Tour Helper Application for Uijeongbu City Tour

Ki-Hwan Ryu, Woo Suk LEE

Abstract Background/Objectives: As information technology plays an important role in the tourism industry, the tourism industry has always been integrated with information technology. This trend has been accelerated as the size of information increases due to the appearance of the internet. In this situation, smart tour systems have been constructed based on the internet and smartphones.

Methods/Statistical analysis:It may be difficult to find a route using only general maps because of the complexity of the route when touring a new area. If you carry the local currency separately, you may run out of money or have difficulty managing the change. It can solve the inconvenient part of the tour by using smart phone.

Findings:The application gives directions based on road view because it is difficult to find paths using general maps. In addition, it is possible to leave a record that a tourist site has been visited through the NFC tag placed on the site just like taking a stamp. This record can always be confirmed through the application at any time. The application also provides a function for viewing a collection of photographs taken at a tourist site. It provides the Uijeongbu cyber money function that helps convenient payments at tourist sites or traditional markets. The cyber money can be set to be manually or automatically charged. When payments are made in cash at stores, it is possible to receive the change in the cyber money.

Improvements/Applications: As directions are given based on road view, tourists can easily find paths even when they visit a new tourist site. The application promotes the interest of tourists by providing the NFC stamp or tourist site photograph viewing function. In addition, it provides the Uijeongbu cyber money payment function to allow easy payments at tourist sites, making purchases easy and providing the convenience of paying no attention to the change.

The purchase details can be seen on the application at any time. Orders can be placed on the application and received via couriers without visiting the tourist sites again.

Keywords: Tourism, application, location-based, guidance, payment

I. INTRODUCTION

Currently, information technology (IT) is regarded as one of the growth factors of the tourism market. As the products of the tourism industry are experience-oriented, it is impossible to assess them before directly experience them. Therefore, it is essential to collect information in advance. In the course of collecting information, it was vital to collect the reviews of tourists with direct experience in the past, but now

Revised Manuscript Received on May 22, 2019.
Ki-Hwan Ryu, Major in Tourism Industry, KwangWoon University, Seoul 01897, Korea
WooSuk LEE, Department of Plasma Bioscience and Display, KwangWoon University, Seoul 01897, Korea
* *E-mail:* allryu@kw.ac.kr

there are more paths to collect information and it is possible to obtain more accurate information in an easier manner.

Various technologies are being developed using location-based services. In the tourism industry, technologies are providing easy access to destinations by showing the actual roads and surroundings through smartphones using location-based services and augmented reality technology [1].

In this study, directions are given based on road view so that tourists can easily find paths even when they visit a new tourist site. In addition, previous tours can be seen by pressing a visit stamp at each tourist site and allowing the view of a collection of photographs taken at each tourist site. In addition, shopping is possible at tourist sites by additionally providing the Uijeongbu cyber money service, and it is possible to make the change management unnecessary by providing the option to receive the cyber money instead of the change. Furthermore, when purchases were made using the cyber money, the purchase details can always be checked on the application and it is possible to reorder the same items using the application without visiting the tourist sites again.

II. RELATED WORKS

Many domestic studies on smart tourism have been focused on smartphones. There are many cases where smartphones were used for tours.

There was a study in which the Gyeongbokgung Palace cultural heritage was experienced through a comparative study that directly executed the smartphone-based state-of-the-art location-based augmented reality application at the site [2]. Another study proposed and implemented a dynamic tour interpretation smartphone application using GPS [3]. In addition, a study is being conducted to examine whether the usefulness, use convenience, entertainment, and accuracy factors are considered important in selecting smartphone-based tour information characteristics [4]. In the smartphone tour information environment, how the previous factors decisively affecting the acceptance of tour information by potential tourists as tour subjects are correlated to each other, how they affect the intent to use, and how they are ultimately connected to the intent to purchase tour products were researched [5]. Communication with resort customers and attempts to manage customers were researched using mobile services, and the mobile services of ski resorts were researched [6].

As the utilization of the existing smartphone sensors alone produces large errors,

various studies have been conducted to improve such errors. A method of reducing errors by collecting location data from location providers using the GPS and cameras of smartphones and a method of accurately obtaining sensor data were researched [7]. In addition, information processing devices, information input, and search methods using the augmented reality technique were researched [8]. Furthermore, location-based service technology was applied to mobile terminals to allow tourists to effectively find tour destinations [9]. A study was conducted to display the actual roads and surroundings on smartphones and to give directions to destinations on the actual roads using augmented reality technology as well as smartphone cameras and sensors [10].

