  // Compressed bits per pixel

    // user information
    0x927C : "MakerNote",               // Any desired information written by the manufacturer
    0x9286 : "UserComment",             // Comments by user

    // related file
    0xA004 : "RelatedSoundFile",        // Name of related sound file

    // date and time
```

Figure 3.2.2.15 shows the JavaScript file of myexif that use to analyze the metadata of picture upload

For this part, album.json are created and it is use to configure the default title of navigation bar for the album page. For the structured layout of the album page the interface is design with implementation of <view>, <scroll-view>, <text> and <images>. Besides, floating windows and text input have been designed in this page as well. As usual album.wxss is the page's style sheet where it apply to specify a page's style.

album.json

```
{
  "navigationBarTitleText": "旅游相册",
  "usingComponents": {}
}
```

Figure 3.2.2.16 shows the album.json file that use to set up the page's default title

album.wxss

```
.album{
  width: 100%;
  height: 100%;
  padding: 0;
  background-color: #eceff4;
  font-size: 30rpx;
  font-family: -apple-system-font, 'Helvetica Neue', Helvetica, 'Microsoft YaHei', sans-serif;
}

.al_view{
  width: 100%;
  height: 100%;
  background-color: #eceff4;
  font-size: 30rpx;
  font-family: -apple-system-font, 'Helvetica Neue', Helvetica, 'Microsoft YaHei', sans-serif;
  justify-content: space-between;
  padding:20rpx;
  box-sizing: border-box;
}

.header {

  height: 90px;
  background: white;
```

Figure 3.2.2.17 shows the album.wxss file

In the navigation directory, there contains of two pages which is named as Map and Location. For both of the pages it contain identical files by each itself that is js, json, wxss and wxml file. Map page is create to aim for develop and shows the Tencent's maps on screen to user. Besides, it provide ability of in- apps maps viewing and the drag and drop of destination mark. Furthermore, it also enable user to check and search for the attraction that nearby their current location. In map.js file, wx.chooseLocation and wx.openLocation API are used to determined, detect and direct the current location, destination location and favorable location. For the rest of the file within map page such as map.xmss, map.wxml, map.json they are quite similar to the previously stated file for example album.json, album.wxss and album.wxml.

map.js

```
31    // 选择位置
32    wx.chooseLocation({
33      success: function (res) {
34        console.log(res);
35
36        // 打开位置
37        wx.openLocation({
38          latitude: res.latitude,
39          longitude: res.longitude,
40          name: res.name,
41          address: res.address,
42        })
43      },
44    })
45  },
46
47
48  regionChange: function (res) {
49    // 改变中心点位置
50    if (res.type == "end") {
51      var mylocation = this;
52      this.mapCtx = wx.createMapContext("centerChange");
53      this.mapCtx.getCenterLocation({
54        success: function (res) {
55          console.log(res);
56
57          mylocation.setData({
58            latitude: res.latitude,
59            longitude: res.longitude,
60
```

Figure 3.2.2.18 shows the JavaScript file of map page where user current location is achieve

```
map.js
50      if (res.type == "end") {
51        var mylocation = this;
52        this.mapCtx = wx.createMapContext("centerChange");
53        this.mapCtx.getCenterLocation({
54          success: function (res) {
55            console.log(res);
56
57            mylocation.setData({
58              latitude: res.latitude,
59              longitude: res.longitude,
60
61              markers: [{
62                iconPath: "/image/location.png",
63                id: 0,
64                latitude: res.latitude,
65                longitude: res.longitude,
66                width: 20,
67                height: 35,
68                title: "我的位置",
```

Figure 3.2.2.19 shows the JavaScript file of map page the mark point is create

Another page that exist in the navigation directory was the location page. In this page, the current user location will be detected and it will collaborate with the information pages that created in the mini program such as hotel, food and attraction. User able to direct to their interested location by just a simple action with a single push of the button on the screen from the information pages. Besides, that are some simple and common features, which is develop and placed in different pages such as calender, about, setting and mini games.

```
location.js
12      covers: [{
13        latitude: 5.140634,
14        longitude: 119.6181485,
15        iconPath: '../../images/wechat.png',
16        rotate: 10
17      }, {
18          latitude: 5.140634,
19          longitude: 119.6181485,
20        iconPath: '../../images/wechat.png',
21        rotate: 90
22      }]
23    },
24    onLoad: function () {
25      console.log('地图定位！')
26      var that = this
27      wx.getLocation({
28          type: 'gcj02', //返回可以用于wx.openLocation的经纬度
29          success: function (res) {
30            console.log(res)
31              var latitude = res.latitude;
32              var longitude = res.longitude;
33              wx.openLocation({
34                latitude: 4.32739,
35                longitude: 101.145073,
36                scale:18
37              })
```

Figure 3.2.2.20 shows the JavaScript file of location page

3.2.3 Compiling and Publishing

3.2.3.1 Compiling

In the compiling process, WeChat Development tools provided two types of debug method that is simulator debug and remote debug. For simulator debug, the compilation and debugging process has done inside the WeChat Development Tools. A mobile device simulator is located at the left hand side of the tools.

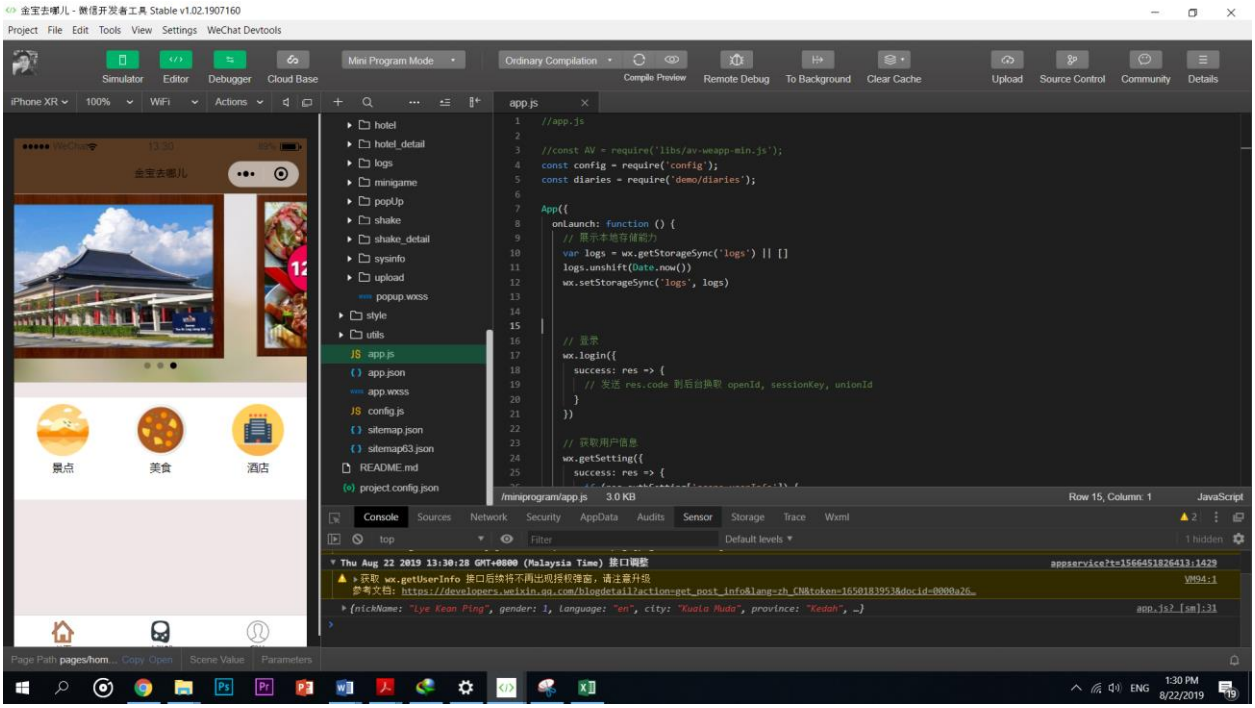


Figure 3.2.3.1.1 shows the interface and simulator of the WeChat Development tools.

On the other hand, for the remote debug method the tools itself will compile the code that have been written. Then, a QR code will be generate and developers are request to scan it by using their WeChat application. While the program is debugging, all the data traffic sent over and network's transaction will be shown in the development tools.

