COMP7705Project

DetailedProjectProposal

ProjectTitle: Travelling Route Generation System

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Aim

With the development of the economy, people's demand for tourism is growing. However, it is very difficult to plan a reasonable, economic and specific travel route in a short period of time. So this system provides a convenient and fast way to plan the travel route for the user. The user only needs to input multiple destinations and the total travelling time and then the system recommends the best travel route based on the comprehensive consideration of the travel route cost (cost consists of tickets' price between destinations, travelling time and distance, etc.). In addition, the system will also plan the detailed route between the attractions in the city.

Functions:
1. The user only needs to enter multiple destinations and total travel time, and the system will plan the complete route.
    1.1 Planning the route between cities - based on the cost of transportation between destinations, time consuming
    1.2 Planning the route of the tourist attractions inside the city - selection of attractions is based on the online users' travelling diaries to extract the hot spots of the attractions.
    1.3 Displaying attractions' basic information
2. The user could modify the route and system rearrange the recommended route accordingly
    2.1 Users can remove or increase the attractions recommended for them - update the attractions rankings and re-plan the route.

Brief Literature Review

The travel route planning problem is based on the evolution of the classic TSP problem. The TSP problem is a typical combinatorial optimization problem. At present, there are many researches on TSP in the world. It has been proposed based on the classical algorithm Dijk-stra algorithm, dynamic programming algorithm, branch and bound method, etc., and improved ant colony based on heuristic optimization algorithm. Algorithm, genetic algorithm, simulated annealing algorithm, tabu search algorithm, Hopfieltl neural network, particle swarm optimization algorithm, immune algorithm, etc. In recent years, the research of Chinese domestic scholars mainly focuses on the application and optimization of ant colony algorithm in route planning.

Xu proposed the encounter algorithm based on the classical ant colony algorithm in the article "Improving the application planning of ant colony algorithm in tourism route planning", which effectively improved the quality of the ant colony algorithm. In addition, Xu improved the travel path, so that the ant colony algorithm can achieve dynamic planning.

In the article "Improving the Application of TSP Model in Optimal Tourism Route Planning", Wang proposed an improved TSP model with multiple time constraints in combination with actual tour conditions (such as queuing). Xu has made reasonable adjustments and analysis in light of the various situations that may be encountered in real life.

Yang specifically designed the constraints of tourism route planning in the article "Research on the Planning of Tourism Route Planning in the National 5A Level Scenic Spots". It includes the number of holidays and time requirements for current city residents, combined with time, distance and cost.

On the basis of Yang's research, Wan improved the input variables of the whole system, including latitude and longitude coordinates, ticket fees, best travel routes and accommodation expenses, etc. in the article "Research on 5A Attractions Tourism Route Planning Problem Based on Ant Colony Algorithm". data. Wan uses the ant colony algorithm to propose four target benefit maximization models for comprehensive time, cost, distance and comfort.

Proposed Methodology

Language: HTML5, CSS3, JAVASCRIPT, jQuery, PHP;

Website Technology: Angular.js, Laravel Framework, AJAX;

Database: MySQL;

Distributed version control: GitHub;

Algorithm: Dijkstra, A* search, Ant Colony Optimization;

Data Collection: Web crawler, API.

We may use python to crawl the data which includes cities, attractions, travelling diaries and the prices of air tickets and train tickets. After cleaning up the data, we may apply Dijkstra algorithm, A* algorithm or Ant Colony Optimization to generate a desired travelling route. And the route can be altered by the user.

The ant colony optimization algorithm (ACO) is a probabilistic technique for solving computational problems which can be reduced to finding good paths through graphs. Combinations of Artificial Ants and local search algorithms have become a method of choice for numerous optimization tasks involving some sort of graph, e.g., vehicle routing and internet routing.

Milestones

	Tasks	Estimated completion time	Estimated number of Learning hours
1	Project web page design	28/03/2019	15
2	Data collection and cleaning	05/04/2019	70
3	Database organization	07/04/2019	15
4	Route optimization algorithm design and implement	01/05/2019	100
5	Performance evaluation and development	20/05/2019	100
6	Web user interface design	01/06/2019	50
7	Prepare presentation PPT	20/06/2019	30
8	Write the final report	01/08/2019	50
9	Poster design	15/06/2019	20
10			
			Total:450

Deliverables

Items	
1	Detailed Project Proposal
2	Project Webpage
3	Interim Report
4	Poster
5	Final Project Report
6	
7	
8	
9	
10	