

A Mobile Smart Tourism and Marketing System Design for Harbin

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Abstract: The rapidly advancing technology has been increasingly integrated with the tourism industry. Harbin is a city characterized by considerable fame, abundant resources and a unique culture. Although some progress has been achieved with regards to tourism, sustainability is impossible without adapting to the needs of the new wave of tourists. Smart tourism encompasses all aspects of tourism: management, service and marketing. This paper proposes a mobile smart tourism and marketing system with four modules: experience-based marketing, smart DIY tourism route, online transaction of tourism product, membership registration and management. Its functions include marketing, information delivery, booking and payment. The proposed system can satisfy the individual needs of tourists, enhance Harbin's tourism competitiveness and foster sustainability.

Keywords: mobile terminal; Harbin; smart tourism; marketing

I. INTRODUCTIONS

With rapid advances in technology and improvement in the people's living standards, the concept of smart tourism is emerging. It combines the traditional tourism with modern information technologies, encompassing the Internet, mobile communication, cloud computing and sensing. Internet-enabled portable devices can access tourism information including resources, economy, activities and even tourists themselves. When used efficiently, these various kinds of information can keep tourists informed of the latest developments and enable them to work out or adjust their sightseeing schedules promptly[1]. Smart tourism involves tourist management, tourism service and tourism marketing. Smart marketing in particular drastically reforms the traditional marketing pattern by introducing new and creative digital media and communication technologies. After accurately identifying and effectively catering to the new needs of tourists, the tourist destinations can be advertised more efficiently[2].

For this paper, Harbin is chosen as the focal point. It was among China's first batch of excellent tourism cities. It is known as a summer resort, a festival city, a top 10 tourist destination, and a brand city. In addition, Harbin boasts of four-season tourism resources unique to northern China. Its peculiar cultural resources include the world-famous ice, music, beer, European influences and urban wetland. In order to fully unlock Harbin's tourism potential, it is necessary to develop a mobile smart tourism and marketing system. The proposed system will integrate marketing, information delivery, booking and payment features.

II. OVERALL DESIGN OF THE SYSTEM

The proposed system covers the tourist destinations, hotels and tourism agencies in and around Harbin. Smart marketing, information delivery and booking services are offered to tourists through a mobile application[3]. The simple, mature and widely used overall structure consists of three layers: user presentation, business logic and data access. The presentation layer is responsible of implementing all forms and components needed for human-machine interface. The business logic layer provides business functions for the administrator and users. The user can send a request to the business logic layer using the presentation layer. The business logic layer can only be accessed via the presentation layer, and the data access layer can only be accessed via the business logic layer. The business logic layer is responsible of executing business rules and logic, retrieving data from the database in the data access layer, and then forwarding the data to be displayed in the presentation layer[4]. The system structure is shown in Fig. 1.

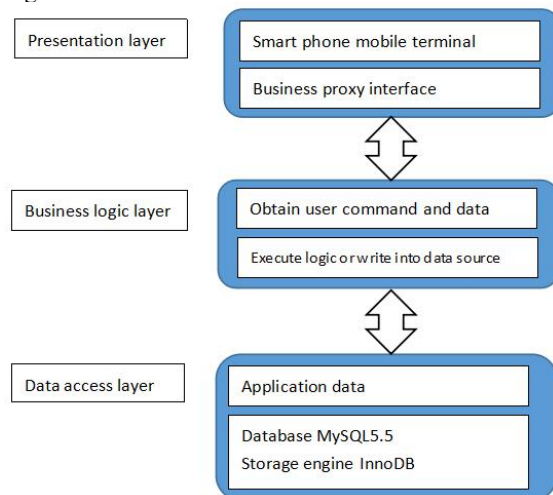


Fig. 1 Overall structure of the proposed system

III. DESIGN OF MAJOR FUNCTIONS

A. Functional framework of the system

The proposed system has four major functional modules, i.e., experience-based marketing, smart DIY tourism route, online processing of tourism product, membership registration and management[5][6]. These are shown in Fig. 2.