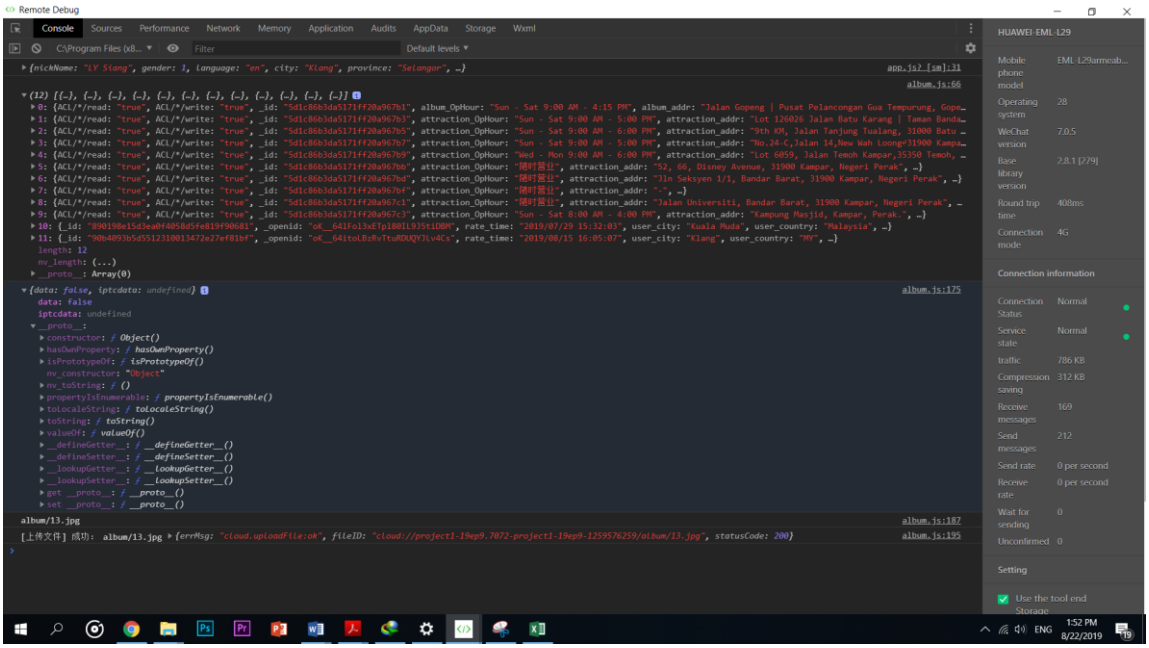


Figure 3.2.3.1.2 shows the data attribute that sent over in the program

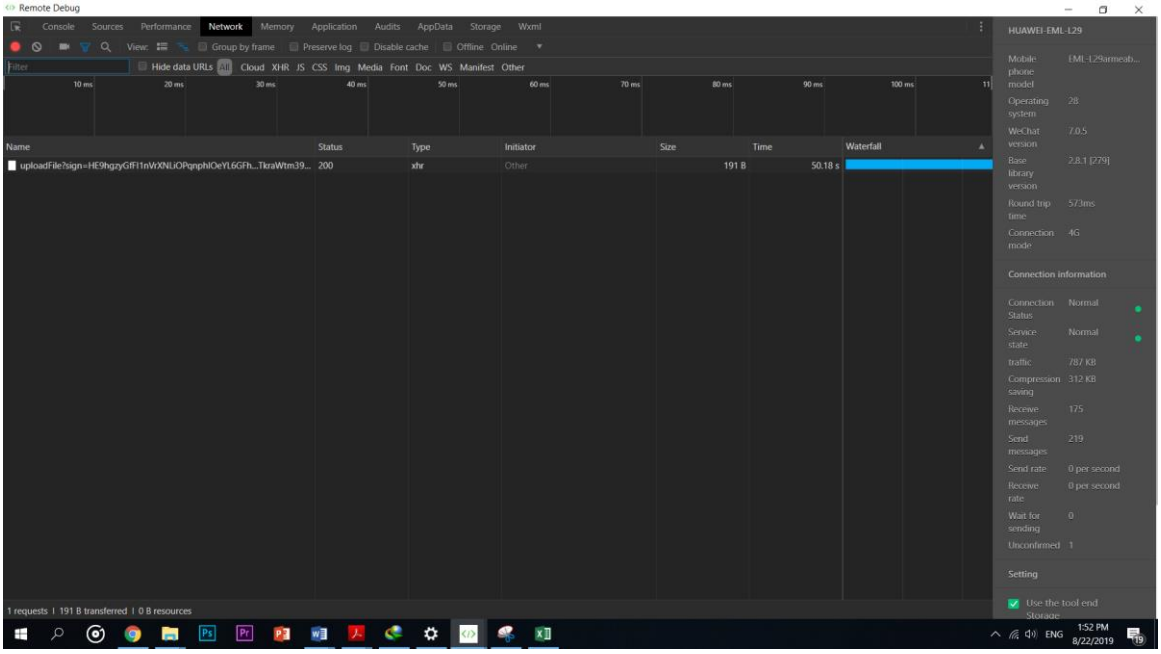


Figure 3.2.3.1.3 shows the network traffic of the uploaded the file

3.2.3.2Publishing

In this stage, developers are going to upload and submit their source code and program to the WeChat Platform, which are going to undergoes a few review from Tencent's company to check and validate the validation and safeness of the program. In the very first step of publishing, developers have to upload the code with insert the Version Number (版本号) as well as the Project Note (项目备注). After that, the admin has to use their WeChat for scanning the QR code to complete the upload.

Figure 3.2.3.2.1 shows the information that needed to fill up in order to publish the mini program.

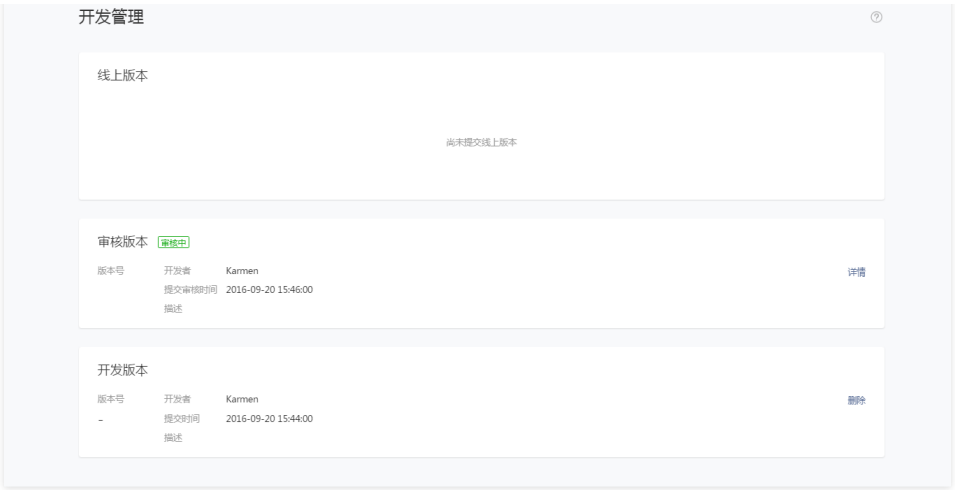


Figure 3.2.3.2.2show existing of the uploaded code in the Development Management (开发管理) tab if the code is successful uploaded.

After the code have been uploaded, the code is then needed to submit for review. Developers has to proceed to the “Development Management” tabs and select the process whether to submit the code for review, or delete the code. In the next step, developers are require to proceed to the Set up Functions Page (配置功能页面), where developers are necessary to fill up at least one Business Categories (业务-类目） and Tags（标签） for user search purposes. However, developers are giving the permission to add 5 Functions Pages.

Figure 3.2.3.2.3 shows the windows to fill up the Business Categories and Tags

After the submission process have completed, developers are able to check the review status on the “Development Management” page. For those that are in pending progress a under review (审核中) icon next to your submitted version. When the code is successfully approved, the mini-program weren’t publish until the Release (发布) button is clicked.

3.2.4 Evaluation

After the coding phase has been completed, it is necessary to conduct program evaluation by testing capability of the program to deliver the requirement that is planned to be implement and introduce with the absent of unexpected errors occurs during the process. Evaluation phase is separated into three part, first is to determine whether the systems are able to get user info by connect to the user's WeChat account. In this phase, the program should able to retrieve the profile picture of the WeChat user and some personal details such as gender, name, province, country and language used.

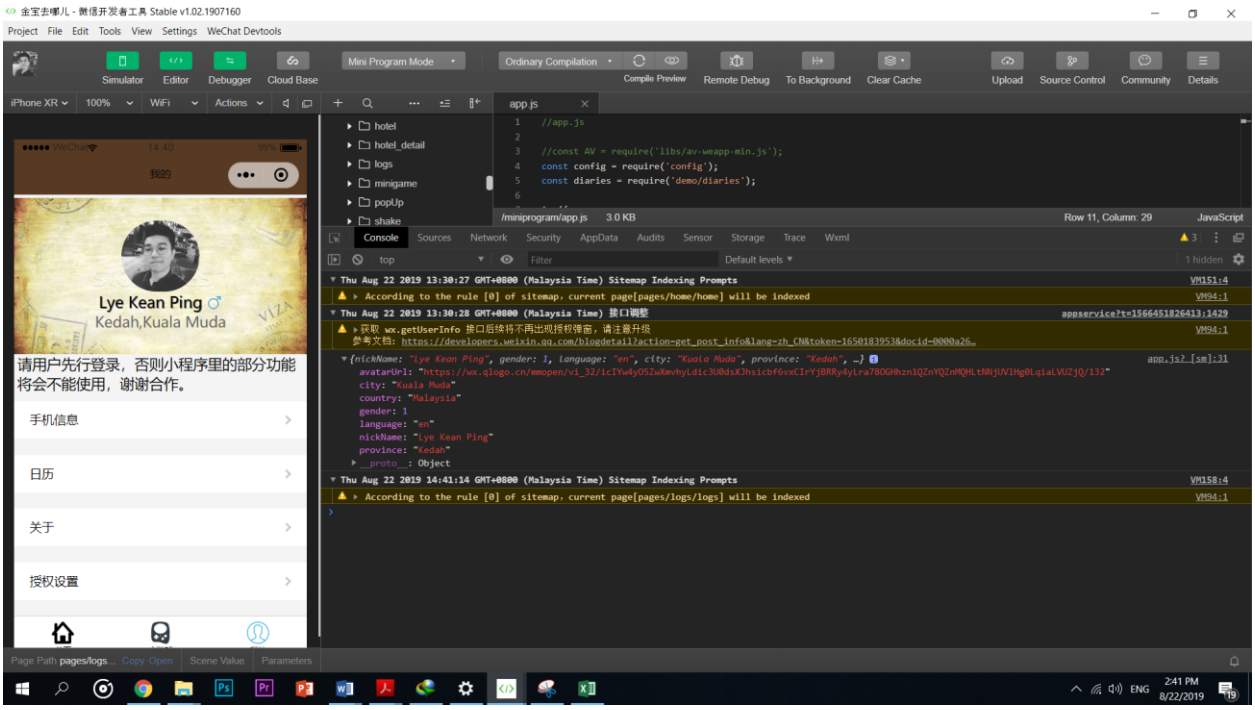


Figure 3.2.4.1 shows that the mini program succeed to retrieves the user personal information once the user is logged in

Another part of evaluation is to verify the performance and accuracy of the tourist's navigation system. The main criteria in the evaluation of this aspect is to make sure the program itself able to detect user's current location and able to shows the destination that has configured on the Tencent's digital map. Besides, it also to make sure the route from the current location to the destination is also able detected and analysis once the navigation button is selected. Furthermore, the program itself will direct to the 3rd part navigation application with bring over the coordinates of user's current location and destination location once the navigation function is activated. For

example, when the navigation button is pressed the wechat mini program will direct to navigation apps such as google maps and then user are able to use the navigation services through the 3rd party apps.

Figure 3.2.4.2 On this digital maps the green color dots show the user's current location and the red color dots shows the location of the user's destination which is Grand Kampar Hotel.

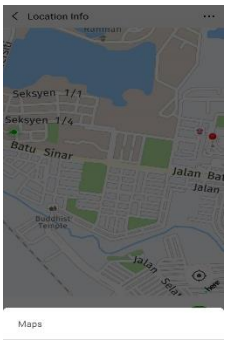


Figure 3.2.4.3 shows the mini program are provided a list of 3rd party navigation apps for user to choose when the green navigation button as shown in figure 4.6 is pressed.

