Regional research based on big data of hot spring industry in Dawan District of Guangdong, Hong Kong and Macao

Bo Zhang¹, Zhiqin Zhang², *

¹,² School of Computer Science, Wuhan Donghu University, Hubei Key Laboratory of Big Data in Science and Technology (Wuhan Library of Chinese Academy of Science), Wuhan 430212, China

* Author’s e-mail: zhangbo@wdu.edu.cn

Abstract. One belt, one road area, tourism research in the Tai Wan District of Guangdong, Hong Kong and Macao is mainly focused on the integration mechanism of culture, commerce and tourism in Guangdong, Hong Kong and Macau, and the leisure and recreational zone structure of the city group of Guangdong, Hong Kong and Macau. In this paper, combined with the actual needs of hot spring scenic spots in Guangdong, Hong Kong and Macao, we use the concept of global tourism to achieve information integration, marketing accuracy, intelligent management, and create humanized service, so as to create a new benchmark of smart hot spring scenic spots. We need a support platform and four kinds of application-oriented business systems, including technical service, technical management, technical marketing, and technical management. Using the methods of theoretical analysis, simulation test or implementation, this paper studies the regional scientific and technological research based on the scientific and technological big data of hot spring industry in Dawan District of Guangdong, Hong Kong and Macao.

1. Introduction

In March 2015, the CPC Central Committee put forward the vision and action of jointly building the Silk Road Economic Belt and the 21st century Maritime Silk Road. The 13th five year plan for national economic and social development of the people's Republic of China and the guidance of the State Council on deepening regional cooperation in the Pan Pearl River Delta were issued in March 2016. In July 2017, the "framework agreement on deepening cooperation between Guangdong, Hong Kong and Macao and promoting the construction of the Great Bay Area" and other policy documents put forward clear requirements for deepening the cooperation between Guangdong, Hong Kong and Macao and making the Great Bay area of Guangdong, Hong Kong and Macao into a national strategy.

The 13th five year plan for tourism development points out that competition internationalization is one of the five major trends of tourism in the future, and the Pearl River Delta tourism urban agglomeration is one of the five trans-regional tourism urban agglomerations. After the proposal of one of the "one belt, one road", the new mechanism of cultural tourism integration and development in Guangdong, Hong Kong and Macao has been put forward. Guangdong, Hong Kong and Macao have developed urban agglomerations, world-class harbor agglomerations, airport agglomerations and tourism resources. The industrial structure of Guangdong, Hong Kong and Macao is highly complementary and has unique regional advantages and resource endowment. The coordinated development of industries in Guangdong, Hong Kong and Macao Bay area needs to innovate the mechanism of industrial division and comprehensive integration of industrial chain, collaborative R
&amp; D and co-cultivation of new formats, as well as the two-way expansion mechanism of international and domestic markets.

From the aspects of economic scale, export-oriented degree, industrial form, urban competitiveness and regional cooperation level, the urban agglomeration of Guangdong, Hong Kong and Macao has the initial conditions to build a first-class Bay area. Guangdong, Hong Kong and Macao Dawan district is located at the fusion point of the three economic circles of "Guangfo Zhaoqing", "Shenzhen, Dongguan and Huizhou" and "zhuzhong River". It is the intersection of international window cities and the bridgehead of the new maritime Silk Road. One belt, one road area, tourism research in the Tai Wan District of Guangdong, Hong Kong and Macao is mainly focused on the integration mechanism of culture, commerce and tourism in Guangdong, Hong Kong and Macao, and the leisure and recreational zone structure of the city group of Guangdong, Hong Kong and Macau.

In most countries, such as Western Europe, Asia and North America, hot spring is a key factor in the supply of beauty and luxury goods. Many countries such as Japan, South Korea and New Zealand are rich in hot spring resources, which are used in the field of health. Many European countries, such as Russia, Italy, Spain and Portugal, use hot spring resources for medical services. In the UK, luxury spa is mainly based on beauty, as well as whole-heartedness products and services. Hungary focuses on medical baths, while southern Europe focuses on traditional hyperthermia and medical spa market. On the whole, the world has a clear development prospect for hot spring tourism.

