

Solution of Applying QR Code Technology to Assist Tourists in Searching for the Destination Information

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Abstract - Today, smart tourism is one of the important economic sectors not only for tourism companies but also for the government. QR code technology is one of the most commonly used technologies in industry services - especially in the tourism industry - to assist tourists in searching for destination information. In this article, a solution of applying QR code technology to assist tourists in searching for destination information is proposed. Tourists just need to turn on the application and use their phone to scan the QR code affixed to tourist destinations, the phone screen will display detailed information about the tourist attractions in Danang city.

Key words- QR-Code, Smart Tourism, Smart city, Micro-Services.

I. INTRODUCTION

Tourism is one of the industries dubbed as the smokeless industry, but its benefits are enormous. Tourism contributes to the country's revenue, provides employment for people, is the most powerful means of promoting the country's image [1], [2].

Based on the ability to write thousands of characters and the ability to respond quickly, QR codes are currently applied to tourism by many countries around the world, including tour schedule guide via QR codes, destination information, hotel information, travel agencies, etc. The use of QR codes is becoming a trend to simplify the provision of information to tourists based on the application of information technology; while saving publications containing traditional information that has been used in printing.

By using smartphones, people can rely on these QR codes to search for information about nearby tourist destinations in an extremely simple and convenient way. Application of QR code in building tourist destinations in Vietnam.

However, with the capabilities, convenience and trend of QR code application, there will be a longer future to apply this technology, contributing to building a tourism destination professionalism, applying technology to developing destinations, at the same time, creating the most favorable conditions for tourists to access to destination information [3].

At a tourist destination, QR codes can be used in convenient locations to provide information about the destination, information about the meaning of the symbol at the destination, information on the route to explore the

destination or any information that the travel authority wants to send to tourists, guide destination awareness as well as a way to promote destinations quickly and minimally. Tours, services, tourism products can be shown via QR codes, putting QR codes containing tourism marketing information on the official websites [4], [5].

Therefore, the application of QR-Code Technology in tourism to meet the needs of tourists seeking information and destination image will attract more and more tourists to Danang. But, at present, the famous tourist destinations in Danang have not been built into an information and image promotion system based on QR-Code technology. Therefore, to assist tourists in searching for tourist information, in the article [6], we have built a total solution to provide a system of support and management services for tourists in the direction of smart city in Vietnam under the STSC model (Smart Tourist Service Center).

In this article, solution of applying QR code technology to assist tourists in searching for destination information on the STSC model platform is proposed. The STSC system is a total solution to provide smart city-oriented visitor management and support services in Vietnam.

The rest of the paper is organized as follows: Part 2 - Related issues, Part 3 - Method to Generate QR Codes, Part 4 - Results Achieved by The Application, Part 5- Conclusions.

II. RELATED ISSUES

A. Build tourism data infrastructure

Tourism data management layer will generally be entrusted to the tourism data infrastructure (Figure 1). However, the expansion of this infrastructure as well as the ability to disperse on different spot will also be considered. The idea is to allow us to take fully advantage of new technology in micro-services.

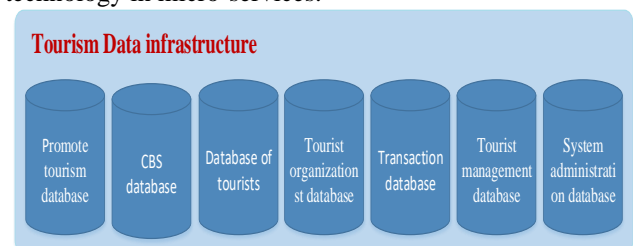


Figure 1. Tourism data infrastructure for the STSC [6]

B. Generating QR-Code

The QR Code was generated by Denso Wave (Toyota's subsidiary) in 1994, whose shape consists of black spots and squares within a sample square on a white background. QR Code can be read faster, saving time and space compared to traditional barcodes.

A QR code can contain information about a web address (URL), time of an event, contact information, email address, SMS messages, textual content or even geolocation information. Depending on which device reads the QR code used for scanning, it will lead to a web page, etc.

Traditional bar codes have one-dimensional long lines and can store only 20 digits, while two-dimensional QR codes can store information with thousands of alphanumeric characters.

QR codes are generated simply by using popular QR code generator software on the internet.

QR code application Currently, QR codes have become a trend and are widely applied in many fields of economic and social life such as:

- Inventory of goods, product information
- Personal information: on visit card.
- Storing URL: phone just read QR Code to get URL, then the browser is automatically opened.
- At museums and tourist attractions: users only need to scan the QR Code placed next to the exhibit to know details and updates, etc.

