Design of introspective cultural tourism project service platform based on big data

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Abstract. This paper designs a self-examination platform based on big data, which consists of three layers, introduces the functions of each part of the top-level visual interface, and expounds the dimensions and the realization of the contents of each function module. The Support Algorithm of face recognition and the flow of video clip are introduced. The Support Algorithm and data mining algorithm of face recognition have been verified in practice, and the effect achieves the expected goal. After further improvement, it will be applied to the Chengdu Smart Travel Project, which will play a positive role in promoting the wisdom of Chengdu smart travel.

Keywords: Data Mining, Text travel platform, Introspection, Face recognition.

1. Introduction

Improve tourism technology content, increase tourism product value-added service ability, talent from industry structure, improve the tourism experience to better reflect the advantage of modern service industry, so as to achieve the construction of the people more satisfied the requirement of the modern service industry. This is the new requirement of today's society for travel. Chengdu both a historical and cultural city of profundity and had the national famous fashion innovation and leisure etc [1]. Suitable for popular elements of modern human activity, has good conditions for the development of wisdom literature brigade. In order to create fashionable Wisdom and do not break the traditional text brigade project, this paper designed the self-inspection brigade platform, based on the large data with large data means to dig deeper into the scenic area culture resources, and catch the tourists prefer to categorize, feedback tourist experience, the further exploration of visitors need, and oriented at different levels with this open and perspective, let travel invisibly into a way of in-depth study, aims to further the traditional culture is deeply rooted in the hearts of the people in chengdu, move the massive scenic beauty culture enlightenment through customs.

2. Function introduction of introspective cultural tourism project service platform based on big data.

The introspective cultural tourism project service platform based on big data is shown in Figure 1. The platform excavates the scenic spot resources from multiple dimensions and levels, highlights the cultural connotation, and improves the tourist experience.
2.1. The cultural connotation mining module of scenic area resources.

In the "scenic resources" module, we dig stories from four dimensions, and combine historical allusions with cultural relics and historic sites to form a set of our own creative templates, and ready to show the plot of the site and show the film and television equipment required. The cultural connotation of the mining methods are as follows.

2.1.1. Through the scenic spot historical story mining development industrial value. The world is so big, how to attract consumers to see? With the help of channels to tell their own story, is the key point of WENLV marketing. Everyone loves to hear stories, because it's human nature. Like Disney, it's a classic example of a story building super IP, starting with a mouse story, ending with a cartoon character, an animated movie, and ending with a theme park. Not only to make the project interesting, but also to develop story-related products. Not only do you want them to have a good time, but you can also take them with you as souvenirs, like the Disneyland's companion product, Mickey Mouse.

2.1.2. Historical search story-based site creation. To build authentic celebrity homes. The former residence mainly through the legendary character's experience and the influence, attracts the visitor to come to look at and the recollection [2]. In the creation of the former residence of celebrities should emphasize the story of the original, try to show the lifelike scenes, so that tourists from the heart and the site of resonance, leave a deep impression. In the establishment of the former residence of celebrities, to grasp the characters and interaction of the story, to create original story scenes and atmosphere, can let tourists have a spiritual resonance, left a deep impression.

2.1.3. Through the creation of stories to establish the cultural connotation of scenic spots. One of the most important things about a successful brand story is that it can move the audience. It takes a lot of skill to successfully interpret a brand story. First, you need to have rich experience. Second, you need to be innovative and have on-the-spot control, the brand world that unknowingly leads the audience to themselves. Creating a story also depends on the timing, location, people, seize the opportunity, as much
as possible to seize the attention of tourists, tourists in the story to take a fantasy trip, so as to attract more tourists to come to play.

2.2. **Project planning module is an immersive presentation of historical stories based on scenic routes.**

The scheme planning module includes four dimensions, which are tourism line, story deduction, Film and Television Works and Short video of tourists.

2.2.1. **Tourist routes.**

The whole tour route of the scenic spot is planned according to the storyline deduced by the "scenic spot resources", and the storyline is performed in the important classics of the tour route.

2.2.2. **Interpretation of stories.** Using digital technology, the show vividly and vividly presents the story to the visitors. The story also creates a strong visual, auditory, tactile, olfactory and gustatory atmosphere, which makes the visitors feel real. The dissemination of this story also requires the story as a background, using the natural beauty such as blue sky, white clouds, Snow mountains and lakes as props, together with modern sound, light and electric digital technology, to create a harmonious art form, the five senses atmosphere it creates is enough to shock the visitor's mind.

2.2.3. **Film and television productions.** TV series and movies can not only show the beautiful natural scenery, but also build up the charming and unique tourism image and enlarge the popularity. Choosing a tourist destination that has long enjoyed a good reputation for shooting films and TV series will undoubtedly increase the popularity of films and TV series, and in this way, attract more viewers to travel.

