

A Study on the Tour Information UXD utilizing Open Data

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Abstract

The Korea government decided to open public data in areas close to people's lives through policies to strengthen the "DNA" ecosystem such as Data, Network, and Artificial Intelligence (AI). This study is based on the use of open data provided by the Korea Tourism Organization. We can receive a variety of tourists information and photos from the nation, owned by the Korea Tourism Organization, in real time. Public data portal(data.go.kr) website is the open data service site operated by the government. The portal provides a lot of data so that it can be used at the user's convenience in various ways such as file big data and open API(Application Programming Interface). This paper proposed the UXD(user experience design) which is utilizing the open data from TourAPI 3.0 for tourists. Ultimately, as tourism services increase through the mobile application, it is expected that domestic tourism will become more active and the domestic economy will be evolved.

Keyword : Open Data, Tour Information, User Interface, Big Data

1. Introduction

The Fourth Industrial Revolution is the continuous automation of traditional manufacturing and industrial practices using modern smart technologies. Industry 4.0 connects a wide range of new technologies to create value. You can design virtual copies of the physical world using cyber-physical systems that monitor physical processes [1]. Gartner, an American market research firm, has selected topics related to big data/artificial intelligence such as Hyperautomation and AI security as technology trends that companies should pay attention to in 2020 [2]. The demand and interest of data, which will be the core resource of the industry, are concentrated. The use of evolving media and technology is accelerating this phenomenon, and government agencies around the world are free to use data to create new value through open data. Open data is free to use and repost some data as anyone wishes, without limitation of copyrights, patents or other control mechanisms [3]. One of the most important things about open data is Open Government Data (OGD), a form of open data generated by the governing government agency. Globally, the government is releasing public data and using it to create added value. Open data policies and data open portals in major overseas countries are as seen in [Table 1] [4].

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[Table 1] Open data policies and portals in major overseas countries

Country	Contents	Open Data Portal
United States of America	The US federal government announced the Open Government Guidelines in December 2009 and opened public data through the open data open portal.	data.gov
United Kingdom	Revised 'The Information Disclosure Act' to open data from January 2010. Established a portal and prepared an open data strategy' in June 2012.	data.gov.uk
Germany	The German federal government has established and operated an open portal for public data since 2013 as a "open government" strategy.	govdata.de
EU	Established the "European Open Data Strategy in 2011," announced the establishment of an EU data portal and support for data processing technology R&D.	europeandataportal.eu
Japan	In July 2012, as a basic strategy to promote the use of open data, 'The electronic administration open data' strategy was established, and open data was actively disclosed.	data.go.jp

In the case of Korea, since the government's 3.0, there have been active discussions to improve public data openness and utilization in terms of transparency and private value added [5]. The Korea Tourism Organization provided open data of various tourists information based on location such as tourist attractions, cultural facilities, lodging places, festivals, food, etc. The big data platform produces high-quality data through 11 big data centers and discloses it to the public, focusing on the context of cultural consumption of 'Where, eat, play, sleep, learn, and live'. Smart tourism based on information and communication technology (ICT) can be seen as a paradigm of the present era. The main aim of this paper is a proposal of the improved mobile UXD using open API from the Korea Tourism Organization so that user can get more customized tour information.

2. Literature review

2.1 Theoretical background

The establishment of intelligent government begins by providing personalized government services through the Digital New Deal, converting the information system into a cloud environment. The data dam project can be said to be a business that has a foundation for collecting, processing, trading, or utilizing data.

Open data is all openable electronic data that is created and collected according to laws and

regulations. Open data means that government data must be available to anyone who can redistribute it in any form without copyright restrictions [6]. And public data portal is an integrated platform that provides in one site. It allows third parties to develop new kinds of digital applications and services, thereby supporting technological innovation and economic growth by making public information public. Several national governments have created websites to distribute some of the data they have collected. City government joint project concept for creating and organizing a culture for open data or open government data.