QR stands for Quick Response. This is a barcode matrix that can be read by a barcode reader or smartphone with a camera function with a specialized application for scanning barcodes. The QR code consists of black modules randomly arranged in a square with a white background. The combination of these modules encodes any online data including links to websites, images, information, product details, advertisements for products, etc.

The difference between traditional QR codes and barcodes is the amount of data they store or share. Traditional bar codes have one-dimensional long lines and can store only 20 digits, while two-dimensional QR codes can store information with thousands of alphanumeric characters. QR codes store more information and easy-to-use feature will greatly help users in all areas.



Figure 2. Traditional bar code



Figure 3. QR Code

QR Code has been developed for faster reading, saving time and space compared to traditional barcodes.

III. METHOD TO GENERATE QR CODES

Use the online QR code generator to generate QR Codes.

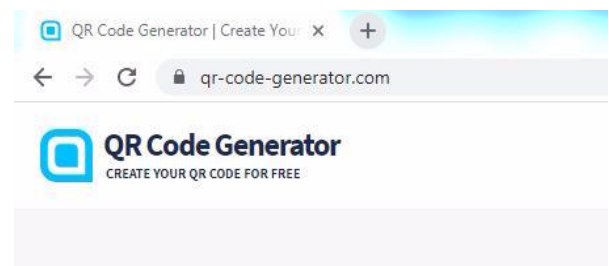


Figure 4. Online QR Code generator

In the interface of Figure 5 and Figure 6, we can put the URL link, Text, email ... in the initialization box to create the desired QR code type. As a result, the QR-code is generated through the steps shown in Figure 7 and Figure 8.

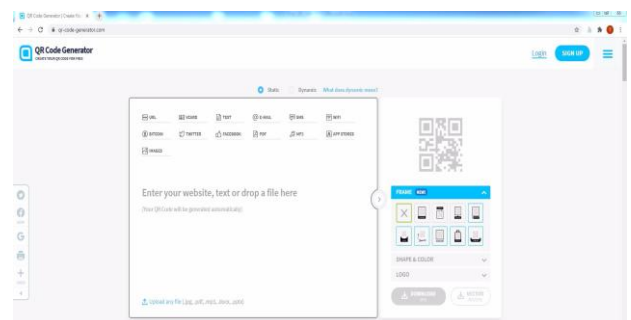


Figure 5. The interface of the application for QR-Code generation

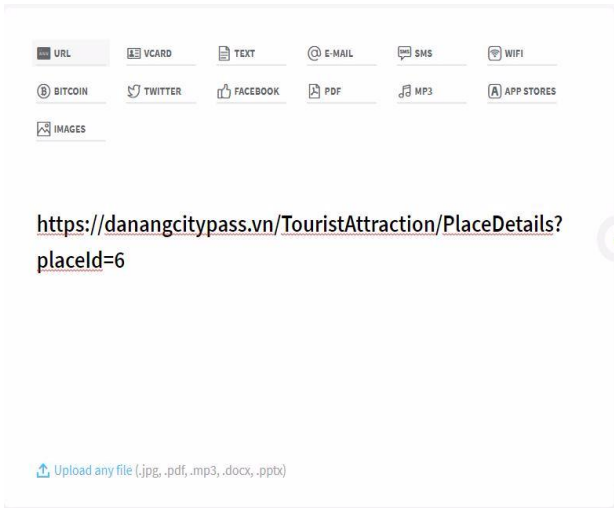


Figure 6. The interface to bring the URL of the destination article

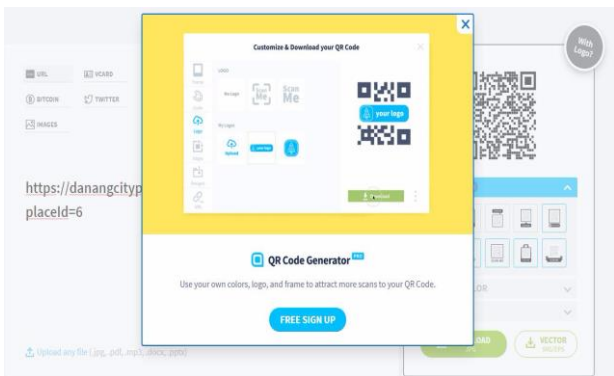


Figure 7. The interface generate QR-Code by URL link



Figure 8. The generated QR-Code containing destination information

IV. RESULTS ACHIEVED BY THE APPLICATION

After building the database of tourist attractions and combining with software to create QR-Code. The author has built an application software with QR-Code function on the phone with Android operating system [7].