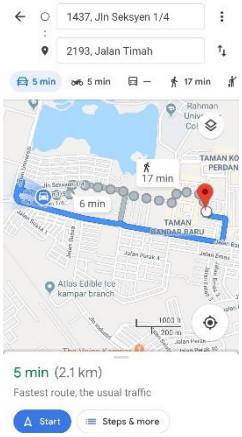


Figure 3.2.4.4 shows that the Goggle maps navigation application that directed from the WeChat Mini Program and the coordinates of the destination and user's location that has brings over to the apps so user did not require to reconfigure it again.

The third part of the evaluation phase is the verification of the performance for the travel photo album. In this album user should be able to upload and download their photo from and into their travel album. Besides, the album are able to retrieve the metadata that stored inside the photo while capture and the name of the photo are able to input by user itself. Figure below shows the interface page of the travel album and its functionality.

Figure 3.2.4.5 shows the page interface of the travel album where user are available to choose features such as upload photo and zoom in photo.

Figure 3.2.4.6 shows the input of the photo title that user willing to insert for the upload photo

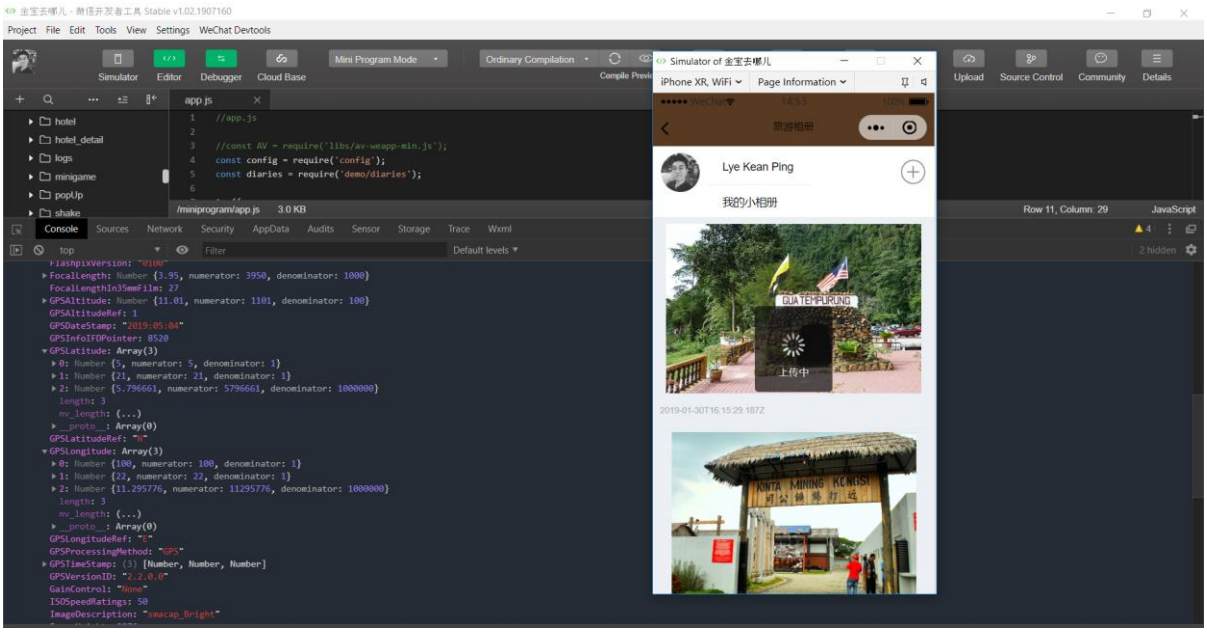


Figure 3.2.4.7 shows the metadata of the photo will retrieve while the photo is uploading

The last part of evaluation phase is to check if there is any imprecise and invalid data are provided on the tourism information. Besides, the error checking such as programming error such as syntax error, runtime error and logical error. For example, sometimes the data information that has been key in might have error such as the wrong type of the operation hours or address which might cause great inconvenient to the user.

3.3 System Flowchart

3.3.1 Main Function

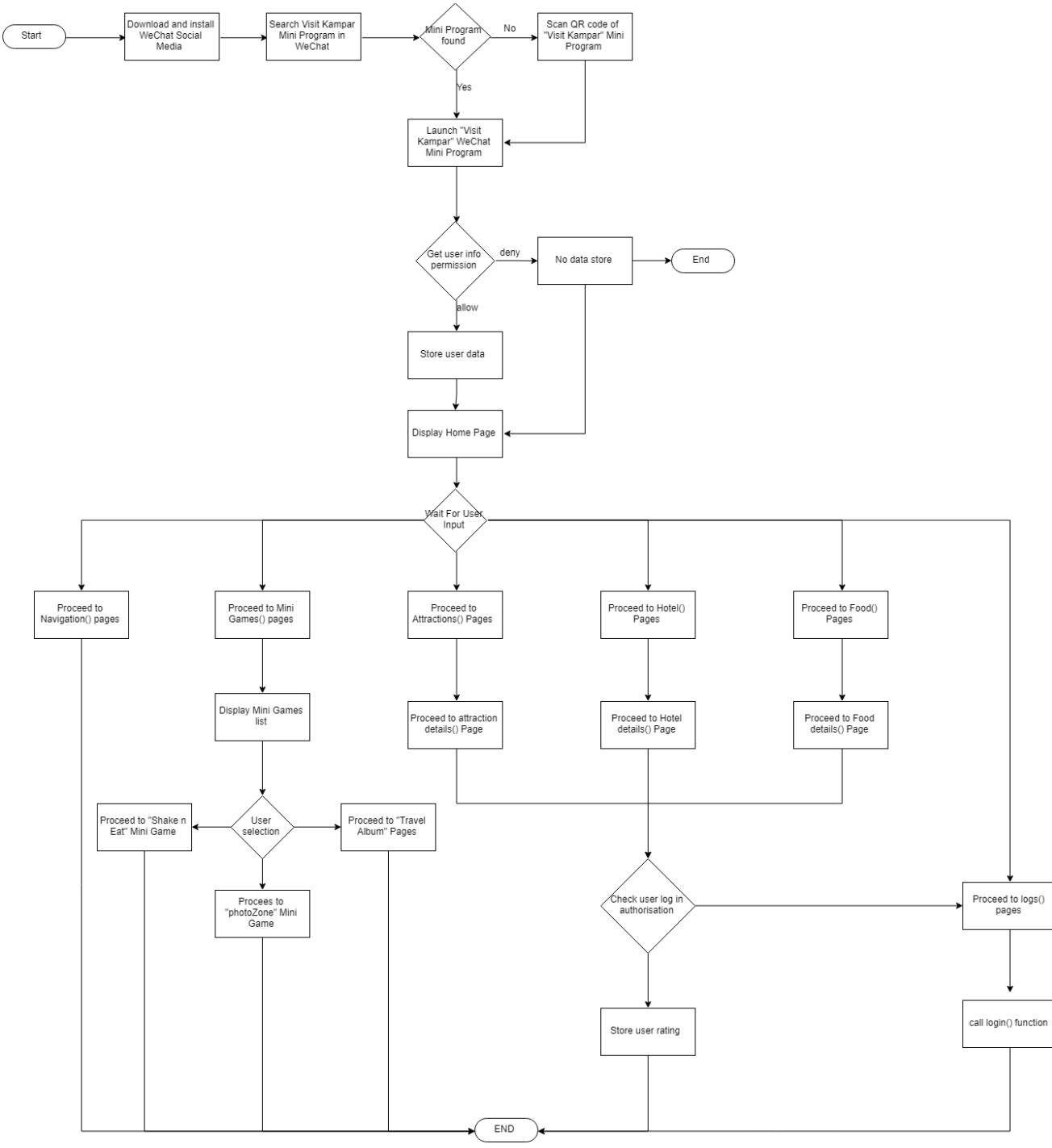


Figure 3.3.1.1 System flowchart of Visit Kampar Mini Program.