In this study, research was conducted on a method of utilizing location-based technology, road view, and augmented reality for giving directions as well as tours.
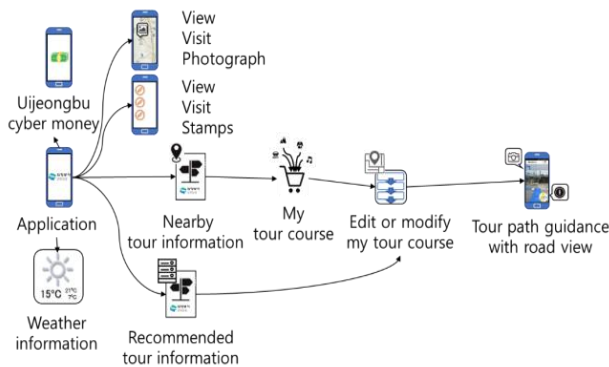
III. PROPOSED

Figure 1.Application structure

Figure 1 shows the basic structure of the application. This tour application provides guidance on the tour resources of Uijeongbu City. The user can directly make a tour course using such resources or can have a tour using the tour courses recommended by Uijeongbu City.

Once a tour course is made or selected using the provided resources, it can be edited or modified again through the preview of the path before it is finally taken.

When a tour begins, directions are given based on road view. When directions are given using road view instead of guidance through general maps, cases of being lost in new tourist sites can be reduced.
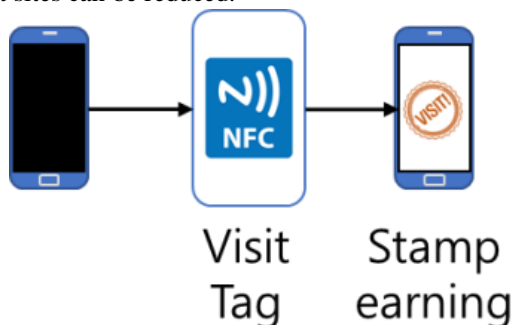

Figure 2.NFC visit tag method

Another function allows the tourist to record a visit to the corresponding tourist site through the NFC tag provided at specific tourist sites as shown in Figure 2. This method can

surely certify that a tourist site has been visited and tourists can also have fun as if they were taking real stamps. The earned stamps can be checked on the application. A stamp has the name of the tourist site as well as the time and date of taking it. If a site has been visited several times, multiple times and dates can be recorded.
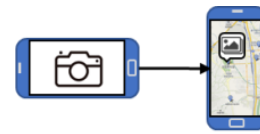
Figure 3. View of a collection of photographs taken at a tourist site

In addition, the proposed tour application can collect photographs in a smartphone and show a collection of photographs taken at each location if such locations are in Uijeongbu City as shown in Figure 3.
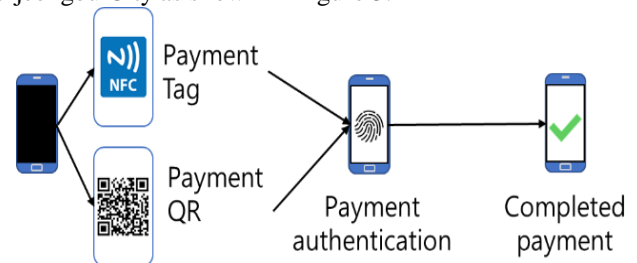

Figure 4. Payment process

Additionally, the proposed tour application provides the cyber money function that can be used in Uijeongbu City. The money can be used for payments on shopping in tourist sites and traditional markets within the city. Payments are performed using the QR code or NFC tag. Figure 4 shows the payment process. Payment authentication is possible through the PIN number set by the user or the biometric authentication of the terminal.

The cyber money can be manually charged or automatically charged from the set account or card when the balance is less than a certain amount. In addition, when payments are made in cash for shopping in tourist sites or traditional markets, the change can be charged as the cyber money. This can reduce the inconvenience that the charge is carried in tourist sites for cash payment.

In addition, when payments are made using the Uijeongbu City cyber money, the purchase details can be checked and additional orders can be placed through the internet in the future by checking such purchase details. This provides the convenience that another visit is not required for buying the same items.
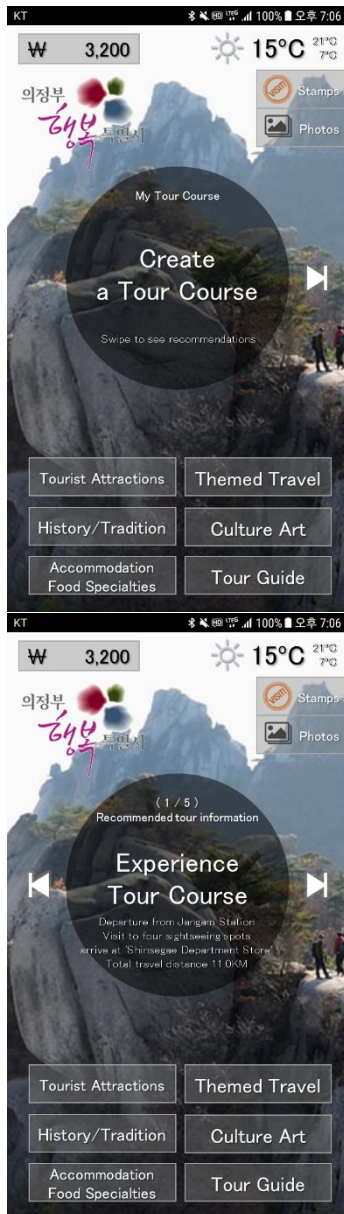
IV. RESULTS

