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Design and Development of *Travel Assist*, An App to Support Smart Tourism

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Abstract: Tourism is the third largest contributor to Malaysia's GDP, worth MYR 86.1 billion in 2019. It is expected that the number of tourists to Malaysia will reach 30 billion in 2020, translated to MYR 100 billion receipts. The Malaysian Smart Tourism 4.0 Initiative strives to unlock the full potential of the tourism industry through enabling technologies of IR 4.0. This work reports the results of an innovation project to support smart tourism in Malaysia. It entails the design and development of *Travel Assist*, a mobile App for visitors to Malaysia. *Travel Assist* integrates three common web services: *Google Translate*, *Google Maps*, and *XE Converter*, into one App. It was developed using MIT App Inventor and Adobe Dreamweaver, and suitable for iOS and Android 7.0 (Nougat) devices and above. The App was tested by a group of users to confirm its functionality and feasibility, and the validation results are encouraging. The underlying technology is robust enough to support future innovation ideas and services under the IR 4.0 umbrella.

Keywords: Smart tourism, mobile application, web services

1. Introduction

Malaysia is ranked ninth in the world for tourism arrivals by the United Nations World Tourism Organization [1]. It was voted the best travel destination in Asia by the World Travel Awards Asia and Australasia in 2016 [2] and rated the best Muslim travel destination by the Global Muslim Travel Index in 2017 [3]. The number of tourists and receipts have been increasing steadily for the past 10 years (Table 1) and it is expected that the number of tourists will reach 30 billion in 2020, translated to MYR 100 billion receipts (Malaysian Ringgit) [4].

Tourism is the third largest contributor to Malaysia's GDP with a 5.9% contribution to total GDP recorded in 2018. As tourism industries across South East Asia experience significant growth throughout the years, Malaysia has positioned itself to be a major player, through the backing of numerous government policies and initiatives to attract regional and international travelers.Here introduce the paper, and put a nomenclature if necessary, in a box with the same font size as the rest of the paper. The paragraphs continue from here and are only separated by headings, subheadings, images and formulae. The section headings are arranged by numbers, bold and 10.0 pt. Here follow further instructions for authors.

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Table 1 - Tourists arrivals and receipts to Malaysia

Year	Arrivals (Million)	Receipts (Myr) Billion
2019	26.10	86.1
2018	25.83	84.1
2017	25.95	82.1
2016	26.76	82.1
2015	25.72	69.1
2014	27.44	72.0
2013	25.72	65.4
2012	25.03	60.6
2011	24.71	58.3
2010	24.58	56.5

Source: Tourism Malaysia

The concept of "*Smart Tourism*" - the increasing dependency of tourism destinations, industries and tourists on Information and Communication Technology (ICT) was first introduced in 2015 [5]. The "*Tourism 4.0*" paradigm was proposed in 2018, to unlock the innovation potential of the tourism industry through key enabling technologies of IR 4.0 [6]. Smart tourism has been identified as a key thrust to increase Malaysia's tourism receipts to USD 110 billion by 2030. The Malaysia Smart Tourism 4.0 Initiative is described as "*a key development and game-changer that will transform Malaysian industry and take it to the next level*" [7].

This work reports the result of an innovation project at University College TATI by the *Software Engineering Research* Group. This work is the materialization of the concepts presented at the Research and Innovation Week 2020 [8] to support smart tourism in Malaysia. This paper entails the design and development of *Travel Assist*, a mobile App for visitors to Malaysia.

This paper is organized as follows: Section 2.0 presents a list of similar applications; Section 3.0 presents the design and development of *Travel Assist*, entailing main modules and interface; Section 4.0 presents the validation results of the App; and finally, conclusion and direction for future work is presented in Section 5.0.

2. Literature Review

For the tourism business, the new era of ICT has brought a plethora of new instruments. Because the tourist industry is one of the best-suited industries for utilising information technology for operational and business purposes, it is no surprise that the concept of smart tourism destinations has taken off swiftly [9].

Smart tourism refers to the use of technology (e.g. internet, mobile communication and augmented reality) to collect massive amounts of data and provide real-time support to all destination stakeholders [10].

The growing usage of mobile devices, particularly the smartphone and its various apps, has ushered in an era of unprecedented connectedness and Internet access (Wang and Xiang 2012). Many technology advances that support mobile access, such as Cloud Computing and End-User Internet Service Systems, are thus critical to achieving smart tourism objectives.