API refers to an interface made to control functions provided by an operating system or programming language so that it can be used in an application program. Mainly, it provides interfaces for file control, window control, image processing, and character control [7]. Those who provide and use the API are considered members of the business ecosystem. An important factor when the API is released is “interface stability”. Changing the API may break compatibility with clients that depend on the API [8]. In most procedural languages, APIs define a set of functions to perform specific tasks and allow them to interact with specific software components. Example of function of API is as seen in [Fig. 1].

```
SYNOPSIS
    #include <math.h>
    double sqrt(double X);
    float sqrtf(float X);
DESCRIPTION
    sqrt computes the positive square root of the argument. ...
RETURNS
    On success, the square root is returned. If X is real and positive...
```

[Fig. 1] Function example of API

Web API refers to a specification defined for sending requests to and receiving responses to other services in web application development. For example, by using the blog API, you can post in other ways without accessing the blog. In addition, there are many useful APIs such as the postal code API of the post office and the map API of Google and Naver.

Open Data Portal is an integrated provision system built to efficiently provide public data. It is a site that opens various public data owned by the Korean state to the public. The homepage address is <http://www.data.go.kr> which is an integrated window that provides public data created or acquired and managed by public institutions in one place. The portal provides various methods such as file data, open API, and visualization so that the public can use public data easily and conveniently, and anyone can quickly and accurately find the desired public data through easy and convenient search. Social interest

can be identified as public data and related data can be found through keyword issues for each social issue. It provides open, high-quality, large-capacity data by refining and processing it in a form that is easy to use in the private sector. TourAPI3.0 is a tourist information open API service to conveniently utilize various tourist information held by the Korea Tourism Organization for developing applications.

2.2 Method

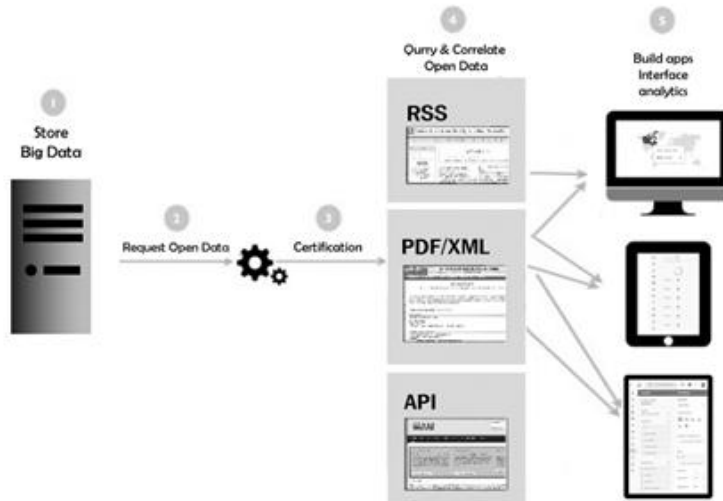
The Open Data Portal (data.go.kr) is a consolidated information outlet that provides Open Data created or collected by public organizations. It offers data in a variety of formats e.g. file data, open API, visual materials, etc. to ensure the general public can use public information in an easy and convenient manner. In order to proactively publish Open Data and to create new business opportunities by processing and analyzing the disclosed Open Data, the Korean government enacted the “Open Data Law” in 2013 and has been implementing a variety of policies ever since.

API description is a communication tool and not a code. It is a browser-based graphical user interface where all participants collaborate and contribute. Data possessed by public institutions is important to the growth of private enterprises and can play a crucial role in the field of industrial revitalization in that the state can be competitive. Also, it is important for API design to provide only the tools that users expect.

The API documentation explains how to use the service and covers everything you need to know for practical purposes. In order to create mega content using open API, we can provide personal content services that meet the purpose of providing the service. In addition, by using open API, network resources can be safely disclosed to third parties regardless of network characteristics and protocols, and communication functions with other parties can be provided using communication functions [9].

