CHAPTER 6

CONCLUSION AND SUGGESTIONS FOR FUTURE WORK

In this section, we summarize the important aspects represented by the thesis and identify the suggestion for possible future research.

6.1. Conclusion

The main goal of this thesis was divided in two parts. The first part was to develop a mobile application based on Android platform, namely Camtour AR. The application was implemented by using Augmented Reality technology and Location Based Service for searching popular and most visited tourist attractions and culinary places in Phnom Penh city, Cambodia. Furthermore, the application has provided a route feature to head for the destination properly and accurately. The second part was to conduct the application usability testing. According the result of usability testing which implemented demonstrates that the satisfaction aspect achieves with 92.22%, learnability aspect achieved with 94.67%, effectiveness aspect achieved with 91.11% and efficiency aspect achieved with 88.89%. It means the application is usable, acceptable and can be utilized by users.

6.2. Suggestion

There are some suggestions which implemented for further research from the result of this work as described below:

- A. Utilizes the Google Maps Directions API which provide the direction and directs the user heading for tour destination.
- B. Add more tour data or content to the application so that the users feel more satisfied and comfortable for finding all the available locations.

REFERENCES

- Amin, D., & Govilkar, S. (2015). Comparative Study of Augmented Reality Sdk'S. *International Journal on Computational Sciences & Applications* (*IJCSA*), 5(1), 11–26.
- Aurelia, S., Durairaj, M., & Saleh, O. (2014). Mobile Augmented Reality and Location Based Service. *Advances in Information Sciences and Applications*, *II*, 551–558.
- Azuma, R. (1997). A survey of augmented reality. *Presence: Teleoperators and Virtual Environments*, 6(4), 355–385.
- Azuma, R., Baillot, Y., Behringer, R., Feiner, S., Julier, S., & MacIntyre, B. (2001). Recent advances in augmented reality. *IEEE Computer Graphics and Applications*, 21(6), 34–47.
- Brata, K. C., Liang, D., & Pramono, S. H. (2015). Location-Based Augmented Reality Information for Bus Route Planning System, *5*(1), 142–149.
- Butchart, B. (2011). Architectural styles for augmented reality in smartphones. *Third International AR Standards Meeting*, 1–7.
- Chheang, V. (2008). The Political Economy of Tourism in Cambodia. *Asia Pacific Journal of Tourism Research*, 13(3).
- Conti, J. P. (2008). The Androids are coming. *Engineering and Technology*, *3*(9), 72–75.
- Croasmun, J. T., & Ostrom, L. (2011). Using Likert-Type Scales in the Social Sciences. *Journal of Adult Education*, 40(1), 19–22.
- D'Roza, T., & Bilchev, G. (2003). An overview of location-based services. *BT Technology Journal*, 21(1), 20–27.
- De, L. N. A. B. (2015). Augmented reality applied in tourism mobile applications. 2015 2nd International Conference on eDemocracy and eGovernment, ICEDEG 2015, 120–125.
- Emir Kremić, A. S. (2011). The Implementation of Face Security for Authentication Implemented on Mobile Phone. *The International Arab Journal of Information Technology*.
- Erdelj, M., Razafindralambo, T., & Simplot-Ryl, D. (2013). Covering points of interest with mobile sensors. *IEEE Transactions on Parallel and Distributed Systems*, 24(1), 32–43.
- G. Papagiannakis, G. Singh, N., & Magnenat-Thalmann. (2008). A survey of mobile and wireless technologies for augmented reality systems. *Computer Animation And Virtual Worlds*, 19(August), 271–281.

- Harrison, B., & Dey, A. (2009). What Have You Done with Location-Based Services Lately? *IEEE Pervasive Computing*, 8(4), 66–70.
- Hui, L., Hung, F. Y., Chien, Y. L., Tsai, W. T., & Shie, J. J. (2014). Mobile Augmented Reality of Tourism-Yilan Hot Spring. 2014 7th International Conference on Ubi-Media Computing and Workshops, 209–214.
- Ismail, M., Diah, N. M., Ahmad, S., Kamal, N. A. M., & Dahari, M. K. M. (2011). Measuring usability of educational computer games based on the user success rate. SHUSER 2011 2011 International Symposium on Humanities, Science and Engineering Research, 56–60.
- Jamieson, S. (2004). Likert scales: how to (ab)use them. *Medical Education*, 38(12), 1217–1218.
- Kounavis, C. D., Kasimati, A. E., & Zamani, E. D. (2012). Enhancing the tourism experience through mobile augmented reality: Challenges and prospects. *International Journal of Engineering Business Management*, 4(1), 1–6.
- Likert, R. (1932). A Technique for the Measurement of Attitudes. *Archives of Psychology*, 22 140, 55.
- Milner, G. (2016). What is GPS? *Journal of Technology in Human Services*, 34(1), 9–12.
- Ministry of Tourism. (2015). TOURISM STATISTICS REPORT. Phnom Penh.
- Patil, B. D., & Ramteke, P. P. L. (2014). Development of Android Based Cloud Server for Efficient Implementation of Platform as a Service, *4*(1), 309–312.
- PLC., P. P. S. (2013). Tourism sector in Cambodia.
- Rattanarungrot, S., White, M., Patoli, Z., & Pascu, T. (2014). The application of augmented reality for reanimating cultural heritage. *6th International Conference Virtual, Augmented and Mixed Reality*, 8526(June), 85–95.
- Rayarikar, R., Upadhyay, S., & Pimpale, P. (2012). SMS Encryption using AES Algorithm on Android. *International Journal of Computer Applications*, 50(19), 12–17.
- Shao, D., Khurshid, S., & Perry, D. E. (2007). A case for white-box testing using declarative specifications. *Proceedings Testing: Academic and Industrial Conference Practice and Research Techniques, TAIC PART-Mutation* 2007, 19(7), 137.
- Shek, S. (2010). NEXT-GENERATION LOCATION-BASED SERVICES FOR MOBILE DEVICES, 1–66.
- Shu, X. S. X., Du, Z. D. Z., & Chen, R. C. R. (2009). Research on Mobile Location Service Design Based on Android. 2009 5th International Conference on Wireless Communications, Networking and Mobile Computing, (60775028), 1–4.

