Start to End: Recommended Travel Routes Based on Tourist Preference

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Abstract. When going on a tour, one of the things to consider is making an itinerary before traveling in accordance to the time limit required by tourists. This application will help tourists plan a tour that suits them. In making this system, Greedy Algorithm is used to help optimizing process of searching the shortest travel time and to find the number of tourism site in the route chosen for the tourists. Tourism site points for start to end can also be determined and specified by tourists. The data used was gathered directly through observations in Yogyakarta, specifically Bantul and Sleman. The result is an application for guiding or routing tourism objects from one object to another from start to end and in between. These travel routes are shown through google maps with other information such as distance and travel time from one tourist attraction to other tourist attractions.

Keywords : start to end, greedy algorithm, tourist, recommendation

1. Introduction
Trip planning system is one of the most popular in recommendation systems, since it help provides tourists interesting tour and trip experiences, it could be a good start for locations that hasn’t been known before [1][2][3]. Nowadays there are many information systems on tourism that has sprung up. However, all of which hasn’t been able to provide complete information about going to different tourism site on one trip. This application was created as an effort to overcome the problem in determining the route of the trip as well as a personal tool intended to assist tourists in making travel plans by matching their travel preferences in order to carry out tourist activities. This research was conducted by using the greedy algorithm as a method to help optimizing the process in providing recommendations for the intended travel itinerary.

2. Method and materials
2.1. Data collecting method
Observation is the method used for required data collection such as tourist data, tourism operations, distance and travel time, photos, and existing facilities. Those data were gathered directly through observation in each tourism site. Data were collected in Bantul and Sleman, Yogyakarta. In addition, to the method used to gather needs and analysis is fact-finding method which is a formal process technique such as interviews and questionnaires to collect facts about systems, needs, and arrangements [4]. In finding facts, researchers conducted direct unstructured interviews in the form of question and answer interviews that are more flexible in finding and gathering general information.
2.2. System development method
The method used in making this application is the Greedy Algorithm with modifications through the time allocation given by tourists. Greedy algorithm is an algorithm that can determine a shortest path between nodes that will be used continuously and adding them to the path to be passed [5][6]. This algorithm is used to help process optimization for finding the shortest path between each tourist site and placing it as a result for tourist travel route.

2.3. Materials
From data collection process, gathered data contains the name of the site, address, distance and travel time, visiting time of each attraction, photos, elevation, latitude and longitude coordinates.

3. Literature Review
Previous research has proposed a number of personalized travel planning systems to formulate tourist destination recommendations. Recommendations are given based on the location of tourists obtained through the user's check-in notes on social networks, which then adjusted to the operating hours of tourist attractions [7][8][9]. However, its usefulness reduces the value of the recommendation system in travel planning and make it very difficult to commercialize it since not all users checked-in through social networks. In this study, an application was made with a start to end system to help tourists plan a trip itinerary that suits their own desires. Made using modified greedy algorithm by taking the time allocation given by tourists which then integrated with google maps. This application is also equipped with information about each attraction, personalized travel routes, distance and travel time, as well as the time of visit of each tourism site.

4. Result and Discussion
The results of this study are web-based applications that aims to provide recommendations for intended travel routes using Google Maps API services to display the maps. Users can start by selecting a starting point and destination point based on the tourism site available and insert the total travel time users wanted in minutes. Suppose the starting point is Prambanan Temple and end at Ijo Temple, the total allocation of 480 minutes, during the test shows a short distance with a sufficient total time allocation and passing several tourist attractions, results as shown in Figure 1.

Figure 1. Display the results of close-range testing with a total allocation of enough time to reach the finish which is 480 minutes
During testing, it also carried out short distances travel with a total allocation of time that is not enough to reach the finish by going through the same route, the starting point is Prambanan Temple and end with Ijo Temple, but instead of 480 minutes the travel time is 110 minutes. The actual time needed to reach the finish this trip is 265 minutes with the distance to be travelled 12 km. However, because the user enters a total time allocation of only 110 minutes, which means this trip could not reach the finish as in Figure 2.

![Figure 2](image)

**Figure 2.** Display the results of close-range testing with a total allocation of time that is not enough to reach the finish that is 110 minutes

If the trip does not reach the finish as shown in Figure 2, the finish point will still be displayed in the map provided, so if the user clicks "View full route" the system will give the full travel recommendations just like in Figure 1. In addition to the test above, there are other possibilities in which are not discussed in this paper such as long distance with sufficient total allocation or long distance with insufficient total allocation. To differentiate the starting point, tourism site along the travel routes and destination, this application shows different markers. Markers with the letter S indicate the starting point, markers with the letter W indicate the tourist attraction being passed, and markers with the letter F indicate the final destination, which can be seen in Figure 3.

![Figure 3](image)

**Figure 3.** Different map markers
5. Conclusion and Future Works

The result of this study is a travel planning application system from beginning to end in the form of a website to create personalized travel plans. From the tests conducted, namely sufficient time with close distance, insufficient close time, sufficient time distance, and insufficient time distance, the system results required by the total time allocation required by tourists, also determine the number of tourist visits, travel time and visit time. Even though the time needed by tourists is enough, there are many tourist objects can be visited, allowing the trip to continue. From this research, researcher hoped to expend the use of its application by adding more algorithms to the system, and to facilitate more responsiveness for the needs of users.

6. References

[1] Hsieh, C. Y., Chen, P. B., Zeng, J. J., Chang, C. K., Wang, R. P., Huang, J. G., ... & Chen, Y. C. (2017, July). Quick travel planning and travel book editing system. In Proceedings of the 4th Multidisciplinary International Social Networks Conference (pp. 31). ACM.

[2] Taylor, K., Lim, K. H., & Chan, J. (2018, April). Travel itinerary recommendations with must-see points-of-interest. In Companion Proceedings of the The Web Conference 2018 (pp. 1198-1205). International World Wide Web Conferences Steering Committee.

[3] Rani, S., Kholidah, K. N., & Huda, S. N. (2018, February). A development of travel itinerary planning application using traveling salesman problem and k-means clustering approach. In Proceedings of the 2018 7th International Conference on Software and Computer Applications (pp. 327-331). ACM.

[4] Connolly, T. M., & Begg, C. E. (2010). Database systems: a practical approach to design, implementation, and management. Pearson Education.

[5] Chen, G., Wu, S., Zhou, J., & Tung, A. K. (2013). Automatic itinerary planning for traveling services. IEEE transactions on knowledge and data engineering, 26(3), 514-527.

[6] Wu, Y., & Wang, J. (2018). Algorithm Design Practice for Collegiate Programming Contests and Education. CRC Press.

[7] Amatriain, X., Lathia, N., Pujol, J. M., Kwak, H., & Oliver, N. (2009, July). The wisdom of the few: a collaborative filtering approach based on expert opinions from the web. In Proceedings of the 32nd international ACM SIGIR conference on Research and development in information retrieval (pp. 532-539). ACM.

[8] Ying, J. J. C., Lu, E. H. C., Kuo, W. N., & Tseng, V. S. (2012, August). Urban point-of-interest recommendation by mining user check-in behaviors. In Proceedings of the ACM SIGKDD International Workshop on Urban Computing (pp. 63-70). ACM.

[9] Kim, J., Kim, H., & Ryu, J. H. (2009, April). TripTip: a trip planning service with tag-based recommendation. In CHI'09 Extended Abstracts on Human Factors in Computing Systems (pp. 3467-3472). ACM.