Thus, Smart tourism is a very promising scenario that leads to more convenient, safe, exciting, and sustainable living spaces for both residents and visitors, more personalized and thus more relevant tourism experiences, and even more opportunities for new services, business models, and markets to emerge as a result of more flexible structures and different perspectives on value creation.

2.1 Similar Apps

Similar Apps has been developed and deployed to support smart tourism. Most Apps utilizes the *Internet of Things* (IoT) and *Cloud* technologies under IR 4.0. Among the Apps that exploits these technologies include *Smart Traveler*, *Triposo* and *TripLingo*.

a) Smart Traveler

Smart Traveler [11], is the official State Department App for U.S. travelers, with frequently updated country information, travel alerts, maps, and embassy locations. The App enables user to create personal itineraries, add notes, and organize trips. It is available for both iOS and Android systems.

b) Triposo

Triposo [12] is an App that uses algorithms for planning journeys. The App displays recommendation on where to go depending on user input. It works without Internet connection by downloading information before the start of the journey. It lists more than 200 countries and 50,000 destinations worldwide, with 10 million users. Triposo is available for both iOS and Android systems.

c) TripLingo

TripLingo [13] an App for learning essential phrases and local culture for travelers. It is used by more than 300,000 international travelers, offers over 2,000 phrases per language in 13 languages, an instant voice translator in 19 languages, and a currency converter. TripLingo is available for both iOS and Android systems.

The proposed App, *Travel Assist*, is more general than Smart Traveler and suitable for all incoming travelers to Malaysia; utilizes existing web services as opposed to Triposo; and provide navigation services in addition to translation and conversion services compared to TripLingo.

3. Design and Implementation

A traditional waterfall approach for system development was adopted in the development of *Travel Assist*. Tools used include MIT App Inventor 2 and Adobe Dreamweaver for engine development and interface design. Three essential web services were identified for incorporation in the first version of the App namely *Google Translate*, *Google Maps*, and *XE Converter*.

3.1 Google Translate

Google Translate is a free multilingual translation service by Google, to translate text and websites from one language into another. As of September 2020, it supports 109 languages [14] with over 100 billion words translated daily [15]. This service is included in the App as the *translation module*.

3.2 Google Maps

Google Maps is a web mapping service by Google that offers satellite imagery, aerial photography, street maps, real-time traffic conditions, and route planning. It is used by over 1 billion people every month [16]. This service is included in the App as the *navigation module*.

3.3 XE Converter

XE is an online foreign exchange tools and services, best known for its currency converter application. It offers exchange rate information, international money transfers, and other currency-related services. It is used by more than over 280 million users annually [17]. This service is included in the App as the *currency conversion module*.

The overall flowchart for *Travel Assist* is illustrated in Figure 1, highlighting the three main services of the App.