China has more than 4000 kinds of hot spring resources, including natural hot springs and developed hot springs. According to the 2018 report on the development of China's hot spring tourism industry, as of October 2019, there are 3795 hot spring enterprises in China, and 1075 in Guangdong Province, accounting for 27.6% of the country. In 2020, after novel coronavirus pneumonia outbreak, the hot spring industry suffered serious losses. Many hot springs enterprises were closed for three months. But with the improvement of domestic epidemic prevention and control effect, the effect of soaking hot springs to enhance immunity was recognized, and the popularity of hot springs was enhanced. Guangdong's major hot springs, combined with information technology, upgrade software and hardware to enhance the core competitiveness of hot spring health care. From January to September 2020, the total revenue of 67 hot springs will exceed 1.8 billion yuan. During the National Day mid autumn golden week in 2020, the total revenue of 67 hot springs in Guangdong will reach 178 million.

At present, hot springs in China mainly include leisure and health complex hot springs, Theme Park hot springs, conference and Leisure Hot Springs, spa hot springs, amusement hot springs, sauna hot springs, recuperation and rehabilitation hot springs, ecological hot springs, hot spring real estate type and hot spring agricultural sightseeing type.

2. A study on the relationship between hot spring tourists' satisfaction and loyalty

The report of 2015-2020 China's global tourism industry market analysis and investment prospect research shows that many cities are developing smart city construction. The National Tourism Administration has deployed the pilot work of "global tourism city" and determined 18 national global tourism pilot cities, including Beijing, Wuhan, Chengdu and Nanjing. Chinese scholars have found that the spatial distribution of tourism flow in the province presents the characteristics of agglomeration [1], in which the self-driving passenger flow in the province presents the spatial distribution pattern of "multi-core network", and the connection between network nodes is relatively balanced [2]. With the deepening of the research, some scholars turn their research perspective to the micro scale such as the city to explore the flow rules among tourist attractions. Using the research methods such as Sina Weibo lbs check-in data, kernel density estimation, social network and so on. It is found that the spatial distribution of urban tourism flow presents the characteristics of "axis scattered point" and "one core multi center", and the relationship between the external traffic nodes and hotels is obvious. The flow of tourists is concentrated in famous scenic spots.

Guangdong, Hong Kong and Macao Bay area includes nine cities in Guangdong, Hong Kong and Macao, with a total area of 56182.51 square kilometers. In 2017, the total population was 68.3935
million, and the GDP was 1.54 trillion US dollars. In 2017, China's GDP was 12.7 trillion US dollars, and nine cities in Guangdong, Hong Kong and Macao Bay District accounted for 9.1% of China's GDP. Different from other regions in China, the special region of "one country, two systems, three tariff zones and four core cities" is a region with close interaction, strong common regional culture and sharing the national policy and welfare of Dawan district. In 2017, Guangdong received 36.4756 million mainland inbound overnight tourists, 27.75 million Hong Kong compatriots, 5.22 million Macao compatriots, 5.29 million Taiwan compatriots, and 22.48 million foreigners. The domestic tourism in China was 4.57 trillion yuan, of which Guangdong tourism was 0.92 trillion yuan, accounting for 20.13%, ranking first in China.

Wang Yahui evaluated Huitang Hot Spring by IPA method, and proposed that the most important factors of tourists' satisfaction are hot spring water quality and hot spring enjoyment process. Taking hot spring tourism in Hunan Province as the research point, Shi Juan and others made it clear that the most important factor of tourists' satisfaction is hot spring water quality. Through regression analysis and other methods, Luo Qing also confirmed that the most important factor of tourists' satisfaction is the water quality of hot springs, and that the tour guide service and reasonable charges have a significant impact on tourists' loyalty. Wen Yuhua uses IPA method to study the relationship between tourists' expectation and perception of hot spring tourism destination in Gansu Province, and puts forward corresponding suggestions and countermeasures according to the conclusion that tourists' actual performance of hot spring tourism destination is lower than their expectation. Through the study of Zhengzhou hot spring tourist satisfaction, Wang Xiaoqing concluded that tourists are not satisfied with the historical value and environmental sanitation of hot spring. By constructing the "attribute performance tourist satisfaction" model, Pan Yafang obtains the important indexes of the hot spring core products and services, environment and facilities in rural hot spring tourism destination. Yu Jinhua et al. Used the linear structure relationship model to determine that the important model of tourist satisfaction is the functional and recreational facilities of tourism experience. Jia aishun confirmed the score requirements of cultural atmosphere, accommodation facilities and service skills of service personnel through IPA analysis.

3. Design and Implementation

The big data of hot spring industry in Guangdong, Hong Kong and Macao is based on Wdu global tourism big data analysis platform. The platform will help hot spring enterprises in Guangdong, Hong Kong and Macao to analyze a large number of dynamic and unstructured data. In big data, more than 90% of the data belongs to machine data. In addition to the traditional it data from server, storage and network, a large number of unstructured data from mobile Internet and Internet of things also belong to machine data. Compared with database data, machine data has the characteristics of large quantity, rapid growth, high complexity and diversification, but the value density is slightly lower. Machine generated data is the fastest-growing and most complex form of big data with great commercial value.

