



## International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: [www.ijirccce.com](http://www.ijirccce.com)

Vol. 6, Issue 11, November 2018

# Keyword based Trip Planner with Optimized Route using TSP Algorithm

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**ABSTRACT:** Recommendation system seems very important part of everyone's day-to-day life. So having a proper recommendation system which will consider user's interest is matter of concern. The previous recommendation system which has used point of interest does not focus on the optimized route. In contrast to this, our recommendation system plays crucial role in providing optimized path at very short time. Apart from optimized path, the feature of inputting the choice of season or time to visit will ensure user's satisfaction. This is basically user-centred recommendation system so as to give priority to user's choice of interest. This paper proposes an approach for keyword based trip planner which uses the popular cities and reviews shared through social networks based on location. The approach utilizes web API's to fetch reviews, distances between popular cities and the corresponding optimized path. This model jointly considers the season/time and the specified radius of interest to visit. Travelling salesman problem(TSP) algorithm is used to generate the optimized travel routes for the user.

**KEYWORDS:** Keyword, Service Recommendation, Trip Planner

## I. INTRODUCTION

As we all know that uses of web services are increasing widely also the services are increasing. In those services, the Trip planner is one of the most important service from the web user point of view. So our review paper deals with this topic. Tourism has become world's one of the largest service. Before planning trip to new city many questions comes in users mind for example:

1. "Are those places suitable according to current time and season? "
2. "Is it possible to visit all those places in single trip?" with minimum distance?"
3. "What about accommodation?"

To answer above questions we have proposed a system which will recommend travel path. This will provide user with shortest path that covers all popular places in particular city. According to the researches done in this field, some have used collaborative filtering method for place recommendation, some have used GPS trajectories, location based social network, geo-tagged photos and travelogues to find out popular places. Our system also consider the time and season for recommendation. For generating optimized travel path between popular places, we are going to use travelling salesman algorithm. Furthermore, according to the forecast by the World Travel Tourism council, the contribution of tourism to global GDP is expected to rise from 9.1 % in 2011 to 9.6 % by 2021 [1].

## II. LITERATURE SURVEY

The Zhiwen Yu et al.[2] have developed person- alized travel recommendation system which gener- ates travel packages containing multiple points of interest and their visiting sequence. They collected user footprints from Jiepan[12] which is popu- lar LBSN(Location Based Social Network) from china. And use this for user profiling and location modeling. They also used Collaborative filtering approach for this.

Dik Lun Lee and Wang-Chien Lee proposed CLR for location recommendation by considering activ- ities and different user classes like pattern, normal users and travelers and clustered data into similar users activities and locations with the help of dynamic clustering algorithm[3].

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Yu Zheng and Xing Xie worked on “GPS enable device location history which recommended two types, namely users with top interesting location and travel sequence in region and personalized with individual location matching with preferences with TBHG (Tree Based Hierarchical Graph)[4] Based on the proposed HITS (Hypertext Induced Topic Search)[4] which was based on infer interest level of location and knowledge. GPS trace dataset and HITS approach to calculate popular places by rank by count and rank by frequency.

Xin Lu et al.[5] proposed travel package recommendation based on 20 M geo-tagged photos and Textual Travelogues Considering User preferences. They have used Dynamic Graph Construction and Dynamic programming. The authors applied algorithms Like (IPD) Internal Path Discovery[5] algorithm.

Probabilistic approach[6] to recommend POI place which is not only relevant to user context but current location time and check-ins but also personalized to his check-in history. Their approach enables users to plan consecutive activity on their current move.

### III. PROBLEM STATEMENT

To recommend travel route to the user with more than one popular places with optimized path using traveling salesman problem algorithm to visit those places by considering season/time of travel and keyword jointly.

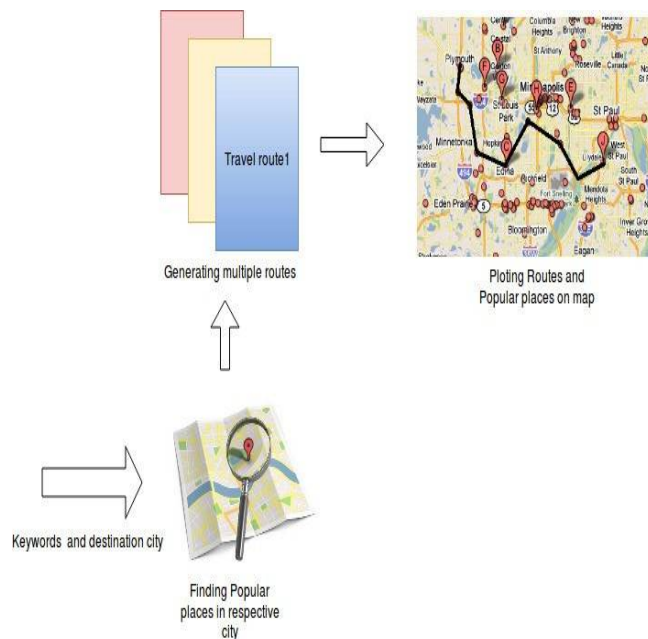


Fig. 1. Methodology[2]

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## IV. PURPOSE, OBJECTIVES AND SCOPE OF THE PROJECT

### A. Purpose

The purpose of project to provide travel route for different keywords based on location popularity.

The crowd sourced range of locations, reviews, paths and distances will be extracted from web API's. We then generate optimized traveling routes by considering favorable season/time to visit and the radius of interest specified by user to visit.