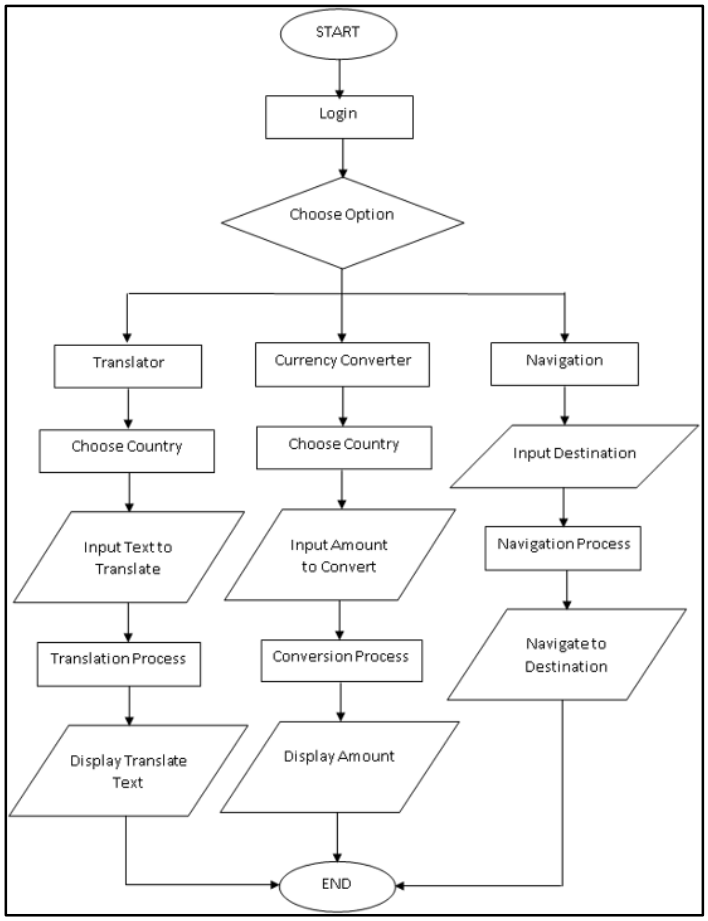

Fig. 1 - Overall flowchart for Travel Assist

Travel Assist offers three main services to the user namely translation, conversion, and navigation. The translation service adapts Google Translate in its implementation where the user chooses the language by country. The input phrase is then input into the system via text (keyboard or pen) or by speech. The translated text is then displayed to the user.

The (currency) conversion service adapts XE Converter in its implementation where the user chooses the currency by country. Input is via keyboard and the converted total in MYR is then displayed to the user.

The navigation service adapts Google Maps in its implementation where the user chooses the destination by keyword and then selects from a list of destination options. The user can then choose the mode of transportation to the destination. Navigation information is then displayed to the user.

Figure 2 illustrates the welcome page of the App. Users are required to sign-up prior to using the App where a pin number will be provided for accessing the service.

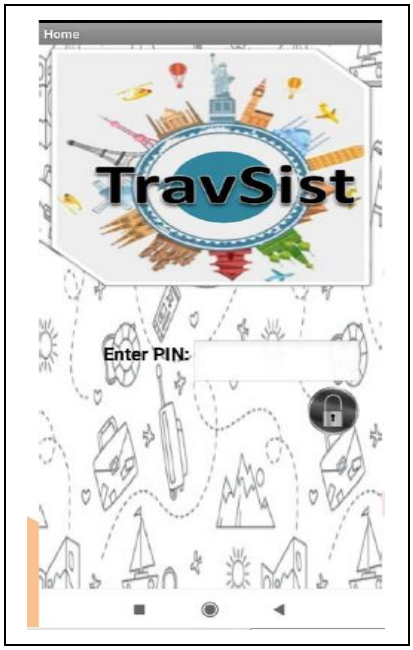

Fig. 2 - Welcome page

Figure 3 illustrates the main page of the App where users are presented with three services to choose from namely *Translation*, *Navigation* and *Conversion*.

Fig. 3 - Main page

Figure 4a illustrates the translation page where input and output can be in the form of textual or speech, subject to the user's preferences as well as the selection of the source and target languages.

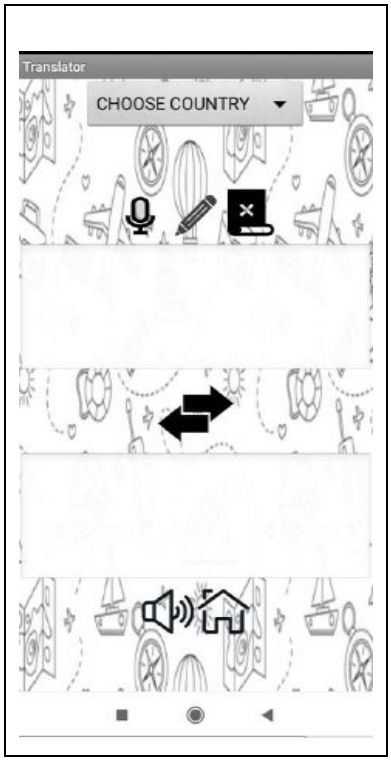

Fig. 4a - Translation page

Figure 4b illustrates an example of the translation service from Korean to English. The user input the text "*How are you*" in English and the translation (including pronunciation) is displayed to the user.

Fig. 4b - Example of translation service

Figure 5a illustrates the navigation page where the initial location of the user is determined by the phone's GPS and the target destination is provided by the user. The user would then have the option of selecting the mode of transportation (walking, driving, others) and a step-by-step navigation direction is graphically and textually displayed to the user.