Even with an open API, there are cases where you must pay for data used. In addition, even if it is completely free, it prevents indiscriminate data abuse by allowing the user to use the open API by separately issuing a public key from the service provider after identification through membership registration. [Fig. 2] is the flow of the process for using the open data.

Recently, government-wide public data opening for the data economy and digital new deal is accelerating. State-focused data in 25 areas in 6 areas that will promote new industrial growth and support people's lives will be opened by the end of this year. Open API refers to a data open method that not only provides information about public data, but also provides a development environment for the private sector to develop applications (apps) or software applications.



[Fig. 2] Process for using the open data

For example, APIs are essential for on-demand food delivery apps. APIs keep business processes organized and concise and make them compatible with different systems. Mobile-related services are diversifying as the demand for tourist information with smartphones and SNS increases. In this paper, mobile application provides location-based user customized tour information Up to 800,000 for domestic tourist attractions in real time and not only Korean, but also multilingual tourism information in English, Japanese, Chinese, German, French, Spanish, and Russian using TourAPI 3.0. In addition, it can be configured in various ways according to the type of tourism and service desired by the user to search, search, and download information.

3. Proposed Work

3.1 Work Process

Smart tourism-related services of public institutions are mainly led by the Korea Tourism Organization and local governments. The Korea Tourism Organization operates a venture team related to smart tourism to discover ideas, start consulting, and conduct creative tourism projects to revitalize the industry. The tourism field can be said to be a field where open data is spreading faster than other fields. The space for exchanging and interacting with tourism information is moving from offline to online, and mobile applications are playing a key role in it.

Most of the people who plan to travel have downloaded travel-related applications, and the

dependence of tourism applications is very high during the tour period. Tourism open data is being provided by the Ministry of the Korea Tourism Organization and its affiliated organizations as file data and open API. In particular, the Korea Tourism Organization is opening various open data that can be used for application development through Tour API 3.0, a tourism information open API service. Tour API 3.0 from Korea Tourism Organization supports XML(Extensible markup language) and Json responses to develop mobile apps. It provides about 80,000 tourist information and the latest tourist information identical to the Korea Tourism Organization portal site, Visit Korea. In order to implement a mobile application, the following steps must be performed. Design of steps for using Tour API 3.0 is seen in [Table 2].

[Table 2] Steps for using TourAPI 3.0 [10]

Steps	Description
1. Registration	http://www.data.go.kr
2. Apply for OpenAPI	Testing and development using API before actual operation
3. Service Key Issuance	Only one service key is issued per person All public data portal OpenAPI is utilized through the service key.
4. Apply for operating account	Steps to processed with actual service
5. Using OpenAPI	Various mashup service can be created

Step 1: Register as a member through the National Information Society Agency's public data portal. (www.data.go.kr) Individuals sign up as general members, institutions and private companies as institutional members.

Step 2: The development account provides 1,000 traffic per day. The development account is automatically approved and can be used after about 30 minutes after application. (Open data portal and Korea Tourism Organization synchronization) If you click on the service you want to use, you can see the detailed information of the service and the application button. You must log in to apply for use, and technical documents [utilization manual] are provided. Authentication type, purpose of use, purpose of use, detailed function, and agreement to the standard terms and conditions are essential, so please select and fill out the correct selection.

Step 3: On the development account detail view screen, the [Receive Authentication Key] button appears in the upper right corner, and if you click the button, an authentication key is issued. If an authentication key has been issued, the [Reissue General Authentication Key] button is displayed.