3.3.2 Tourist Navigation

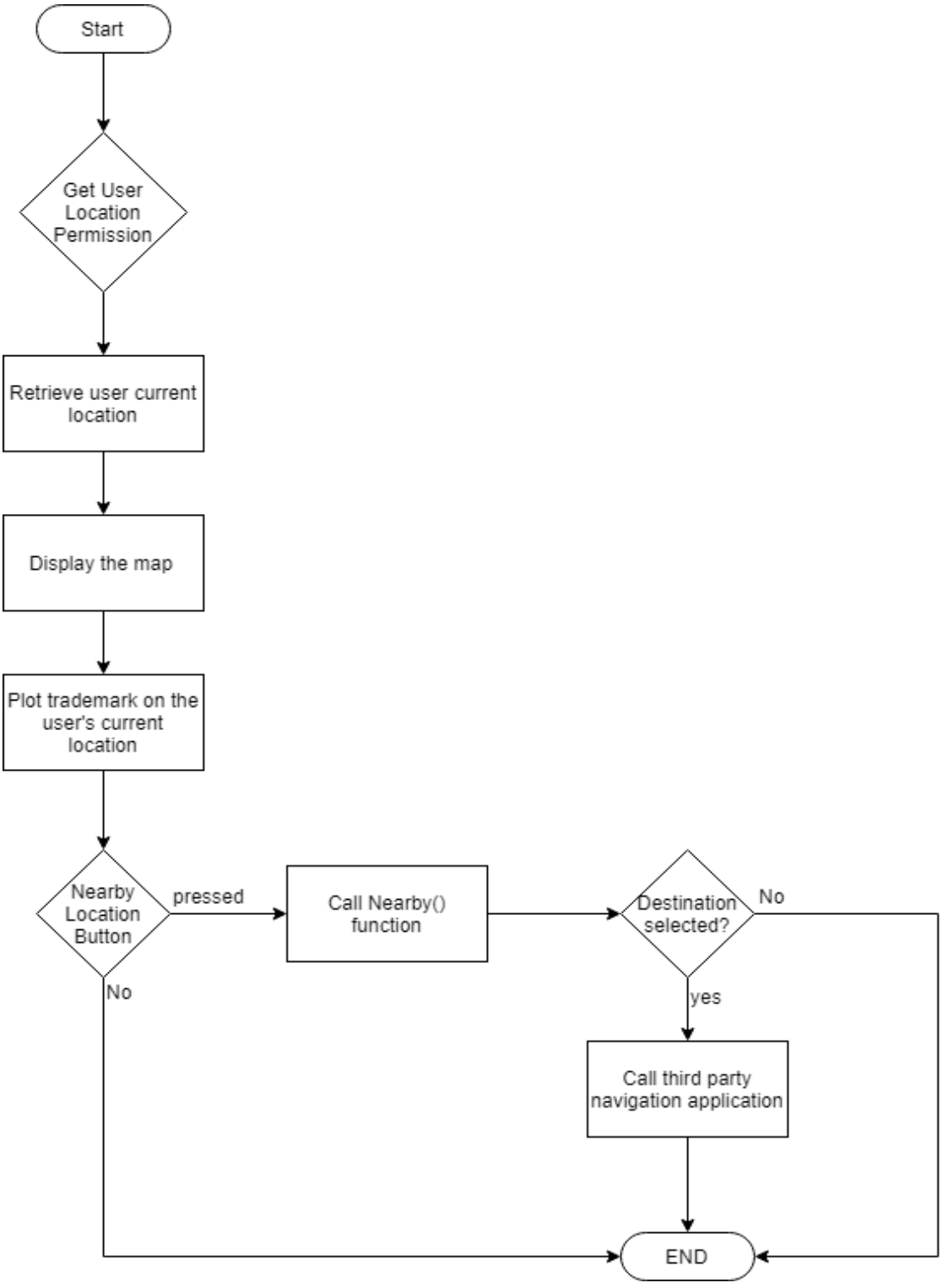


Figure 3.3.2.1 shows the tourist navigation's system flowchart

3.3.3 Travel Album

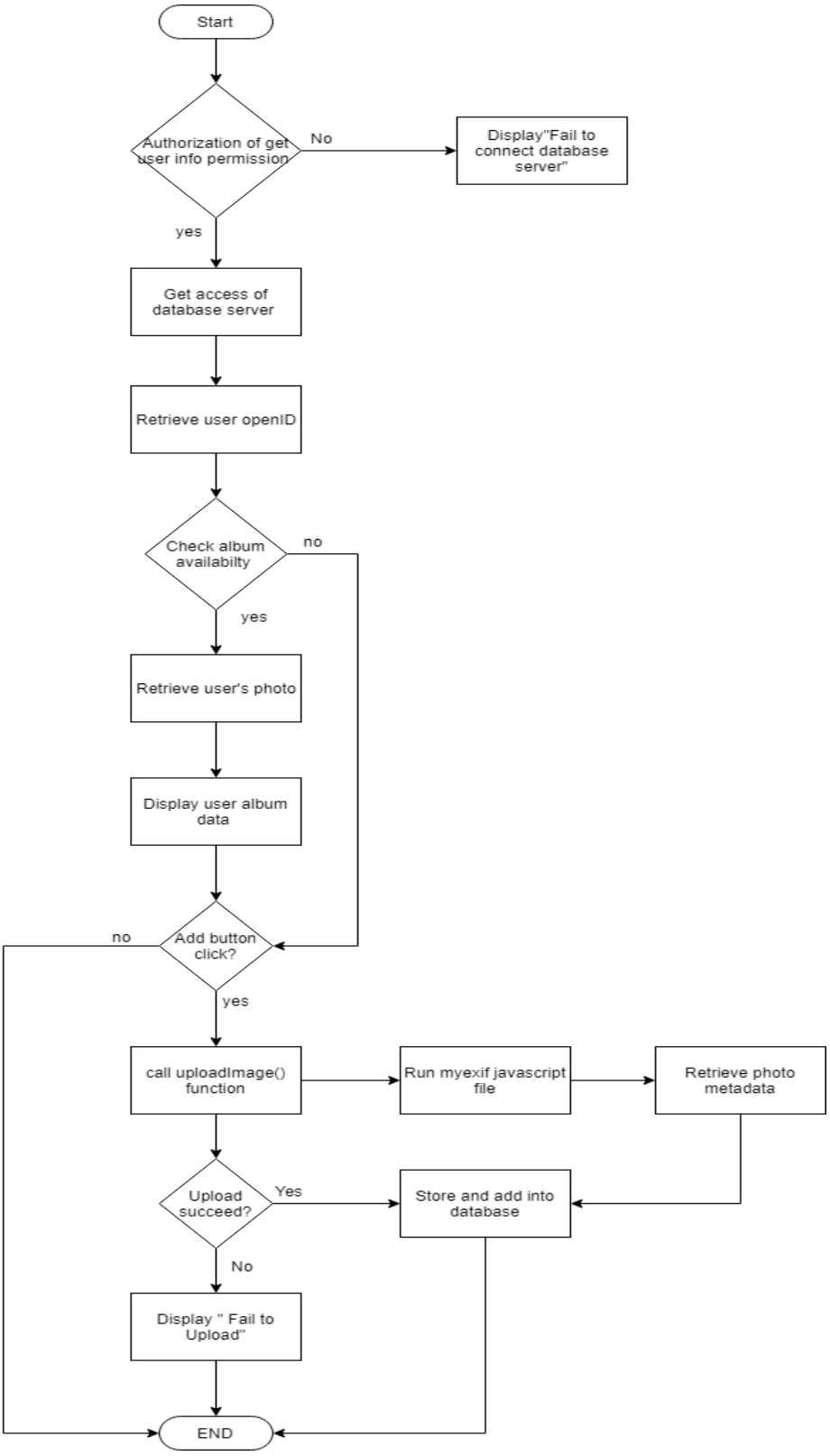


Figure 3.3.3.1 shows the travel album's system flowchart

Chapter 4: Discussion on System

4.1 Methodology and General Work Procedures

In this project, agile methodology development has been chosen to as the methodology throughout the development of the project. In brief, the purpose of select the agile methodology is because in this project coding practices are more focus instead of design documentation. In agile methodology task are divide into short phase of work which form the ability of overcome the frequently change and of system requirements while the project development process ongoing. Besides agile methodology are also claimed to develop a system with faster speed. This is proved where it does not needed to consume their time on determine the complete requirement of the projects and also design documentation. Defining complete requirements at the beginning of the project and regulate the change of requirement that have been defined in the middle of the development process are very challenging and extremely time consuming. Therefore agile methodology which support the change of requirements at any point during project development is more effective and better approach in developing a mobile application.

At the beginning of the development process, planning phase are carried out instead of coding phase. This is to provide a more complete overall image to the system that are going to developed and more understanding on the direction of development. For example, feasibility analysis on the platform that tends to develop. It is important to clarify whether the system that going to develop is a realistic and feasible goals by determine the market, trends, future develop potential and time consuming issue. Besides, SWOT analysis are done by referring to the article and research paper as well in order to determine the strength, weakness, opportunities and threads from the existing system. Furthermore, in order to define the requirements of the project, few requirement gathering techniques are conducted such as report inspection and review of existing system. Moreover, software information and hardware requirement have been studied as well before coding phase. After all the information and resources that require are gathered and determined, it comes to the coding phase. The written code will be tested after develop in order test and check if there is any errors occurs and to make sure the system can be perfectly deliver.

4.2 Development Tools and Programming Language

4.2.1 Development Tools

In the development process, there are various tools has been use throughout the process. In brief, the tools are categorize into three category such as software, database and hardware.

For the software aspects, WeChat Mini Program is develop by using a software provided by Tencent (IDE Integrated Development Environment). It is necessary for the developer to having it in order to do all the code and preview your mini-program. WeChat Open Platform- Developer Tools is the tools that created by Tencent and it provide developers to developing, debugging, code editing and mobile simulation. In term of display output, WeChat Development Tools provide two methods, which is mobile simulator right beside the left hand side of the development tools as well as the remote debug which the output will be show on your handheld device by scanning the QR code generated.

For the hardware aspect, this project require few tools such as an handheld devices, internet adapter, GPS adapter and also mid-end computer with a decent processor and min amount of 2GB of RAM to run the WeChat developer tools. However, higher specification computer is expect to have a better performance while debugging and compiling since higher ram are needed for the simulator. GPS and Internet adapter is necessary in development of this WeChat Mini Program because Visit Kampar is a program that provide navigation services and it require the connection between the server and the program itself in order to retrieve or add data into the database.

For the back-end part, WeChat Development Cloud (云开发) is select as the database support and server support throughout the project. WeChat Development Cloud server provide various support to the development of WeChat Mini Program. For example, it provide class-based database with the implementation of extra features for user management. As mentioned before, it provide various support to the WeChat mini program which indirectly enhance the user experience and make the development process become more efficient and convenient. For example, WeChat Development Cloud store and retrieve user information automatically once the user logged in. Besides

storing information, it also support provide common data analysis features such as to show the most visited page, major user gender and else.

4.2.2 Programming Language

In term of the coding language, WeChat Mini Program are develop in a specific "language" which similar with the JavaScript framework that developed by Tencent itself. In fact there are much similar as the google development language such as HTML, CSS, and Java. HTML is almost similar to the WXML files, it is more likely use for design and create an interface of a page. On the other hand, there are very similar characteristic between JS and CSS language. There for non-WeChat Mini Program's JSON file are usable for developing the application that require JSON file but not only the WeChat. Lastly, JS file of the program is going to in charge for the app services and logic flow of the entire program. Figure below shows the main structure of how the pages in WeChat Mini Program are flow.