### B. Objectives

The main objective of the project is to help user in new city to visit places. Our system will recommend the travel route with efficient visiting points based on time of traveling, season of traveling to that city.

### C. Scope

Travel route not only contains the popular cities, but also the hotels in that vicinity. We can create user profile from users previous activities and then we can recommend them travel places.

## V. INITIAL PHASE OF DESIGN

### A. Data flow Diagram of system

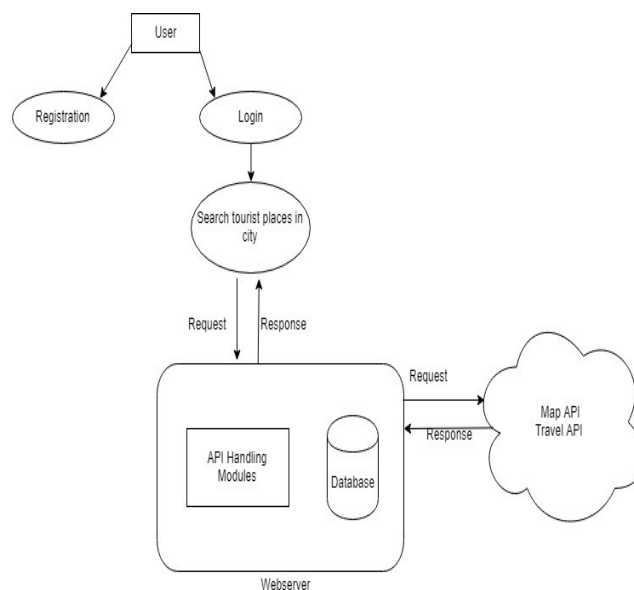


Fig. 2. DFD level 1

Our aim is to build system capable of recommending travel routes on smart-phones. Figure:1 illustrates the methodology of system, which mainly consists of three components: discovery of popular cities , generating multiple routes, and plotting route and popular places. As we know, different seasons or periods in a year have different effects on the visiting popularity of cities. Based on that,we discover the places to provide better choices for users. We then generate route and plot those routes on map.



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The recommendation engine aims to generate the travel routes to satisfy the user choice and particular requirements, and is performed online. Figure:2 illustrates the flow of implementation. The user will have to either register or login. After login, user can input the name of city of his interest to search. It will then be requested to web server. Web server has the API modules and the local database. If needed the same request will be forwarded to Map API and the corresponding response will be provided to user via web server.

With the discovered places, trip planner will provide appropriate traveling route based on the popularity using TSP algorithm. The mobile user interface allows a user to enter input requirements and show the results on a user's mobile phone. User requirements include the range of vicinity, destination city. System will return the recommended results on the user's mobile phone. Users can look up the details of each recommended travel route from the map service, such as popular places to visit and hotels.

## VI. IMPLEMENTATION STRATEGY

### A. Google API's

API stands for "Application Program Interface" Google API's are developed by google for the communication between different google api services such as Gmail, Google Maps, etc. We can also use these API's to take advantage to extend the functionality of the existing services[8]. One of the important service is google Map services which provides different API's like Place API, Distance Matrix API[8]. This type of API's are very useful to extend our project scope and give some additional functionality.

### B. TSP Algorithm

The Traveling salesperson problem[7] is one of the problem in mathematics and computer science which has drawn attention as it is easy to understand and difficult to solve. The travelling salesman problem (TSP) is described as "Given a list of popular places and the distances between each pair of them, what is the optimized route that visits each place?"[7] It is an NP-hard problem with time complexity in dynamic programming is  $O(n^2)$ , in which n is the number of nodes in graph. TSP modeled as an undirected weighted graph, such that popular places are the graph's vertices and paths are the graph's edges, and distance between places are the edge's weight. It is a minimization problem starting and finishing at a specified vertex after having visited each other vertex exactly once. If no path exists between two cities, adding an arbitrarily long edge will complete the graph without affecting the optimal tour[7]. TSP will be useful up to the 20 nodes using Generic Travelling Salesman Algorithm which has less time complexity than dynamic programming. By considering our topic Travelling Salesman Problem useful for calculating the optimized routes using number of popular places points from particular city/place.

TSP using Genetic Algorithm[9] Genetic algorithms are evolutionary techniques used for optimization purposes according to survival of the fittest idea. These methods do not ensure optimal solutions; however, they give good approximation usually in time. The genetic algorithms are useful for NP-hard problems, especially the traveling salesman problem. The genetic algorithm depends on selection criteria, crossover, and mutation operators. To tackle the traveling salesman problem using genetic algorithms, there are various representations such as binary, path, adjacency, ordinal, and matrix representations. A simple and pure genetic algorithm can be defined in the following steps[9].

Step 1. Create an initial population of P chromosomes.

Step 2. Evaluate the fitness of each chromosome. Step 3. Choose P/2 parents from the current population via proportional selection.

Step 4. Randomly select two parents to create offspring using crossover operator.

Step 5. Apply mutation operators for minor changes in the results.

Step 6. Repeat Step-4 and 5 until all parents are selected and mated.

Step 7. Replace old population of chromosomes with new one.

Step 8. Evaluate the fitness of each chromosome. Step 9. Terminate if the number of generations meets some upper bound otherwise go to Step- 3.[9]



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## VII. CONCLUSION

Using this system user will get all popular places from particular city. Also User will get optimized travel route according to time and season.

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