MultiHotelPlanner

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Motivation

Our ultimate goal is to combine traveling route generator with traveling housing recommendation. Until now these two services are hardly accommodated to each other to provide all in once traveling plan for clients, Our work will liberate both consumers and traveling business sectors from endless searching between hours option to choose their traveling route and select hotels.

Approaches

We implement Google Map API in order to visualize optimized route connecting all the housing recommendation sites. Node.js, JavaScript runtime environment with the Express framework are responsible to bring our algorithm to work and then interact with the front end.

1 Clustering Algorithm

The centers of each K-means clusters are designated for hotel recommendation site. By doing so we reduce overall traveling distance for clients. It is clear that our function is not limited to recommendation but also an overall optimization of travelling

2 Ranking Algorithm

We took three factors into consideration: distance to the POIs, price and customers' reviews. We use the square of distance for two reasons. First it speeds up the calculation of the server and second it guarantees that we select both the nearest and the most appropriate hotels. The metric can be as illustrated as:

$$S = \beta_1 distance^2 - \beta_2 rating + \beta_3 price \qquad (1)$$

Hitmap of ranking result

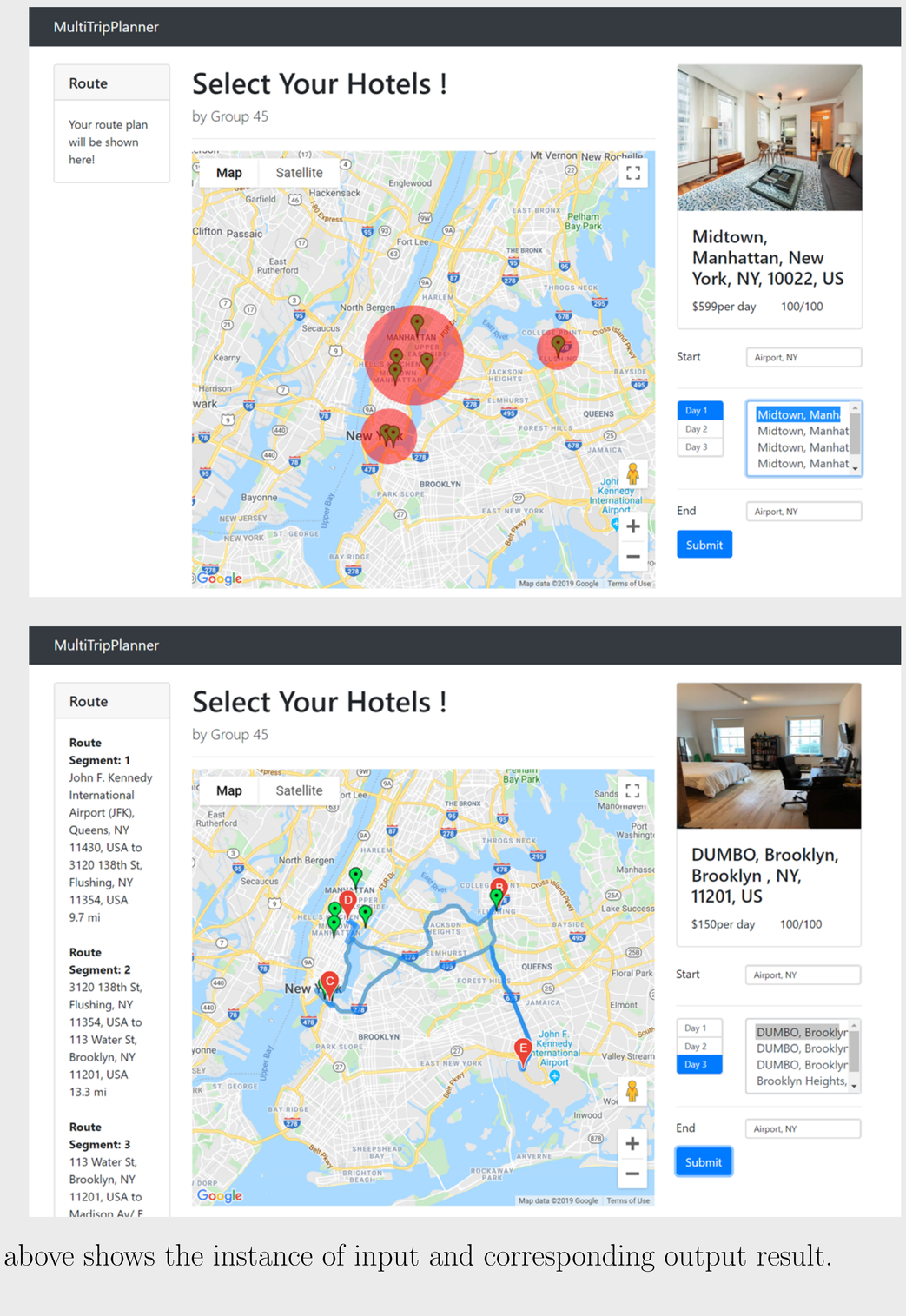
Data

We use MongoDB as our database to store and retrieve Airbnb data with more than 100,000 hotel information in NYC up to September 2019. The subset contains each hotel's name, id, price, room type, review score, latitude, longitude and etc. I

Experiments and Results

3 Testing Result

After receiving customer's input POI, our software cluster the POIs according to their relative positions and make recommendation for each cluster, the rout planning result and corresponding Airbnb recommendation list is returned for customer's reference.



The figures above shows the instance of input and corresponding output result.

4 Customer Satisfactory

	Convenience	Interface	Efficiency	Overall
rating(/5)	4.5	3	4.5	4

We invited 10 volunteers to try our product and review on convenience, interface and efficiency. The results are shown in the table above.