2.2.4. **visitor short video application participation role play to enhance the visitor's experience of the story.** Role-playing is a comprehensive and creative interactive activity, through which people can share and feel their experiences and experiences [3]. Through role-playing, visitors can experience and practice the role of others, so as to better understand the situation of others, experience the inner feelings of others in different situations, and reflect the inner feelings of individuals. Understanding the ways and attitudes required to temporarily place individuals in the social position of others and participate in a predetermined storyline can improve people's understanding of social roles and their own roles, in order to have the empathy that is so important in humanity. How to create a customer-satisfied personalized service? During the entire tour, the cameras at the scenic spots have already captured the tourists'status, saved the tourists'photos and videos to a database, automatically generated short videos with a thank you note with the tourists'names attached, and also asked if they needed to reserve relevant services, these small low-cost initiatives may allow visitors to feel the warmth of personalized services, enhance the experience of tourists and satisfaction.

2.3. **Value evaluation system**

In order to measure the value of the big data tourism platform, data quantitative statistics are carried out from the four aspects of the number of tourists, economic benefits, tourists' reputation and the influence of scenic spots. Feedback data is used as the basis for product optimization iteration.
2.4. The underlying design of the big data platform

The face detection algorithm based on MtCNN and Facenet firstly uses the VideoCapture class in OpenCV to read the classroom camera images, and then uses the Read interface and Write interface of VideoCapture class to read and store the key frames, and then sends them to the MtCNN algorithm module.[4]

MtCNN, a multi-task convolutional neural network (MtCNN), puts face region detection and face key point detection together. Overall, it can be divided into P-NET, R-NET, and O-NET three layer network structure. Firstly, the image is transformed at different scales, and the image pyramid is constructed to adapt to the detection of faces of different sizes.

P-NET is fully called Proposal Network. Its basic structure is a full convolutional Network. The basic idea is to use a relatively shallow and simple CNN to quickly generate face candidate Windows, as shown in Figure 2. Construct a complete image of the step pyramid, through a network of the convolution border preliminary feature extraction and calibration, the characteristics of the network input results after three convolution layer through a face classifier to determine whether the region face, at the same time use border regression and a facial point locator to face region's initial proposal, this part will output a lot of pieces of possible face face region, and input these areas into R - Net for further processing.

Figure 2. Face recognition and video editing process

Figure 3. P - Net structure
R-NET is called Refine Network, and its basic construction is a convolutional neural Network. The basic idea is to use a more complex Network structure compared with P-NET to further select and adjust the possible face region Windows generated by P-NET, so as to achieve high-precision filtering and face region optimization, as shown in Figure 3. Compared with P-NET of the first layer, a full connection layer of 128 is added to retain more image features, so the screening of input data will be more strict. After the image passes through P-NET, many prediction Windows will be left, and all the prediction Windows will be sent into R-NET. This network will filter out a large number of candidate boxes with poor performance. Finally, the selected candidate boxes will be further optimized by Bounding Box Regression and NMS, as shown in Figure 4.

![Figure 4. R - Net structure](image)

O-NET is fully called Output Network. Its basic structure is a more complex convolutional neural Network, which has one more convolutional layer compared with R-NET. Its basic idea is similar to that of R-NET, which uses a more complex Network to optimize the model performance. The difference between O-NET and R-NET is that this layer structure will identify the facial area through more supervision, and will make regression to the human face feature points, and finally output the coordinates of the upper left corner and the lower right corner of the face area and the five feature points of the face area. O-NET has more characteristic inputs and more complex network structure, also has better performance, the output of this layer as the final network model output.[5]

![Figure 5. O - Net structure](image)

MtCNN extracts the face area frame and sends it into the Facenet algorithm module together with the face images in the tourist face image library.

Facenet is an algorithm of Google's face recognition system, which can directly map face images to Euclidean space. The length of space distance represents the similarity of face images, and its structure is shown in Figure 5. Deep Architecture is the structure of convolutional neural network after removing SOFMAX. After the normalization of L2, all the features of the image will be mapped to a hypersphere. After that, an embedding layer (embedding function) is connected, and the embedding process can be expressed as a function, that is, the image X is mapped to the D-dimensional Euclidean space by the function F, and then the feature representation is obtained, based on which the triple loss is calculated, as shown in Figure 6.
Figure 6. FaceNet structure

Facenet output result is the confidence value of the matching degree between the key box of face recognition and each person in the tourist face image library. Finally, the recognition result is converted into the tourist name through the SVM classifier, which is input into the database. After unified collection and sorting of the database, the statistical results are displayed on the terminal.

3. Conclusion
With the continuous development and progress of the national economy and the rising living standards of the people, cultural tourism, by means of big data, has brought a completely new way of development to the tourism industry, allowing tourists more flexibility and freedom on the journey, let the tourism enterprise also improve its own industry competitiveness and level, thus further improve the height of the tourism industry. It is an inevitable trend for the development of tourism in China to use the high-tech intelligent tourism mode to integrate with the cultural and tourism resources, space layout, capital industry form and so on, so as to better embody the essential function of tourism.

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