- Steiniger, S., Neun, M., & Edwardes, A. (2006). Foundations of Location Based Services. *Cartography*, 1, 1–28.
- Ullah, M. I. A. (2016). Usability Evaluation of HEC National Digital Library Website: A Qualitative Approach, *33*(3).
- Uzun, A., Salem, M., & Küpper, A. (2013). Semantic positioning-An innovative approach for providing location-based services based on the web of data. *Semantic Computing (ICSC)*, 2013 IEEE Seventh International Conference on, 268–273.
- Virrantaus, K., Markkula, J., Garmash, A., Terziyan, V., Veijalainen, J., Katanosov, A., & Tirri, H. (2001). Developing GIS-supported location-based services. *Proceedings of the 2nd International Conference on Web Information Systems Engineering, WISE 2001*, 2, 66–75.
- Whipple, J., Arensman, W., & Boler, M. S. (2009). A public safety application of GPS-enabled smartphones and the android operating system. *Conference Proceedings IEEE International Conference on Systems, Man and Cybernetics*, (October), 2059–2061.

APPENDIX

Appendix A. Application Assessment Questionnaire

APPLICATION ASSESSMENT QUESTIONNAIRE

PURPOSE

The purpose of this questionnaire is to collect the data about satisfaction level and user's opinion for utilizing the "Camtour AR" application. The purpose of this application is to provide users a search tool for tourist attractions and culinary places with route map view. The respondent data is really significant for me because these data will be processed to be my research achievement.

AGREEMENT

The respondent assessment of using the Camtour AR application has really helped me and provided many contributions for this research. The respondent data will be utilized only in this research and will not be used by other person or other research. Thank you for your cooperation.

Name	•	
Age	:years old	
Gender	: □ Male □	Female
Occupation		
Place of Origin	:	

INSTRUCTION

Please read the statements in the research carefully, then fill them by using (\checkmark) sign in the available given number column based on your opinion such as (1) strongly disagree, (2) disagree, (3) neutral, (4) agree and (5) strongly agree..

No	No Statement	Answer						
No Statement	1	2	3	4	5			
Location-based Augmented Reality Features Assessment								
1	The Camtour AR application provides the location direction and distance information in Phnom Penh city, Cambodia.							

2	The location direction and distance information is presented accurately.					
3	The Camtour AR application provides the location information well.					
4	The given location area in the application is really useful in providing the tour location area.					
5	The provided route feature really assist the user to head for destination.					
	Application Interface Assessmen	t				
Satis	tisfaction		2	3	4	5
6	I am comfortable and enjoy using the Camtour AR application.			<u> </u>		
7	The interface of this application was pleasant.				X	
8	I would recommend this application to other friends for using the Camtour AR application for searching tourist attractions and culinary places in Phnom Penh city.				5	
9	I would like to install this application on my mobile phone for searching tourist attractions and culinary places information which available in Phnom Penh city.			7		
10	The Camtour AR provide more knowledges about tourist attraction and culinary places information in Phnom Penh city.					
11	This system has all the functions and capabilities I expect it to have.					
Learnability		1	2	3	4	5
12	I thought that Camtour AR application was easy to use and learn.					
13	The background and other user interface components of each interface in this application are familiar and consistent.					
14	The color combination in the whole system is good.					

15	The language that used in every sentence or phrase is easy to understand.					
16	The information (on-screen messages) provided with Camtour AR is clear.					
Effectiveness						
17	I found the various functions in the Camtour AR application were well integrated and work well.					
18	The information was effective in helping me complete the tasks and scenarios.	L	. 0			
19	The Camtour AR application gives a good response for all working activities.			`. X		
Efficiency				.0	ر مد	
20	The application does not take long time in getting information of a location.				S	
21	The Camtour AR take less than 3 second to load map and route.					
22	This application loads each function or activity fast as I expect it to have.					