

## A preliminary study on route planning of self-driving travel

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### Abstract

**Self-driving tourism is a rapidly rising tourism project in recent years, which is becoming more and more popular among tourists. How to rationally and scientifically plan the travel plans of self-driving tourists is becoming more and more important. Through the system research tourism route planning research status at home and abroad, combing analysis of existing research results and technical problems to be solved, provide a reference for scholars to carry out research in road route planning.**

### Keywords

**self-driving tour, Route planning, review.**

### 1. Introduction

Tourist activities is become one of the important driving force of the development of the global economy, it accelerated the international capital flow, the spread of information, technology, management, create efficiency value, demand and consumer behavior patterns, etc. With the rapid development of economy, people's living standard has been greatly improved. More and more people are actively participating in tourism activities which are conducive to physical and mental health. Self-driving travel is a rapidly rising tourism project in recent years, which is becoming more and more popular among tourists. Therefore, it is increasingly important to rationally and scientifically plan the travel plans of self-driving tourists. Through the system research tourism route planning research status at home and abroad, combing analysis of existing research results and technical problems to be solved, provide a reference for scholars to carry out research in road route planning.

The tourism route planning can be divided into three parts: the tourism route planning between the cities, the tourism route planning of the scenic spots within the city, and the tourism route planning of the scenic spots within the scenic spots. Travel route planning is all from a point of departure, through other points, and only once, and finally back to the starting point of route planning, namely the TSP loop problem. In recent years, with the rapid development of information technology, scholars at home and abroad have carried out a lot of researches on the planning of tourism routes, and achieved fruitful results. According to the research scope, mainly divided into route planning algorithm research and route planning platform design.

### 2. Basic theory of travel route planning

#### 2.1 Motivation

Travel route planning is a very important link for users to prepare for self-service travel. Typically, when a user is getting ready for a trip, they usually start with: where to play? A few days? Mountain climbing, sea view, or sightseeing? Then I will consider how to arrange these days? Where to go first? What must be seen inside each scenic spot? How much time does each attraction take? Where should we go if we want to visit the monument? Where should I go if I want to see the sea? With these problems, users often turn to BBS on the Internet to obtain previous travel experiences. Each netizen in the BBS, however, will only give their own opinions and each travel only tells the story of a person's travel tips, it requires the user to take a lot of time and energy to do the analysis summary, finally to make a travel route planning. And because of the differences in language, the differences in interests between individuals make the research of users more time-consuming. Therefore, it is

necessary to research and develop automatic interactive tourism planning system, and with the rise of self-help tour, the demand of the system will be greatly promoted.

## 2.2 Challenges

In fact, the automatic planning of the travel route is a very complicated subject. The complexity of its first as tourism planning itself is affected by many factors: such as a tourist destination, play time, play, play time, tourists' age, physical condition, be fond of and so on. In this paper we consider the following factors: tourist destination (for example: Beijing, Paris, New York), play time (for example: three days, a week), visit the season (for example: in July, summer), user interest (for example, sea view, historic sites to watch).

Second, the complexity of the problem lies in the randomness of the user-generated data. Although we have observed that user generated data with GPS information is a good representation of the user's footprint, and recorded very rich travel related information, these data are very sparse. This is because the user is not taking photos all the time, and they are randomly assigned to take photos and take pictures. In addition, users usually don't upload all of their photos to the online album, and they will only upload some photos at random or according to their preferences. This makes it impossible for us to get a complete travel record of everyone.

Therefore, the automatic travel route planning system faces great challenges, on the one hand from the user's needs and on the other hand from the scarcity of data.

## 2.3 Evaluation criteria of tourism route planning

Tourism route planning is a highly subjective research topic, which aims to provide users with more satisfactory personalized travel routes and provide directions and road guidance for users during the trip. Therefore, subjective evaluation is very important in the overall evaluation criteria of tourism route planning. The main objective evaluation criteria commonly used in this research topic are described below:

### (1)Objective evaluation criteria

To carry out the objective evaluation of the tour route, we must first find the best path. The algorithm is evaluated by the optimal path and the reasonable comparison of the path of the algorithm.

### (2)Subjective evaluation criteria

There are two main kinds of subjective evaluation criteria, one is the user rating the results of different algorithm and the other is PK. The researchers set some scoring rules and gave a score indicating that the user scored on different criteria, such as diversity and accuracy. PK refers to the selection of the best results from different algorithms according to different criteria.

## 3. Design of route planning platform

Based on the tourism route planning algorithm, domestic and foreign scholars have developed a series of route planning platforms with certain applicability. Horse rainbow (2012), for example, through the analysis, analyzes characteristics and spatial distribution features of tourism resources based on GPS and ArcGIS software, analyzes the tourism resources and tourism node spatial database is established, implemented tourism spatial visualization expression of nodes and routes. Hao Biao etc. (2015) by studying the ACO ant colony optimization algorithm, baidu map API interface, Bootstrap technology, introducing the current grid layout, constructed based on B/S architecture of intelligent tourism scenic route planning system platform. Ji pengfei (2016) such as Tours for tourists need to spend a lot of time and energy to complete the travel route planning problem, the development of the tourist route customization system based on semantic Web technology, realize the user retrieval demand analysis and the retrieval results are sorted according to user's interest model, by using semantic correlation between sites related to time and route extension. Sun jiayi et al. (2017) adopts the high speed priority strategy, and considers the consumption situation and the number of scenic spots to build a planning model of a self-guided tour route 0-1, which is implemented by lingo software programming.

#### 4. Conclusion

With the development of tourism and transportation integration gradually, under the background of good policy environment, making a system gradually perfected, its proportion in the tourism market continue to rise, thereby to automobile, petrochemical, transportation, tourism, entertainment, and many other industries, and potential huge economic impact. At the same time, the increase in the number of road travel, holiday travel "cluster" phenomenon, in particular, in a short period of time to local traffic or some sites have a huge pressure, thus reduces the tourists travel quality. Is the so-called "shu tong, blocking the surplus", therefore, according to statistics, travel will scientific planning road routes, reasonable traffic induction is to realize "travel + traffic" the root of the sustainable development strategy.

At present, domestic scholars have carried out a lot of research on the design of tourism route planning algorithm and route planning platform, and have achieved a lot of achievements. But still there are some deficiencies, for example, at the same time considering time, path length, personal preferences, landscape on the way and travel data under the coupled action of multiple factors such as the optimal path, avoid making a "cluster" phenomenon of induced traffic study, etc.

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