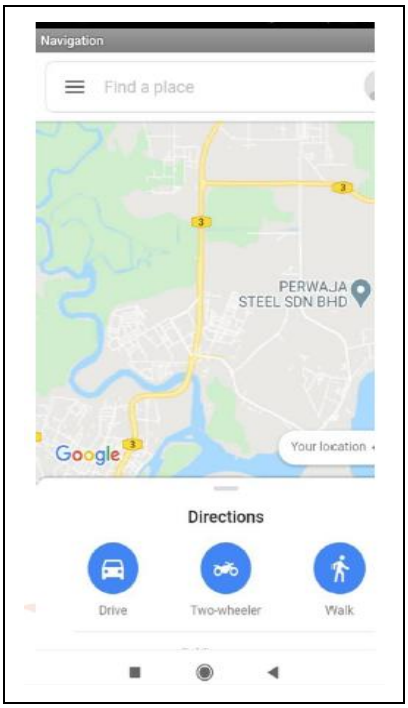

Fig. 5a - Navigation page

Figure 5b illustrates an example of the navigation service from the user's current location to *Seoul Tower*. The user input the keyword for search (*Tower*), and then a selection of destination that matches the search string is displayed to the user. Once selected (*Seoul Tower*), the service displays the location of the destination and the current location of the user.

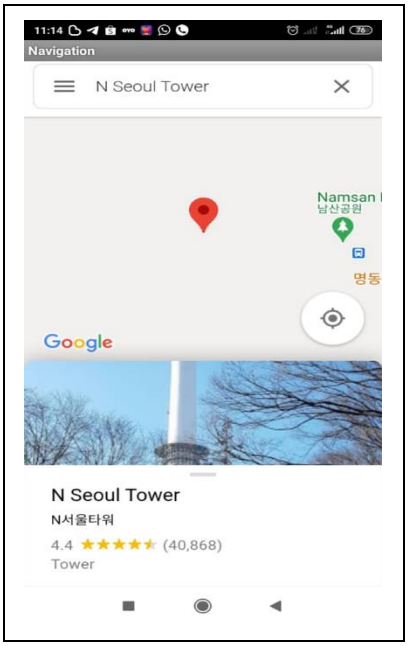

Fig. 5b - Navigation page

Figure 6a illustrates the currency conversion page where the source currency is selected by the user and the conversion to MYR is carried out in real-time.

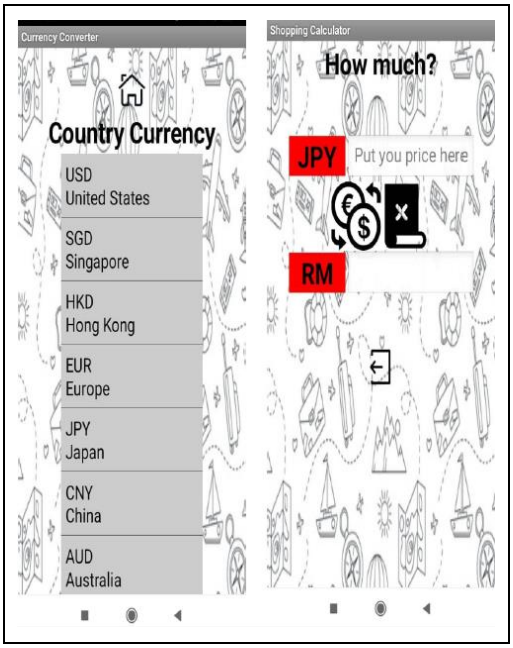

Fig. 6a - Currency conversion page

Figure 6b illustrates an example of currency conversion from Korean Won to MYR. The user selects the currency based on the country (Won for Korea) and the desired total for conversion. The converted value is then displayed to the user.

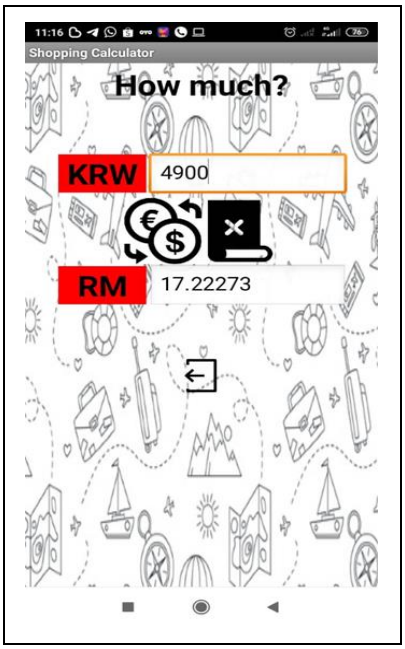

Fig. 6b - Currency conversion page

4. Validation Results

The functionality and feasibility of *Travel Assist* as a tool for the tourism industry was validated by means of user review. A group of 30 students and 20 lecturers from University College TATI were selected as respondents and given access to the App for 30 days.