The overall architecture of the overall solution of science and technology big data in Guangdong, Hong Kong and Macao hot spring industry can be summarized as "one platform, two centers, three portals and four systems".

One platform: Wdu global tourism big data management platform, integrates the functions of command center and general monitoring room, independently establishes and operates on the same platform, builds intelligent command platform and intelligent decision-making platform, strengthens the functions of information service, resource management, dynamic research and judgment, key prevention and control, emergency disposal and law enforcement supervision, builds tourism management platform, and realizes 24-hour on duty and practical operation. There are three portals: official website interactive portal, microblog interactive portal and wechat interactive portal; four systems: management system, marketing system, service system and protection system.
The technology big data intelligent management system of hot spring industry in Guangdong, Hong Kong and Macao Dawan district includes: electronic ticketing system, office OA, integrated communication system, personnel attendance system, access control management system, scenic spot passenger flow guidance system, all-in-one card system, hotel management system, scenic spot group booking management system, catering management system, customer management system, member management system and tourism product management system System, centralized supply chain management system, investment leasing management system, goods leasing management system, locker management system, tour guide management system, electronic file management system, asset management system, situation monitoring system, passenger flow statistics and safety warning management system, operation and maintenance management system, etc.

The application layer consists of application support layer, resource layer and application system layer.

Application support layer: it mainly refers to the enterprise level big data platform products, as well as the basic support functions provided by the platform. It provides MapReduce and distributed storage capabilities for the processing of traditional structured data, semi-structured, unstructured, and new data. It also provides storage capabilities for massive data, supports different computing frameworks, and provides unified configuration management Management system for data, application and other aspects of control.

Resource layer: data integration is mainly used to load all kinds of data out of the platform into the platform through tools. The platform provides all kinds of integration tools to load the original data into the platform for calculation.

Application system layer: the platform also integrates a large number of mature information processing tools to support functions such as metadata asset management, data visualization, advanced analysis engine, SQL Engine, workload management, security audit, etc.

(1) Concurrent performance bottleneck of data collection
Faced with the huge volume and complexity of big data, a data acquisition method supporting high concurrency and large amount of data is needed. It can flexibly define the acquisition scheme, define the acquisition mode, acquisition frequency, and collect data regularly / in real time, so as to realize the high-speed and stable acquisition of massive data. It is expected to achieve the acquisition speed of one million per second and the concurrency of thousands of times per second.

(2) Performance bottleneck of distributed full text retrieval of data

Taking the advanced search technology as the core, and aiming at the deep search depth, high acquisition accuracy and fast capture speed required by professional users, the distributed multithread concurrent instruction execution architecture is adopted to realize the sub second retrieval speed and the concurrent retrieval support of hundreds of times per second.

(3) Algorithm and model of data mining

Data mining is a comprehensive application technology that integrates statistical analysis, machine learning, artificial intelligence, database and many other aspects. In the face of the low value density of big data, rich algorithms and calculation models, including decision tree, clustering, regression, neural network, are used to "purify" the data to solve the problems that are difficult to be solved by traditional statistical methods in practical application.

(4) evaluating indicator

In this study, the evaluation index system of innovation ability of tourism enterprises is constructed, and the industry segmentation coefficient is determined. Through the linear weighted synthesis method, the evaluation model can be expressed by formula.

\[ I = 0.32 \times L_1 + 0.29 \times L_2 + 0.23 \times L_3 + 0.16 \times L_4 \]  

\[ F = \sum_{i=1}^{N} \phi_{ij} X_{ij} Y_{ij} Y_i \]  

\[ X_{ij} = \frac{Y_j - Y_{\text{min}}}{Y_{\text{max}} - Y_{\text{min}}} \]  

4. Conclusion

The big data of hot spring industry in Guangdong, Hong Kong and Macao Bay area belongs to a kind of modern service industry, which involves a wide range of areas with fuzzy boundaries. The tourism innovation management and industry big data are constantly enriched, and the dimensions are constantly adjusted. At present, there is no recognized evaluation index system and evaluation model. The reasons lie in the complexity of the tourism industry, the diversity of sub industries, and many data are difficult to collect and measure. There are many factors. Relying on the Guangdong, Hong Kong and Macao Bay area is a new attempt to explore the technology big data of tourism enterprises from general to specific operation.
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