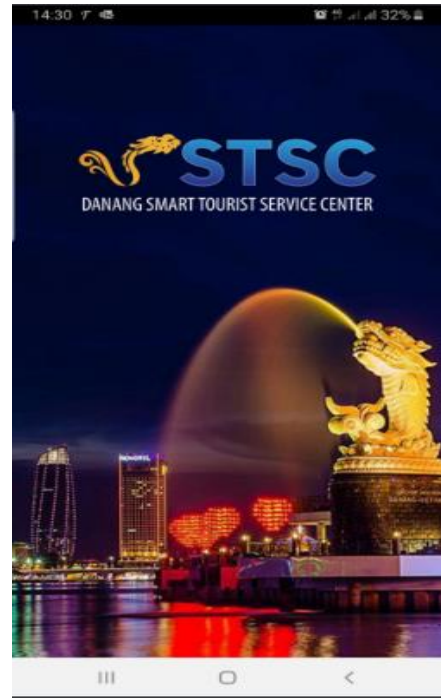


Figure 9. Application launch interface

After the app is launched, the application homepage will be displayed, select the utility function, then select the QR-Code function to support tourists to search for tourist destinations in Da Nang city.

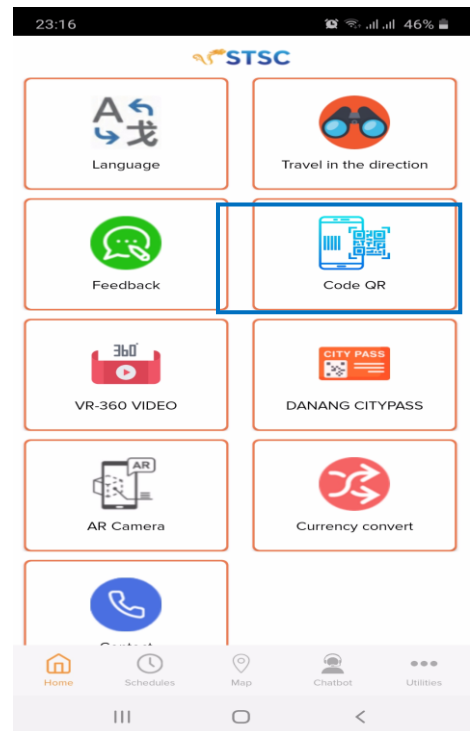


Figure 10. The Interface of utility section with QR-Code function

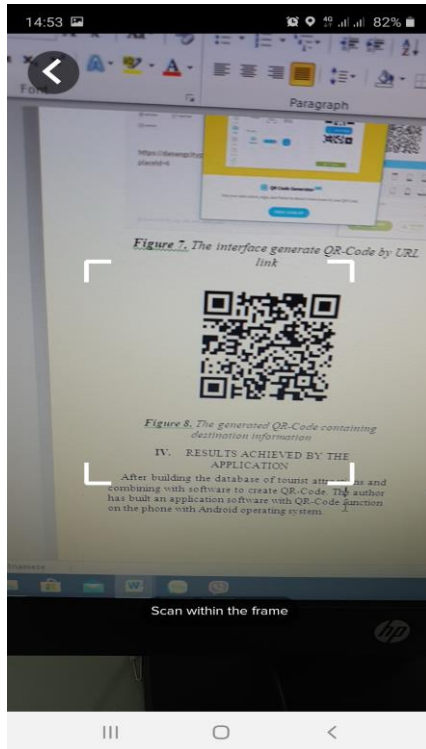


Figure 11. Enable QR-Code scanning

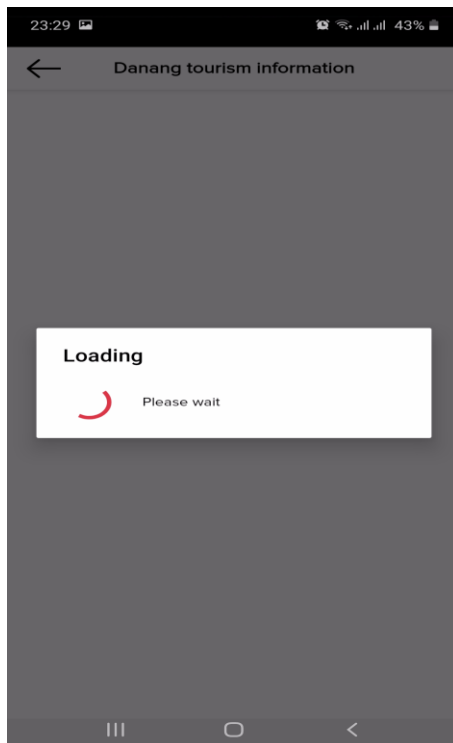


Figure 12. The software is reading data information from QR-Code



Figure 13. Destination information result after scanning the QR-Code

V. CONCLUSION

In this article, the author has built an application to assist tourists in searching for destination information using QR-Code technology on the STSC model platform. The results were done on Android platform, the same development on iOS platform was also done.

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