03/02/2022

SHORTEST DESTINATION FINDER

(CS-323) AI PROJECT

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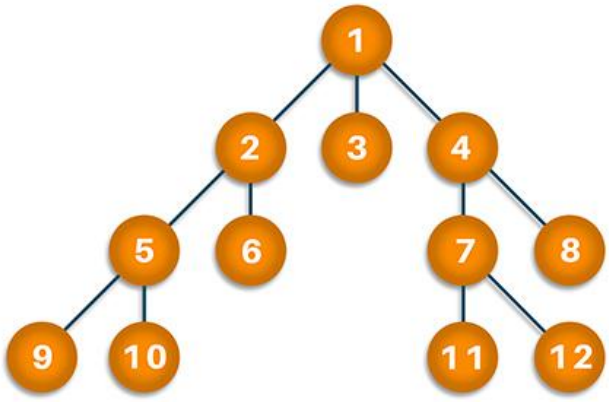
BACKGROUND

BFS is a traversing technique. It's basically an uninformed search algorithm. We only know what has been specified in the problem rather than extra knowledge of that particular problem. BFS maintains the shallowest path to every node in the frontier.

INTRODUCTION

Shortest Destination Finder is an ultimate solution to daily life problems. This approach is based on Breadth First Search-BFS algorithm. It works on a similar principle as BFS does. Main motive of using this idea is to save our precious time. Among all the available possible paths, SDF will discover the most optimal route in the wink of an eye.



BREADTH FIRST SEARCH

SCOPE

Most of the time ambulance drivers can't find the shortest possible path or sometimes they don't know which route will be the shortest at the moment. SDF fits best here. Moreover, all these services i-e Uber, Careem, Bykea etc use the same approach for navigation.

WHY BFS?

- The architecture of the BFS algorithm is simple and robust.
- It is also useful for analyzing the nodes in a graph and constructing the shortest path for traversing.
- The result of the BFS algorithm holds a high level of accuracy in comparison to other algorithms.
- BFS iterations are seamless, and there is no possibility of this algorithm getting caught up in an infinite loop problem.

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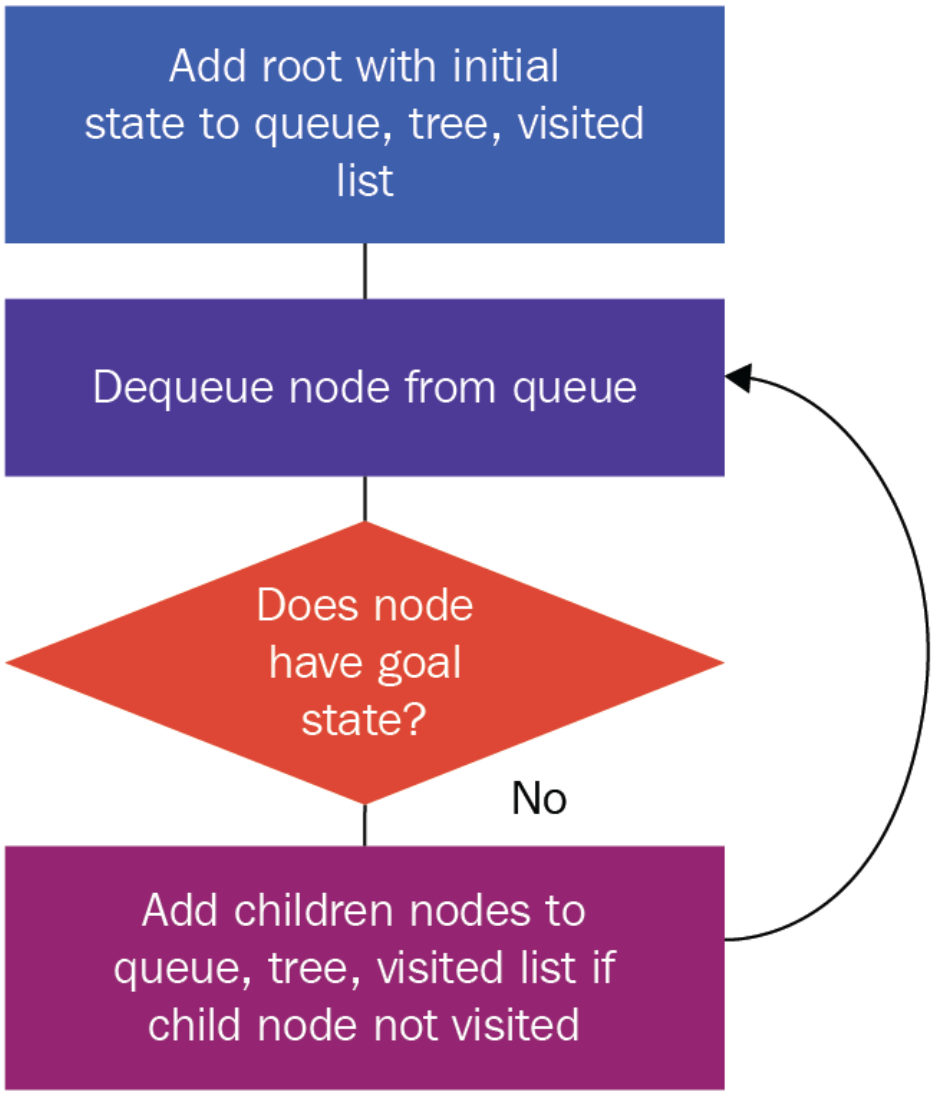
HOW IT WORKS?

1. In the various levels of the data, you can mark any node as the starting or initial node to begin traversing. The BFS will visit the node and mark it as visited and place it in the queue.
2. Now the BFS will visit the nearest and unvisited nodes and mark them. These values are also added to the queue. The queue works on the FIFO model.
3. In a similar manner, the remaining nearest and unvisited nodes on the graph are analyzed, marked and added to the queue. These items are deleted from the queue as received and printed as the result.



ANALYSIS

- **Completeness**

  If it is finite then it's complete.

- **Optimality**

  It is guaranteed to be optimal, if all step costs are equal.

- **Time Complexity**

  O(b^d+1)

- **Space Complexity**

  O(b^d+1)

APPLICATIONS

Used in navigation systems for finding all the neighboring locations. Itcan easily create the shortest path and a minimum spanning tree to visit all the vertices of the graph in the shortest time possible with high accuracy. It can be implemented to locate all the nearest or neighboring nodes in a peer to peer network. This will find the required data faster. Due to high precision and robust implementation, It is used in multiple real-life solutions like Network Broadcasting etc

SCALABILITY

If it’s able to solve most problems in the least time then it’s guaranteed to be scalable.

CONCLUSION

Breadth Search Algorithm comes with some great advantages. One of the many applications of the BFS algorithm is to calculate the optimal path. It is also used in networking to find neighboring nodes and can be found in social networking sites, network broadcasting, and garbage collection.