Minor technical glitches were reported on the first week of testing, mainly due to different versions of operating systems used by the respondents. All bugs were fixed by the end of the second week and the App was running smoothly by week 3.

At the end of the testing period, a questionnaire was electronically distributed to all respondents and results were recorded using a 5-point Likert scale.

Table 2 illustrates the demographic profile of the respondents where 60% is aged between 18 and 24 years old; 10% is between 25 to 30 years old; 14% is between 31 and 40 years old; and 16% is more than 41 years old.

Table 2 - Demographic profile of respondents

Item		Frequency	(%)
Age	18-24	30	60
	25-30	5	10
	31-40	7	14
	41 and above	8	16
Gender	Male	27	54
	Female	23	46

Table 3 and Figure 7 illustrate the evaluation results using inferential statistical method. Four main items were evaluated: *easiness*; *user friendliness*; *meeting expectation*; and *flexibility*. Easiness or easy to use refer on how comfortable user using the propose application. In this research, user friendliness describes an application interface that is easy to use. From the questionnaire, researchers want to identify either the propose application is to be as good as or have the qualities that someone predicted, expected, or hoped for. Thus, in this paper, the meet expectation criteria are evaluated. Finally, the flexiblility of the application is measured to ensure the application can be expanding in future.

Table 3 - Response for ease of use

Item	Min	Max	Mod	Average	Standard Deviation
Easy to use	3	5	5	4.5	0.57
User Friendly	3	5	4	4.3	0.65
Meets Expectation	2	5	5	4.3	0.65
Flexible	2	5	5	4.2	0.75

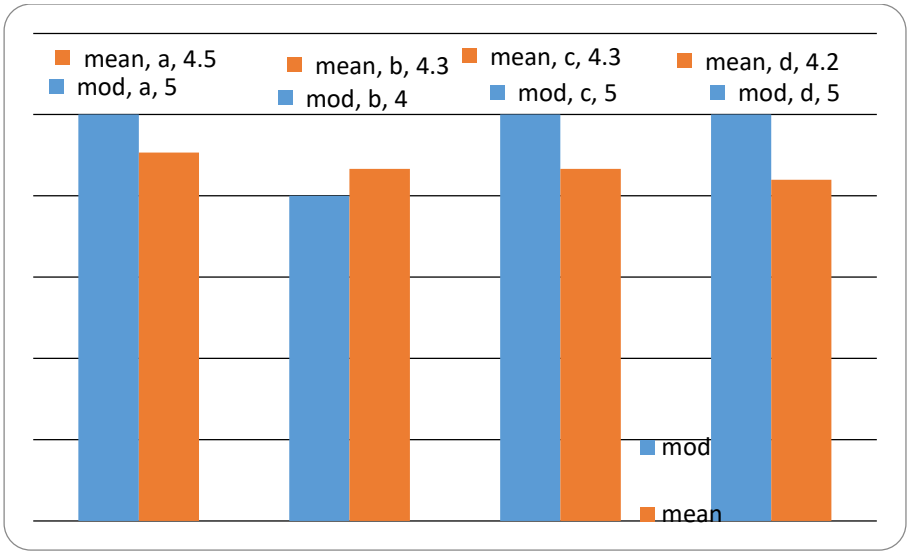

Fig. 7 - Response for Ease of Use

From the questionnaire, the result is calculated to get the mod and median for each of items. For all the item evaluated, results reveal that *Travel Assist* is easy to use (average 4.5, SD 0.57); user friendly (average 4.3, SD 0.65); meets user's expectation (average 4.3, SD 0.65); and flexible (average 4.2, SD 0.75).

5. Conclusion

This paper reports the result of an innovation project to support smart tourism in Malaysia. It entails the design and development of *Travel Assist*, a mobile App for the tourism industry. *Travel Assist* integrates three common web services: Google Translate, Google Maps, and XE Converter and developed using MIT App Inventor and Adobe Dreamweaver. The App was tested by a group of users to confirm its functionality and feasibility, and the validation are encouraging. The underlying technology is robust enough to support future innovation and services in IR 4.0. It is hoped that *Travel Assist* would contribute to the transformation of the tourism industry in Malaysia and take it to a higher level as envisioned by the Malaysian Smart Tourism 4.0 Initiative.

Acknowledgement

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