Step 4: The operating account requires approval from the person in charge of the Korea Tourism Organization, and it takes about 1 to 2 days. You can apply for an operating account through the

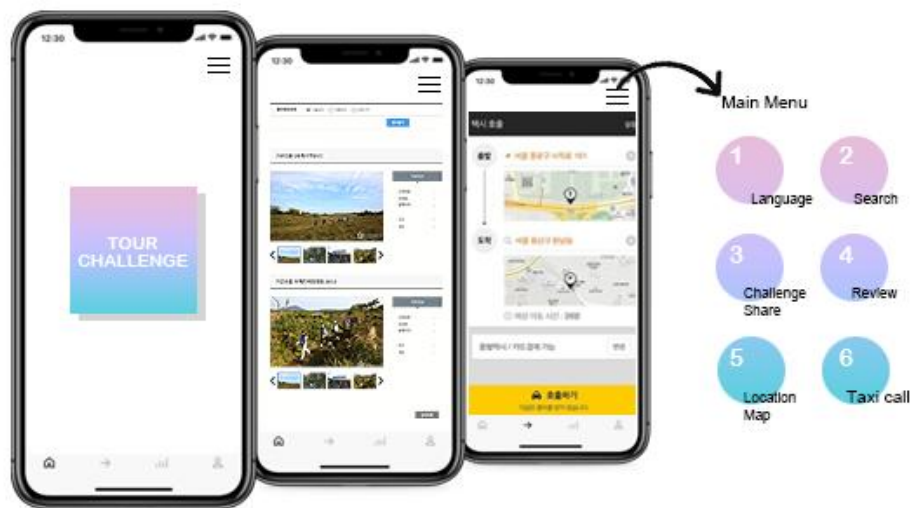
Operation Account Request button on the [My Page> View Development Account Details] screen. When applying for an operating account, you can adjust daily traffic for each operation (100,000 is recommended) and fill out the use case information before applying. After confirming that the service is in normal operation, the person in charge of the Korea Tourism Organization, an API provider, will approve it.

Step 5: Various mashup such as application, web interface, report, analytics etc. can be created. And It is registered and promoted in the public data portal [Use Case] and the Korea Tourism Organization [Use Case].

3.2 Application UXD

The advent of smartphones has created a condition in which a wide range of everyday life can be achieved through media. Long ago, Innis argued that media evolution played a pivotal role in changing the historical paradigm. It's argued that the process of mediation has created a new possibility for mobility in mediascapes, which is related to the neutralization of images and fantasies of foreign experiences and social environments.

In particular, various mobile contents provided by smart phone applications search for and provide information that tourists need anytime, anywhere [11], and applications are used to reduce uncertain decision-making by tourists even at the moment of tourism [12].



[Fig. 3] Mobile application UXD

This study suggests a mobile application UXD that guides local travel in Korea and can be divided into functions of recommending customized tourist attractions, introducing experience activities, accommodation information, and reviews. Main menu is composed to language, Search by category, Share the information, Review and grade, Location in realtime from openAPI. Share Car or taxi service is also working for easy to move that user can be convenience and accessibility. The application named “Tour Challenge” interface design is seen in [Fig. 3].

4. Conclusion

In recent years, the importance of public mobile applications has emerged as the smart mobile society changes. In the case of Korea, it has an advanced information and communication technology (ICT), which is excellent in the world, but there is little connection with the tourism sector. With the advent of the new term “Data-driven Economy” and “Data Technology” (DT) era, interest in open data is increasing worldwide. The demand for big data is increasing, and as a core resource in the industry in the future, satisfaction can be depended on how well the data is utilized when providing services centered on consumers.

Public institutions also collect, open and disclose data with publicity. This movement is currently being promoted more actively. The Ministry of Foreign Affairs and Trade is providing a “overseas safe travel” service that allows you to contact the consulate in emergency situations, and the Ministry of Environment introduces domestic travel destinations through “National Park Trail Information”. Each metropolitan and basic local government also provides mobile services that reflect the characteristics of the region well, increases tourism attraction in the region, and strives to revitalize the tourism industry.

The Open API is a set of various functions for developing software applications, and it is a core technology that implements data opening and sharing. Anyone can use this to collect open data and provide services. This paper proposed mobile-centered smart tourism platform. As improved mobile UXD using open API from the Korea Tourism Organization, user can get more customized tour information.

This proposal is expected that make more active the tourism industry. As a limitation of this study, mobile application UXD was proposed to revitalize tourism, but an empirical analysis that can support this should be conducted as an additional study.

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