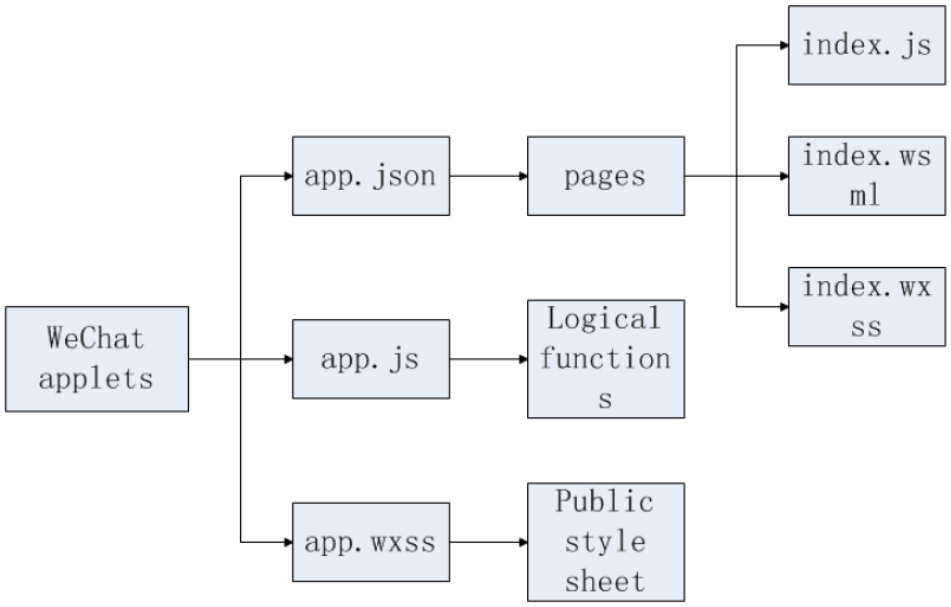


Figure 4.2.2.1 shows the main structure of the WeChat Mini Program system

4.3 Page Arrangement

WeChat Mini Program are divide into four tabs, which is home, mini features, maps and my profile pages. Home is the tabs that implement with the main page of the Visit Kampar Mini Program. In this page, user are able to direct into three different page such as hotel, food and attraction. Inside each of the three page, it will be a list of location, shop or attraction where user can simply browse for more information by a single click on the listed item, the page will then been directed to their own details page respectively. The second tab that have been created in Visit Kampar is the mini features tab. In this tab, it consists of two mini games on the list which is “shake n eat” (摇一摇) and “photoZone” (摄影达人). The first mini games “shake n eat” is a program that can randomly select a restaurant when the phone devices is being shake. The second mini game “photoZone” is a program that provide upload photo features where user can upload the favorite photo to the Visit Kampar server to get a chance for winning rewards. The tab is then follow with the navigation tab, map page is show when the navigation tab is press and it provide features such as search nearby attraction and map searching. Lastly will be the profile tab. In this tab user require to approve the permission of WeChat to accessing their user information in order to log in, their profile and name will be shown when the process is done. Besides that, there are few more page that user are able to access from the profile tab. Figure shows the directory of the Visit Kampar WeChat Mini Program.

Chapter 5: Implementation issues and challenges

In the development process of this project, several challenges and problems has occurred. In brief, the issue and challenge that faced can be classify into two part that is technical challenge and non-technical challenge. For the technical challenge that would be the technical problem that faced while the development process such as coding issue, function or API applied and database set up. On the other side, non-technical issue is define as the problem that faced which are irrelevant with the IT related technique and skills.

5.1 Technical issue and challenge

The first technical issue and challenge that faced while developing the Visit Kampar mini program is the limitation on the memory of the mini program file. As mentioned at the WeChat developer platform, memory for the entire WeChat Mini Program cannot be exceed the amount of 10MB. Because of this, navigation are fail to implement inside the apps as there need a larger file capacity in order to implement the route, traffic details and else. However, in this project the problem have been solved by direct into a third party navigation app such as Baidu Maps or Google Maps while using navigation services. By undergoes this method, WeChat Mini Program able to provide tourist navigation services but it causes another cons for the developer where user location cannot be detected and record from time to time while they are on the third party navigation application..

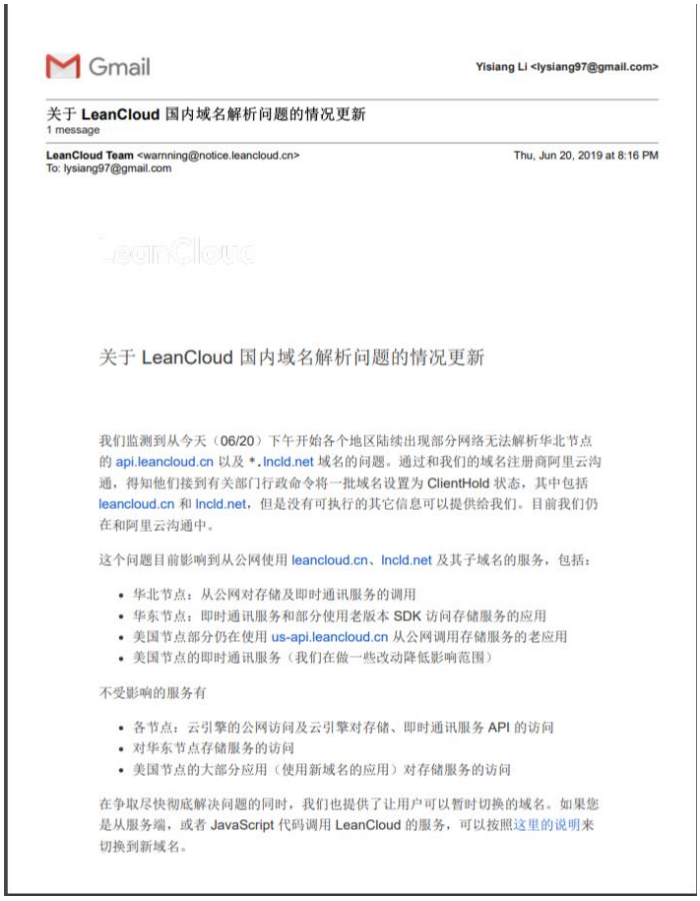
The second technical issue and challenge that have met while develop the mini program is the failure to obtain the metadata of the uploaded image. In this project, .metadata of a photo such as capture date, GPS longitude and latitude is require to export out in order to undergo behavior analysis. However, the photo that uploaded to the server are always in compressed form and the metadata would be remove at the same time. It can be solve by force to upload an originally uncompressed photo but it seem to have a problem where when the photo size exists of 25MB WeChat will restrict the upload process due to over file size limitation.. Besides, due to the limited capacity of the database storage, images size are good to be

small so that more photo can be store in the limited storage. However, this problem is solved by creating an array to obtain all the metadata before the image is compressed and upload from the devices to the server. When the wx.ChooseImage API is called, the get exif function will be launch first and compress the photo after the metadata obtained.

Figure 5.1.1 shows the metadata of the photo obtain before compressed and without compreese file

The third technical issue and challenge is the force of migration data of backend server. In this project, the cloud server that initially implemented into the

Visit Kampar mini program is LeanCloud server. However, in the period of June 2019, LeanCloud undergo a copyright issue with the China's government and yet the server is close to maintenance for around one week and it require having a China citizen information (IC) to verify the profile of the cloud owner after the cloud is back on operation. As a foreign country developer, we are force to migrate all the data out from the database and move to the new cloud server, which is WeChat Developer Cloud (云开发).



Gmail — Yisiang Li <lysiang97@gmail.com>

关于 LeanCloud 国内域名解析问题的情况更新
1 message

LeanCloud Team <warnning@notice.leancloud.cn> — Thu, Jun 20, 2019 at 8:16 PM
To: lysiang97@gmail.com

关于 LeanCloud 国内域名解析问题的情况更新

我们监测到从今天（06/20）下午开始各个地区陆续出现部分网络无法解析华北节点的 api.leancloud.cn 以及 *.lncld.net 域名的问题。通过和我们的域名注册商阿里云沟通，得知他们接到有关部门行政命令将一批域名设置为 ClientHold 状态，其中包括 leancloud.cn 和 lncld.net，但是没有可执行的其它信息可以提供给我们。目前我们仍在和阿里云沟通中。

这个问题目前影响到从公网使用 leancloud.cn、lncld.net 及其子域名的服务，包括：

- 华北节点：从公网对存储及即时通讯服务的调用
- 华东节点：即时通讯服务和部分使用老版本 SDK 访问存储服务的应用
- 美国节点部分仍在使用 us-api.leancloud.cn 从公网调用存储服务的老应用
- 美国节点的即时通讯服务（我们在做一些改动降低影响范围）

不受影响的服务有

- 各节点：云引擎的公网访问及云引擎对存储、即时通讯服务 API 的访问
- 对华东节点存储服务的访问
- 美国节点的大部分应用（使用新域名的应用）对存储服务的访问

在争取尽快彻底解决问题的同时，我们也提供了让用户可以暂时切换的域名。如果您是从服务端，或者 JavaScript 代码调用 LeanCloud 的服务，可以按照这里的说明来切换到新域名。

Figure 5.1.2 shows the apologies letter due to LeanCloud server down.

The forth-technical issue and challenge was the unexpected shutdown of the devices while the development of WeChat Mini Program undergoes. In the period of development process, due to instability of the Windows 10 operating system, it happened the blue screen restart problem. Thus, it causes the album.js file for the travel album, which currently in the development process corrupted and the all code become null value. To overcome this, recovery step such as using Recurva are fail to

approach because WeChat development tools are with unlikely those mobile application development tools where there will be the auto backup txt file once the code is compile and build. This issues end up with rewrite of the album code and its give a lesson where always have a multiple backup for those important file.

5.2 Non-technical issues and challenge

In this project, the first non-technical issues and problem that have face during the development process is the restriction of registration as individual developer for the foreign developer. This is happen while account registration process in the WeChat Open Platform. Foreign developers can only register as company, which they have to register by submission of company's documentations and have to be reviewed by the WeChat Open Platform. Developer can only create and develop their WeChat Mini Program after he/she fully registered as the member.

The second non-technical issues that occur in this project was the limitation on using the third part APIs. For example, while developing the map and navigation pages, it fail to register the permission for implement the third party APIs such as Baidu navigation because China's citizen Identification Card and China's hand phone number are require for authorization.

Besides, limitation of information of Tencent's maps has becomes another obstacles of the developers within China. While implementing the navigation system, Tencent maps are state to be the most suitable and compatible with the development of WeChat Mini Program due to both of them are production from the same company, Tencent. However, Tencent's maps are lack of updated information for the location that within China area such as Malaysia, Brunei and else.

Furthermore, insufficient of accurate and useful tourist information within Kampar town becomes a non-technical issue that have been faced as well. To cope with this issue, we have cooperate with an organization named KHAN (Kampar Heritage and Nature) which to acquire those Kampar related tourist information from them. However, it causes another issue when implement those solution which is the data given by them are in handwritten from or even a simply not organized data. Besides, as the main language of the Visit Kampar Mini Program is in Mandarin. Developers have to translate the information by themselves and insert it into database with hand typing files by files.

Lastly, another challenge that has faced while implementation the program is the lack of information on the attractions' coordinates for Tencent's maps. Coordinates of a

location for google maps is usually details and able to find easily by searching online. However, in Tencent's maps, the coordinates of the attraction in Malaysia are always lack of details and the worst case is it even does not exist at all. In order to overcome it, developers have to set up the location by key in the destination longitude and latitude itself. But it is a minor different of the longitude and latitude between Tencent maps and Google Maps. Therefore, the result output might have slight move away from the real location when we implement it.

Chapter 6: Tourist Navigation and Behaviour Analysis

6.1 Tourist Navigation

In this project, tourist navigation features have been developed and are able to provide features such as map viewing, nearby attraction detection and destination navigation system.