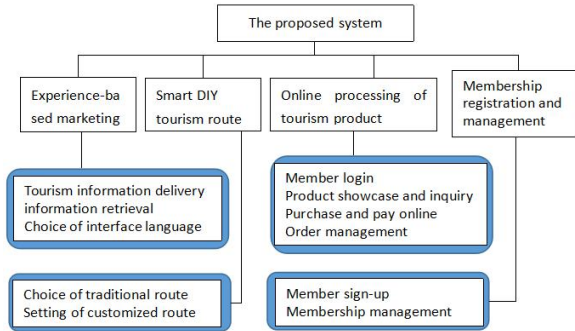


Fig. 2 Major functions of the proposed system

B. Experience-based marketing

Harbin is renowned as Asia's Paris or Moscow. The buildings in this city have a long history and showcase both Chinese and western cultures. Written description is quite insufficient when presenting these resources to tourists. Instead, experience-based marketing that involves picture, video and micro-film should be used to combine Harbin's history, humanity, folk art, and dietary habits with tourism activities and marketing resources. Virtual reality technologies can be used to provide tourists with new means of experiencing the unique culture of Harbin. Video presentations can perfectly broadcast various tourism activities and festivals such as the Harbin International Ice Festival, Harbin Music Festival, and Harbin Wetland Culture Festival. In addition, these can be advertised through micro-film, animation and product placement. As a world-famous tourist destination, Harbin attracts a large number of visitors from around the world. Hence, multi-language interface is supported, including Chinese, Japanese, Korean, English and German[7]. The process of this module is shown in Fig. 3.

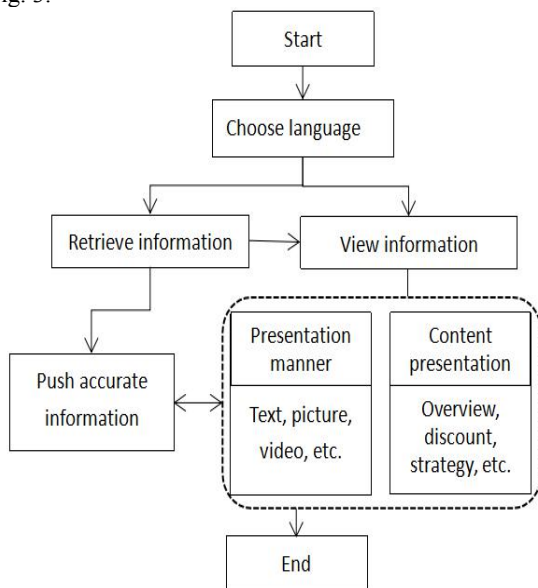


Fig. 3 Process of the experience-based marketing module

C. The tourism route smart customization module

This module has two major functions, i.e., traditional route recommendation and route customization. In the first function, the tourist can choose from the recommended traditional routes. Once the tourist inputs the start point, destination or major scenic spot, the second function considers the geographical locations of these places and then generates an appropriate customized route. Note that in order to support route customization, this module integrates all of the tourism resources of Harbin, including the big data of tourist activities as well as reference data (e.g., scenic spot comments and sightseeing strategies). In this way, the tourists can work out a route that matches their needs easily and efficiently. The process of this module is shown in Fig. 4.

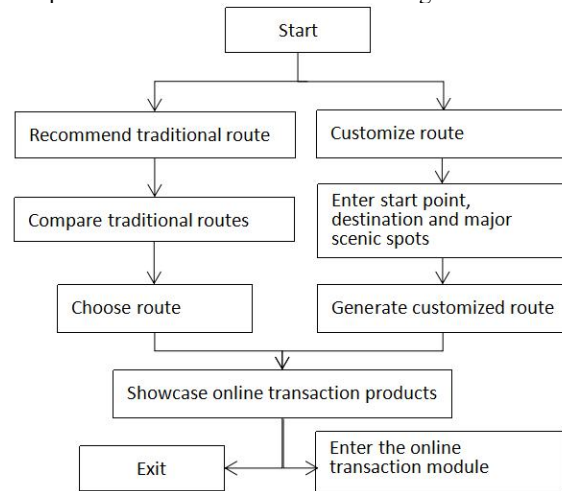


Fig. 4 Process of the tourism route smart customization module

D. The tourism product online transaction module

The traditional tourism services include information browsing, retrieval, and booking. But with rapid progress of e-commerce, the new tourism services nowadays also encompass mobile online transaction and payment. A tourism product online transaction module is needed to promote Harbin tourism using the mobile devices.