Figure 5. Start Screen

When the Uijeongbu tour application is started, the start screen shown on the left-hand side of Figure 5 appears. The start screen shows the weather information, Uijeongbu cyber money balance, and each menu entry screen. If a user sweeps "making a tour course" at the center to a side, the tour courses recommended by Uijeongbu City can be seen as shown on the right-hand side of Figure 5.
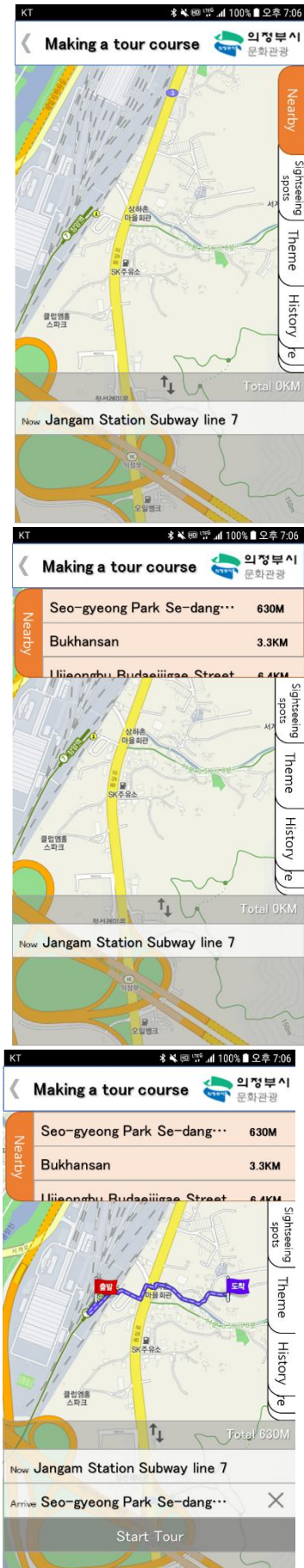

Figure 6. Making a tour course

When a user selects a menu for making a course, the screen shown in Figure 6

appears. On the right-hand side of the screen are tourist site classifications. If one of them is selected, tourist sites corresponding to the classification are displayed from the nearest one. The user can make a tour course by selecting desired tourist sites. Whenever a tourist site is added, preview is available to help making a course.
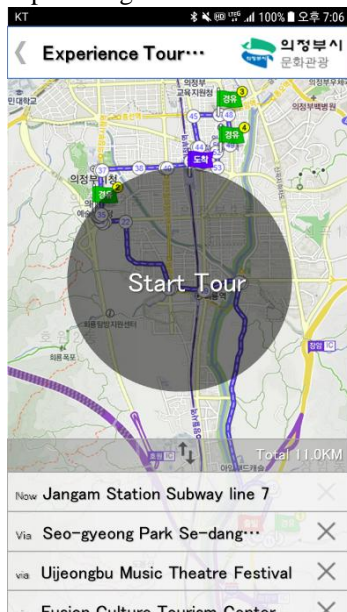

Figure 7. Recommended tour course editing

When a tour course recommended by Uijeongbu City is selected, the screen shown in Figure 7 appears. The tour can be started as it is and it is also possible to modify the order of the tourist sites and even to delete them.

Figure 8. Road view guidance screen

When a tour is started, guidance with road view operates as shown in Figure 8. It can minimize the chance of being lost by giving directions using actual photographs.
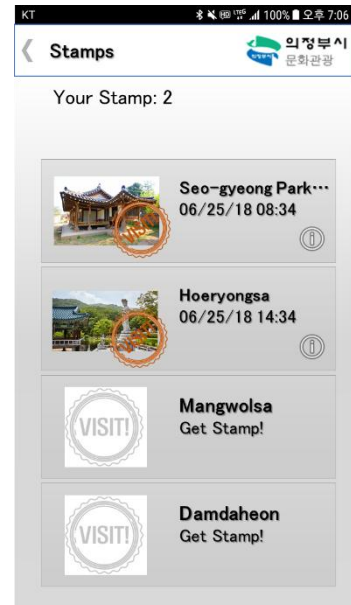

Figure 9. Stamp box

If visit NFC tags provided by certain tourist sites are taken during a tour, the application can take stamps representing that such sites have been visited. When a stamp is taken, the photographs as well as the visit time and data are displayed and the information on the site can be seen.