By having the map viewing features, user are able to know their location, search around the maps, and zoom in certain area by click and swipe the maps displayed. When the user double click on the certain area of the maps, it will enlarge towards the location pointed. Besides, there will be a red mark point to indicate user current location.

Figure 6.1.1 shows that maps viewing page. The red mark on the maps indicate current location.

Besides, by further discover, user are able to browse for the nearby attraction with a single click on the button that float below the map pages. Figure shows the interface when the nearby attraction button is pressed.

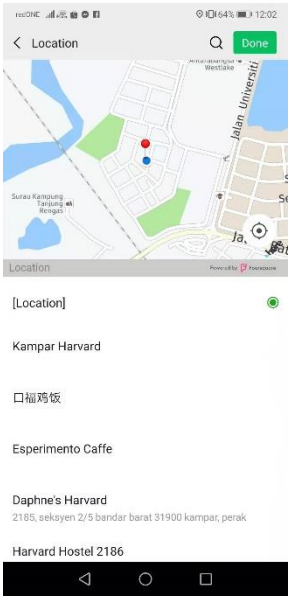


Figure 6.1.2 shows the list of nearby location and user can be directed to the destination when the place on the list is pressed.

Furthermore, to provide a fast and convenient user experience, user are able to use the navigation service from the interested location details page with a simply tap on a button. Figure shows the hotel details page and the navigate features button. After user choose to navigate, third party of navigation apps will be launch and take over the navigation tasks.

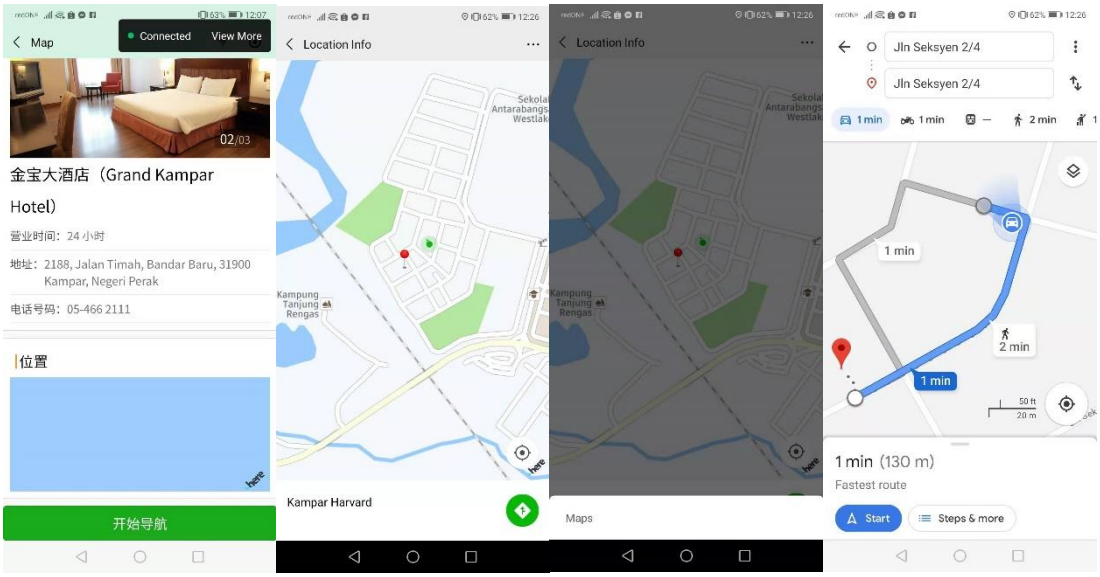


Figure 6.1.3 shows the details page with the navigation function and when its press third party navigation apps is called

6.2 Data Collection

In term of data collection, WeChat developer cloud is selected as the database to store and handle all the application data such as attractions, hotels, foods, albums, users and rating. It not only act as a server to provide the information data but also as a platform to store and record user using experience such most visited page, major gender population, active user population and more.

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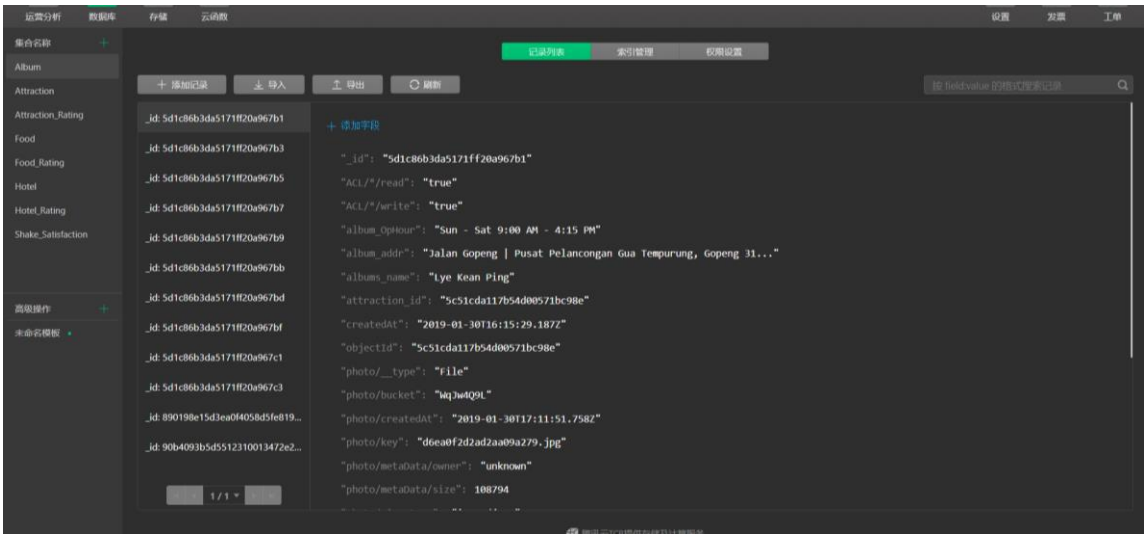


Figure 6.2.1 shows the various data attribute and the data store in the database

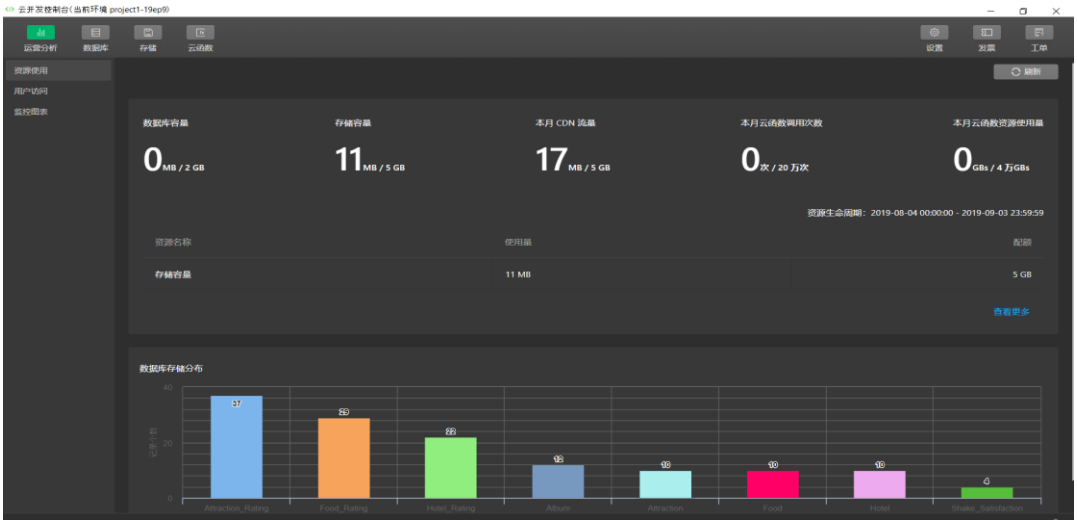


Figure 6.2.2 Shows the storage of database been used and the chart are analyze the memory consume by each attribute

When a user approve the permission of getting user info, common user information such as ender, name, province and language are being recorded. This data is further process in order to detect the user behavior such as to analyze the interested page for the male gender and between which age ranges and else.