The major functions of this module include member login, retrieval and showcase of tourism products, purchase, as well as order management[8]. The member login function is tied to the member sign-up function. The registered member can log in directly, whereas a first-time user can sign up and then log in. Once logged in, the user can retrieve the price, location and grade of Harbin scenic spots, hotels, entertainment facilities, souvenirs, and tourism vehicles. The user can choose the products they like and pay for them. Orders generated in this process can be queried and managed by users. This module emphasizes seamless integration of the online platform with the backend system to ensure consistent and accurate order processing[9]. The process of this module is shown in Fig. 5.

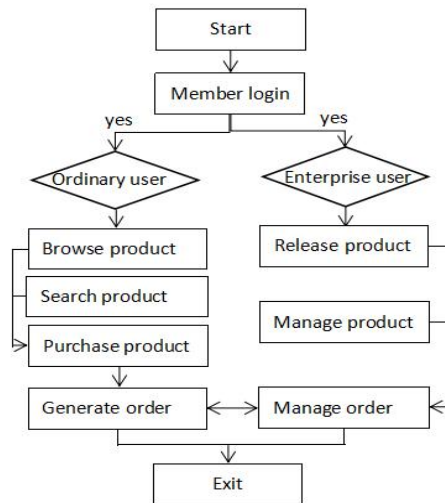


Fig. 5 Process of tourism product online transaction

E. The membership registration and management module

Membership registration is the first step in the membership management system. It is required in order to use the proposed system. Registration information includes the username, password and verification code. After initial registration, the user will be guided to fill in more membership information. Note that the username cannot contain any Chinese character and must be different from already registered usernames. Otherwise, it will not be verified. The registration process is as follows. Step 1: The user clicks “registration” to go to the registration interface, fills in the required information and then clicks “submit”. Step 2: The membership information is verified using a verification code sent to the mobile phone or email to confirm the authenticity of the user. Step 3: The user completes the registration.

The membership management function involves membership data management, authority verification and password modification. It is designed to modify already registered membership data or provide new membership data of both individual and enterprise users. The administrator can verify the identity of the user in the background. An individual user will be allocated relevant rights as a buyer to retrieve product information, purchase product, place and query orders. An enterprise user will be allocated relevant rights as a seller to release and manage products[10].

IV. SERVER DESIGN

The server stores all data involved during system operation, including updated data. It must be operated and maintained by specialists. For other personnel engaged in routine maintenance of the server, their operation authorities should be set up appropriately and certain management software should be adopted for server management. Server can provide data for client by synchronizing the database. Operations that the server can perform on database include add, delete, modify, and query.

Windows Server 2008-2016 is used as the server development platform in order to meet the growing needs of the proposed system. It is an operating system characterized by remarkable security, availability, scalability and reliability.

The server stores all data models, providing a unified and open interface for the mobile client. Generally speaking, the mobile client issues a request to the server through open interface. Server receives the request, analyzes and processes the data. Mobile client also accesses the server’s data model using unified access interface. The database needs to always synchronize data operation of the server with that of the mobile client.

V. CONCLUSION

Tourism marketing should adapt to the new consumer behaviors and ideas in the era of smart tourism. In this paper, a mobile smart tourism and marketing system is proposed for Harbin, which integrates the features of marketing, information browsing, booking and payment. By introducing modern technologies, the proposed system will satisfy the individual needs of tourists and improve the city’s tourism competitiveness and sustainability. Because a large number of tourists and tourism enterprises are involved, the system requirements will eventually change over time and more work will be needed in the future to improve its performance.

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