Figure 10. View of a collection of photographs by tourist site

It is common to take photographs using smartphones during a tour. If too many photographs are taken, later it becomes difficult to find the photographs taken at the time of the tour.

To avoid such inconvenience, the Uijeongbu tour application shows a collection of photographs taken around the locations registered as Uijeongbu City tourist sites among the photographs with location information in a smartphone. This way, the user can see only the photographs taken when the tourist site was visited.
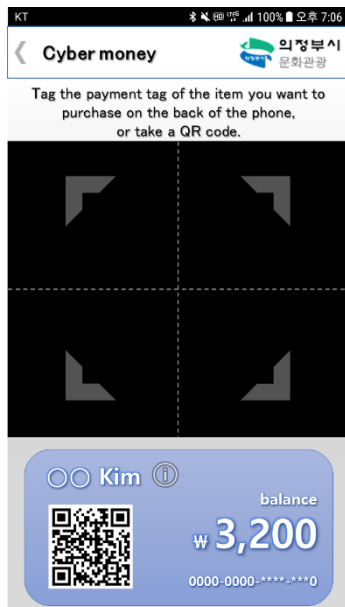
Figure 11. Uijeongbu cyber money

The Uijeongbu cyber money works like a prepaid card. Both manual charging and automatic charging are available. After payments are made at tourist sites or traditional markets in Uijeongbu City, the change can be charged as cyber money. This can improve inconvenience during a tour caused by the absence of cash or too many coins.

To make a payment, a QR code is taken or the NFC tag of a product is tagged, and then a screen for confirming the product appears. If the product is correct, perform payment authentication to complete the payment. Payment authentication can be performed through the preset PIN code or the biometric authentication of the terminal.

In addition, when a payment is made using the Uijeongbu cyber money, the payment history is stored and it is possible to place orders and receive the same products via couriers without visiting the tourist site or traditional market again.

V. CONCLUSION

The proposed smartphone application not only makes the tour of Uijeongbu City easy but also provides various functions such as NFC stamps, tour history, and view of a collection of photographs taken at tourist sites, which can add fun to a tour.

This app provides a route based on the road view so tourists do not get lost. And as with stamping, visitors can leave a record of their visit to NFC tags placed at the tourist sites, so that tourists can have fun.

Furthermore, it enables convenient payments at tourist sites as well as easy future purchases.Uijeongbu Cyber Money feature makes it easy to pay in sightseeing spots and traditional markets. In addition, the remaining amount after payment is saved in cyber money, so you do not have to manage change.

It will be developed as an app that will help visitors to Uijeongbu tourism by adding the function of displaying information about sightseeing spots when entering sightseeing spots in future.

REFERENCES

1. E. Sternberg, The Iconography of the Tourism Experience, Annals of TourisM Research, 1997;24(4):951-969.
2. Hong Seon Choi, Kang Hee Lee, A Survey of Location-based Augmented Reality APPs for implementing the Experience APPs of Cultural Assets, The Journal of KoreanInstitute of Information Technology, 2010;5(5):171-189.
3. S.H. Kim, J.U. Kim, H.J. Kim, D.G. Park, A Tour Information System on Smart Phone using Location Based Service, Journal of Korea Multimedia Society, 2012;15(5):677-691.
4. Y.S. Yoon, Y.K. Yoo, Y.L. Jang, A study on the Influence of Travel Information Characteristics of Smart-phone on Travel Information Satisfaction, Credibility, and Behavior Intention, Journal of Tourism Sciences, 2013;37(5):11-28
5. S.H. Cho, B.G. Koo, A study on Smartphone Web service of resort tourist, International Journal of Tourism Management and Sciences, 2013;28(4):259-279.
6. J.Y. Kim, C.K. Lee, J.M. Kim, A Study of Examining the Relationship between Adoption of Smartphone- Based Tourism Information and Use Intention, International Journal of Tourism Management and Sciences, 2013;27(6):15-38
7. Yi Lun He, A Study of Augmented Reality Navigate on Android Platform, Graduate School of Paichia University.
8. Ig Jae Kim, The information processing apparatus and an information input, a search method using augmented reality techniques, KIST, trends/Research report, 2014.
9. Ki-Hwan Ryu, Young-Soo Park, Technology of Location-Based Service for Mobile Tourism : An Application of Major Tourist Spots in Seoul, Information, An International Interdisciplinary Journal, 2015;18(10):4075-4082.
10. Myung Suk Lee, Study on the Walk Navigation App Using Augmented Reality, Korean Society of Computer and Information, 2016;24(1):197-199.