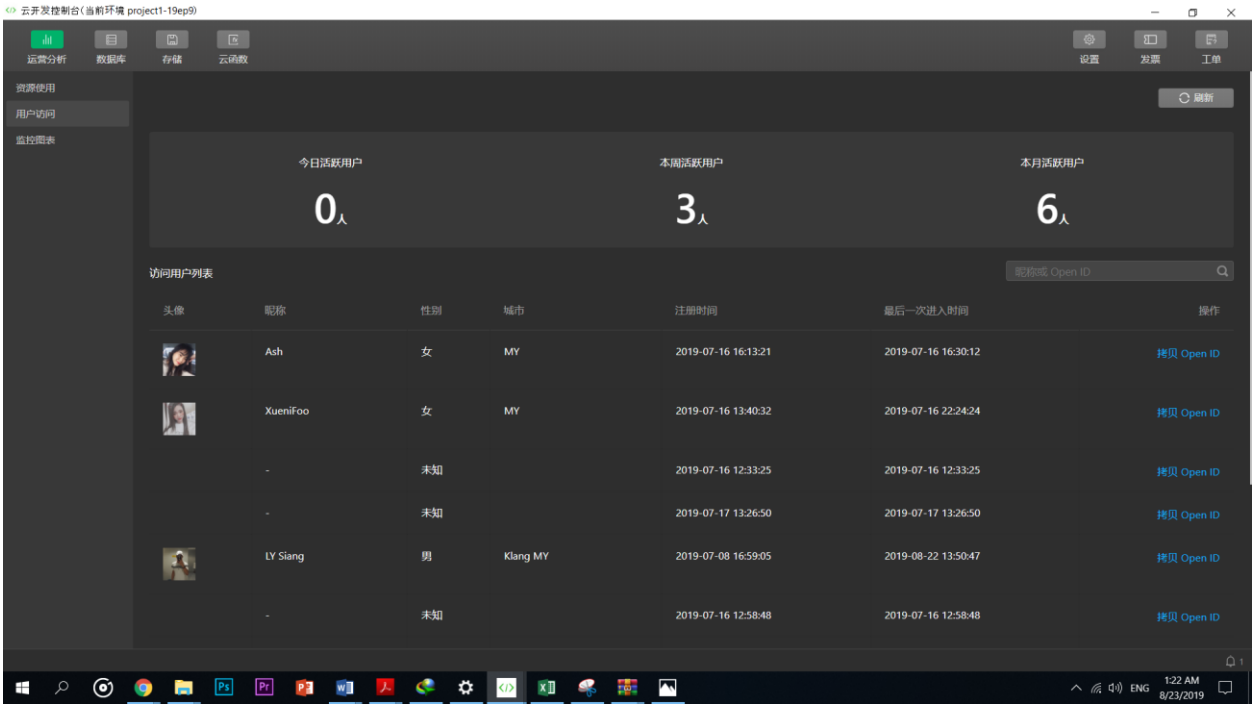


Figure 6.2.3 shows the user data that stored through the cloud interface

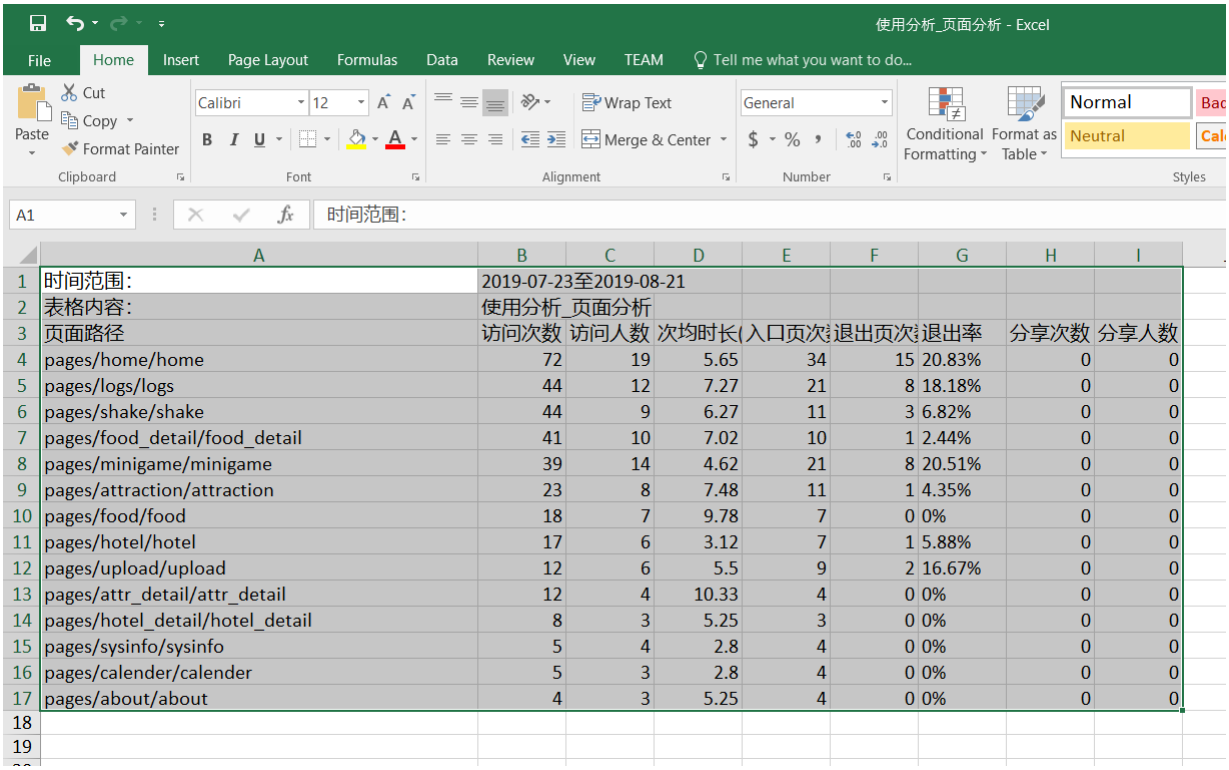
All of the data obtained above are retrieve from the WeChat Mini Program analytic tools. Developer needs to configure on it in order to use the analytic tools.

时间范围：	2019-07-14至2019-08-12	
表格内容：	用户画像_性别分布	
性别	用户数	占比
男	19	63.3333%
女	11	36.6667%

时间范围：	2019-07-14至2019-08-12	
表格内容：	用户画像_年龄分布	
年龄	用户数	占比
17岁以下	4	13.333300000000001%
18-24岁	7	23.3333%
25-29岁	13	43.3333%
30-39岁	2	6.66670000000000005%
40-49岁	1	3.33330000000000004%
50岁以上	3	10%

Figure 6.2.4 shows the user data that have been through analytic by age group and gender

Moreover, the page visit data is also a part of the data collection. This data is then taken into the behavior analysis process where to identify which page is the most likely interest by majority and the most unpopular page. Developer can take it as references to find out the reason of the page being unpopular in order to improve the perfection and completeness of the program.



使用分析_页面分析 - Excel

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Paste Cut Copy Format Painter Clipboard Calibri 12 Font Wrap Text Merge & Center Alignment General Number Conditional Formatting Format as Table Normal Neutral Styles

A1 时间范围:

	A	B	C	D	E	F	G	H	I
1	时间范围:	2019-07-23至2019-08-21							
2	表格内容:	使用分析_页面分析							
3	页面路径	访问次数	访问人数	次均时长(	入口页次	退出页次	退出率	分享次数	分享人数
4	pages/home/home	72	19	5.65	34	15	20.83%	0	0
5	pages/logs/logs	44	12	7.27	21	8	18.18%	0	0
6	pages/shake/shake	44	9	6.27	11	3	6.82%	0	0
7	pages/food_detail/food_detail	41	10	7.02	10	1	2.44%	0	0
8	pages/minigame/minigame	39	14	4.62	21	8	20.51%	0	0
9	pages/attraction/attraction	23	8	7.48	11	1	4.35%	0	0
10	pages/food/food	18	7	9.78	7	0	0%	0	0
11	pages/hotel/hotel	17	6	3.12	7	1	5.88%	0	0
12	pages/upload/upload	12	6	5.5	9	2	16.67%	0	0
13	pages/attr_detail/attr_detail	12	4	10.33	4	0	0%	0	0
14	pages/hotel_detail/hotel_detail	8	3	5.25	3	0	0%	0	0
15	pages/sysinfo/sysinfo	5	4	2.8	4	0	0%	0	0
16	pages/calender/calender	5	3	2.8	4	0	0%	0	0
17	pages/about/about	4	3	5.25	4	0	0%	0	0
18									
19									

Figure 6.2.5 shows the page analysis which include number of visit, visiting time and else.

Chapter 7: Conclusion

In conclusion, the problem statement of this project is that the necessary of implant accomplishments in order to improve the tourism and travel industry in Malaysia especially the small town area like Kampar. Digitalization is a way that are effective enough in handle this situation. Therefore, the motive to initiate this project is to develop more accessible and convenient online platform for accessing the services of tourism application, which will allow users to use the features, and services without download the application to their phone. The proposed solution is to build a more accessibility and convenience platform to access the features and information in order to promote and enhance tourism of Kampar.

WeChat Mini Program is an application inside another application. It provide superiority of does not require download where user able to use the services and features supported when there is a WeChat accounts and the WeChat application itself. WeChat is not only just a social media application but also a bridge of communication and transaction between services provider and user. In this mini program, there is two major component which giving more concern in this project which is Tourists Navigation Services and User Behavior Analysis. By complete of this, user can use variety of features such as navigation services, mini games, reward services, information provider and review and ratings services.

To be brief, this project is aim to build a platform for the tourists to have a greater travel experience and further analysis the data that obtain from the user in order to observe and predict the trends of tourism industry in certain area. With the realization of this project, tourism industry can be further improve if make the good use of the modern technology today such as mobile application. In the end, mobile application will help improving the tourism field and the society will be benefited from it, therefore this project has also indirectly contributed to that end.

References

1. Babel L. Zimmermann T. 2014. Planning safe navigation routes through mined waters, European Journal of Operational Research, 241. 99-108. (in English).

2. Marr, B. 2017. 'Want To Use Big Data? Why Not Start Via Google, Facebook, Amazon, (Etc.)' Available from: <https://www.forbes.com/sites/bernardmarr/2017/08/14/want-to-use-big-data-why-not-start-via-google-facebook-amazon-etc/#23973a7c3d5d>. [14 Aug 2014].

3. Marr, B. 2014, ' Big Data - The 5 Vs Everyone Must Know', notes Available from: <https://www.slideshare.net/BernardMarr/140228-big-data-volume-velocity-variety-varacity-value/7-ValueThen_there_is_another_V>. [28 Feb 2014].

4. Nakatani Y., Tanaka K., Ichikawa K. 2010.Tourist Navigation System that Promotes Interaction with Environment, Engineering Letters. – International Association of Engineers. (in English).

5. Tourism Malaysia (2017), *Malaysia Tourism Statistic in Brief* [Online]. Available at https://www.tourism.gov.my/statistics. [Accessed: 12 April 2018].

6. Wang, D., Park, S. and Fesenmaier D.R., 2012. The Role of Smartphones in Mediating the Touristic Experience. [pdf] SAGE Publications. Available through: Journal of Travel Research [Accessed 03 March 2015]

7. Zeimpekis V., Giaglis G.M., Lekakos G. 2013. Taxonomy of Indoor and Outdoor Positioning Techniques of Mobile Location Services, ACM, 2013.

Appendices

Final Year Project Biweekly Report

FINAL YEAR PROJECT WEEKLY REPORT

Project II

Trimester, Year: May, 2019	**Study week no.: 2**
Student Name & ID: Li Yi Siang, 15ACB06107	
Supervisor: Ts Dr Liew Soung Yue	
Project Title: The Development of WeChat Mini Programme for Tourist Navigation Services and Behavior Analysis	

1. WORK DONE

- developed the navigation system

2. WORK TO BE DONE

-Determine the new objective for final year project II

3. PROBLEMS ENCOUNTERED

-Technical problem such as unable to connect the third party API

- Data collection problem

4. SELF EVALUATION OF THE PROGRESS

More research and documentation have to be done before start.

