

Survey on Finding Cost & Time Effective Path For Travelling

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Abstract- In this paper we propose finding cost and time effective path for travelling. This system which is based on finding effective path with minimum cost and time shows the path to be travelled with minimum cost or time. So system which deals with such type of problem and provides the optimized solution from source to destination giving the shortest path for the same along with the various means of transports available are discussed.

Keywords- Shortest path, Travelling, time and cost efficient.

I. INTRODUCTION

Travel!!!! What are the things that would strike to your mind when you hear of travel??? First you would figure out the place, the map, the ways and means to reach there, you would draw a complete picture of your trip/ journey. To begin with the first friend you would remember to solve all these problems is 'GOOGLE'. Being of an E-age era there are various applications, websites and Tours & Travel agencies available for helping people commute from one place to another. Now these all decisions will be taken based keeping in mind many factors such as cost, time, comfort to reach the desired destination etc. So in order to deal with all such issues, one System is required which would overcome all these problems at a stroke with optimized resources. If a person wants different means of travel like bus, train, taxi or any other which are available in that city then this is the basic task for solving the travelling problems. Also he/she can travel in less time or in less cost. The common man can get a solution to his daily life transportation. Common man can use Internet browser through which he will find a solution to travel from one place to another based on different parameter like distance or cost or time.

Some web sites like "Indian Railway Catering and Tourism Corporation (IRCTC)"[3] site searches direct path between two cities in India. It is an online railway reservation website which searches the path only for railway. "Maharashtra State Road Transport Corporation (MSRTC)"[5] is used for bus reservation. These types of different websites give only limited and standard path and cost. It searches the path from source to destination only for particular cities otherwise it displays no direct train/bus found.

II. LITERATURE SURVEY

The path finding technique mainly works on different types of algorithms. There are various types of algorithms which are used for finding shortest path.

Dijkstra's Algorithm: The Dijkstra's Algorithm [10] is a basic method for finding the shortest path. It is applicable for two terminal problems. This algorithm delivers the shortest path from a given node 'i' to a single destination node or all other nodes within a graph with non-negative path costs. In Dijkstra's algorithm, initially all distances are infinity. The start node 's' is the initial current node. The next node is selected when the shortest distance is considered. Similarly, all nodes in the graph are to be travelled which gives the destination node 'd' with minimum cost path. Dijkstra's algorithm stores nodes in a linked list or an array. The time complexity of Dijkstra's algorithm is $O(n^2)$.

The Dijkstra's algorithms have bi-directional approach also called as two-side Dijkstra. The Dijkstra's algorithm can be interpreted as a BFS (Breadth First Search). It carries out "unnecessary" steps before reaching the destination node this is main drawback of Dijkstra's algorithm.

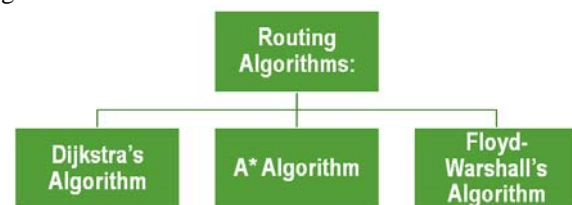


Fig.1. Types of Popular Algorithms used for Routing

A* Algorithm: A* Algorithm [2] is a general approach of Dijkstra's Algorithm. A* algorithm is based on AI (Artificial Intelligence). The A* algorithm is suitable for finding not only the shortest path but also the better routes, namely suboptimal routes. It uses Heuristic Function for path finding.

$$f(n)=g(n)+h(n)$$

Above function consist of $g(n)$ which is an actual cost of the given graph and $h(n)$ is a heuristic function it gives the minimum cost path from $f(n)$.

The time complexity is $O(b^d)$ which depends upon the Heuristic Function. Here 'b' is a branching factor. It is more efficient than Dijkstra's Algorithm. It does not explore all paths during searching. Optimization of path is depending upon Heuristic Function. It requires more memory than dijkstra's algorithm. It does not search deeper on the opposite direction to the destination.

Floyd-Warshall's Algorithm: Floyd-Warshall's Algorithm [1] gives compute path from given start node to multiple nodes. From a single node to all other nodes are computed within a single loop. The time complexity is $O(n^3)$.the time complexity of given algorithm is more than dijkstra's algorithm, but it works in less timethan dijkstra's algorithm. It works by using the Bellmann-Ford algorithm to compute a transformation of the input graphthat removes

all negative weights, allowing Dijkstra's algorithm to be used on the transformed graph.It is more compatible for large graphs. Computational model can consume more space. Therefore, it uses the technique like dividing large graph into sub graphs. Due to dividing, less space is required for storage. It is more suitable for large graph. From our survey the Table 1 shows comparison study as follows:

Parameters	Dijkstra's	A* Algorithm	Floyd-Warshall's
1. Time Complexity	$O(n^2)$	$O(b^d)$	$O(n^3)$
2. Speed	Fast (for one to many)	Same as Dijkstra	Slow(many to many)
3.Compatibility	For transformed graphs	Less compatible for large graphs	More compatible for large graphs
4.Efficiency	Less	More than Dijkstra	large
5.Loops	Multiple loops	Multiple	Single loop
6.Runtime Storage	Less	More than dijkstra's	Less

Table 1 Comparison between survey algorithms

Travelling means	Paper / Reference	Advantages	Disadvantages
Train	www.irctc.co.in	Tatkal ticket booking	User account required
		Calculates Ticket fare	Only shows direct trains
		Finds Train details	
	www.indianrail.gov.in	Used for railway enquiries	Not for reservation
BUS	www.msrtc.gov.com	Can be used to go to rural areas	Ticket is costly then train
Taxi	www.ecabs.in/	Comfortable way of journey	Cost is more than bus
		Takes less time than other	
Auto		Easy way to travel in-between city	Not compatible for long distance travels

Table 2:. Table of Advantage and Disadvantage of Public Transport Vehicles

This paper surveys these algorithms from the point of view of applying them to the two terminal shortest path problem on the road network. The problem in the travelling system is that they don't show the alternative paths considering different intermediate nodes.

Above Table 2 shows the comparison between different means of travelling. IRCTC & MSRTC website is specially designed for Railway & Bus Reservation. These types of webpages are helpful to people but, there have

disadvantages also which people are facing. Mainly, Searching trains also requires Registration to site. Similarly, www.ecabs.in[6] is a most popular Internet website for cab booking in India. Cabs are better than bus and railway journey but the cabs are more costly than Bus and Train. Auto is a simple travelling mean in India which is used for inter-city travelling which is only compatible for minimum distance.

III. CONCLUSION

Hence, the study of different algorithms their advantages and disadvantages, various travelling means and their comparative study has been concluded successfully.

IV. ACKNOWLEDGMENT

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V. FUTURE WORK

Research could concentrate on computing optimal partitions of given graphs such that the number of connecting edges is minimized while the number of nodes per sub-graph does not exceed a certain limit. Currently, the proposed system is limited for two districts but in future it can be enlarged for two states or countries.

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