_____ _____

Supervisor's signature Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

Project II

Trimester, Year: May, 2019	**Study week no.: 4**
Student Name & ID: Li Yi Siang, 15ACB06107	
Supervisor: Ts Dr Liew Soung Yue	
Project Title: The Development of WeChat Mini Programme for Tourist Navigation Services and Behavior Analysis	

1. WORK DONE

- The objectives of Final Year project 2 is determined

- Rearrange the code

2. WORK TO BE DONE

-Create database server

-Connect photo album with the server

3. PROBLEMS ENCOUNTERED

-Database unable to access due to wrong appID inserted

4. SELF EVALUATION OF THE PROGRESS

Double check the common information when error are unable to found

_____ _____

Supervisor's signature Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

Project II

Trimester, Year: May, 2019	**Study week no.: 6**
Student Name & ID: Li Yi Siang, 15ACB06107	
Supervisor: Ts Dr Liew Soung Yue	
Project Title: The Development of WeChat Mini Programme for Tourist Navigation Services and Behavior Analysis	

1. WORK DONE

- Database have been created

-album linked to the server database

2. WORK TO BE DONE

-Create database attribute in order to stored data

-Complete photo upload and retrieve function

3. PROBLEMS ENCOUNTERED

-Cloud server unable to access regarding citizenship.

4. SELF EVALUATION OF THE PROGRESS

Always backup the file

_____ _____

Supervisor's signature Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

Project II

Trimester, Year: May, 2019	**Study week no.: 8**
Student Name & ID: Li Yi Siang, 15ACB06107	
Supervisor: Ts Dr Liew Soung Yue	
Project Title: The Development of WeChat Mini Programme for Tourist Navigation Services and Behavior Analysis	

1. WORK DONE

- success to migrate the server from LeanCloud to WeChat develop cloud

2. WORK TO BE DONE

-export the metadata of the photo uploaded

3. PROBLEMS ENCOUNTERED

-limitation of wechat developer tools where the photo is compressed once upload.

4. SELF EVALUATION OF THE PROGRESS

Always try out the solution when there is a possibility

_____ _____

Supervisor's signature Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

Project II

Trimester, Year: Year 4 Trimester 1	**Study week no.: 10**
Student Name & ID: TANG CHEE HONG 15ACB06202	
Supervisor: Ts Dr Liew Soung Yue	
Project Title: The Development of Interactive Dashboard for Malaysia Tourism	

1. WORK DONE - done the javascript for getting the metadata
2. WORK TO BE DONE - apply the javascript to the mini program source code -combine and rearrange the existing code
3. PROBLEMS ENCOUNTERED - Limitation of WeChat where the metada being delete once the photo upload and compressed.
4. SELF EVALUATION OF THE PROGRESS -Always try out other method when there is posibility

_____ _____

Supervisor's signature Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

Project II

Trimester, Year: Year 4 Trimester 1	**Study week no.: 12**
Student Name & ID: TANG CHEE HONG 15ACB06202	
Supervisor: Ts Dr Liew Soung Yue	
Project Title: The Development of Interactive Dashboard for Malaysia Tourism	

1. WORK DONE - successful obtain the image metadata
2. WORK TO BE DONE -plot route on map by using the gps metadata obtained
3. PROBLEMS ENCOUNTERED -need to use a new programing language to complete the progress such as python
4. SELF EVALUATION OF THE PROGRESS -self learning skills is important

_____ _____

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Poster

小程序
WeChat Mini Programs

INTRODUCTION

- To build a tourism WeChat Mini Program for promote the Kampar Tourism
- Mini Program does not require download in order to use the services
- Provide Tourism Information to the user
- A more convenience and efficient platform

METHODOLOGIES

- Develop by using WeChat Open Platform-Developer Tools
- WeChat cloud and database is implemented
- Data collection by gps tracking and user log in
- Behavior analysis based on the data collected

CONCLUSION

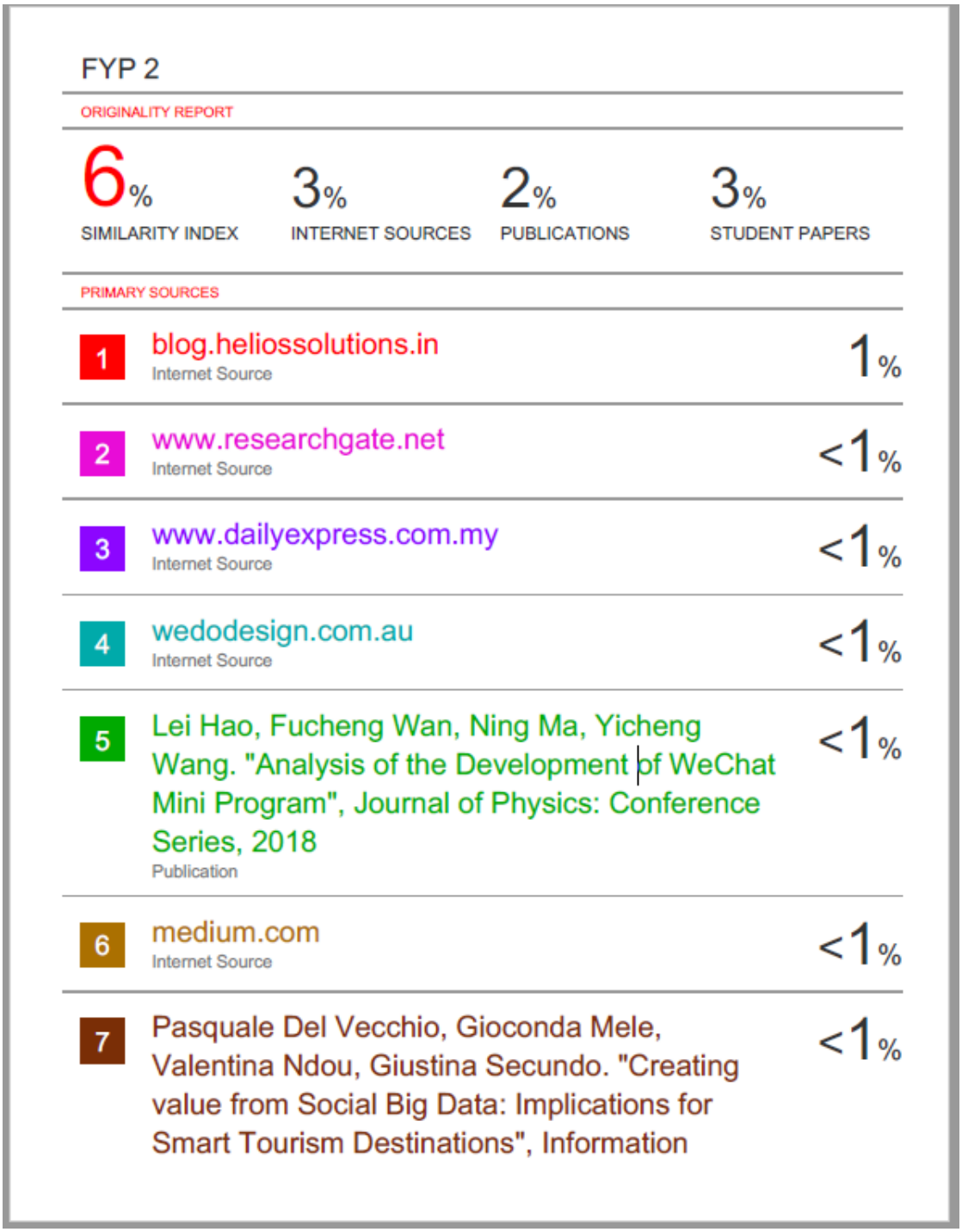
- To discover new buisness model and enhance tourism of Kampar.
- Improve the economy of small town like Kampar
- A good approach that provide better travel experience

"VISIT KAMPAR" WECHAT MINI PROAGRAM

THE DEVELOPMENT OF WECHAT MINI PROGRAMME FOR TOURIST NAVIGATION SERVICES AND BEHAVIOR ANALYSIS

FINAL YEAR PROJECT
DEVELOPE BY:LI YI SIANG

BACHELOR OF COMPUTER SCIENCE (HONS)



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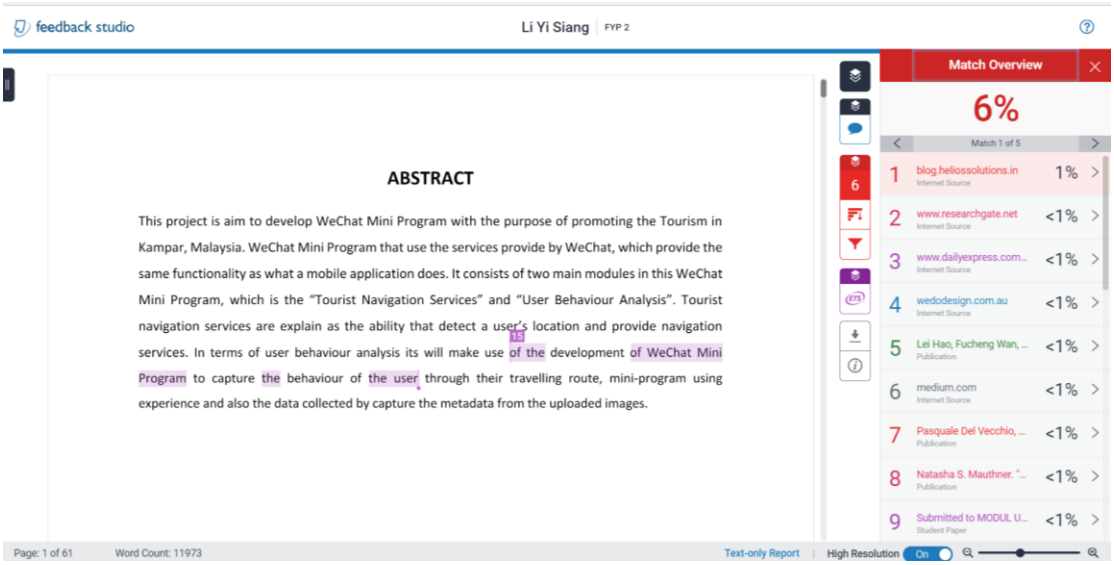

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ABSTRACT

This project is aim to develop WeChat Mini Program with the purpose of promoting the Tourism in Kampar, Malaysia. WeChat Mini Program that use the services provide by WeChat, which provide the same functionality as what a mobile application does. It consists of two main modules in this WeChat Mini Program, which is the "Tourist Navigation Services" and "User Behaviour Analysis". Tourist navigation services are explain as the ability that detect a user's location and provide navigation services. In terms of user behaviour analysis its will make use of the development of WeChat Mini Program to capture the behaviour of the user through their travelling route, mini-program using experience and also the data collected by capture the metadata from the uploaded images.

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