

# Pizza Dough Service Provider at Various Area Followed by Depth-First Search Algorithm



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## ABSTRACT

To figure out process that attend time investment in terms of material delivery at the nearest points is always a challenging. So that people globally finds easiest way to reach their destinations within time. Moreover the edge relatedness regulate the minimum number of paths among dealer and receiver. Here the confer question is belonging to the pizza ingredients delivery time at privileged areas. The number of branches which are located at discrete spot and are challenging with reference to time, the proposed methodology will aid the legitimate string of branches by using depth first search algorithm which will produce the optimum results at its deeper expands. The proposed graph reflects all the possible routes on which a rider can go for timely delivery of pizza dough on the basis of minimum path it has estimated.

**Keywords:** Pizza Service, Depth First Search, Genetic Algorithm, Permutation rules

## 1- INTRODUCTION

Food is an elemental precondition for every individual, and the flavored food is craving especially when it comes to Pizza. Pizza is an [4] Italian luscious dish topped with various ingredients, and dough is the basic layer on which the whole material relies. Different brands chooses different dough making factory [6] from where the dough becomes ready like Pizza Max, Pizza Hut, Pizza Crust, California Pizza, Broadway Domino's Pizza and many more, the one which is processed under our research is Pizza hut, which is more promising brand [7] for the taste of Italian dish, each of branch is dealing more than 600 pizza per day which is colossal quantity for any running branch, this is how each of branch for Pizza Hut is focused for time management, the company which provides dough throughout branches.

### 1.1 Search Algorithm

Searching Algorithms are devised to check and retrieve [2] for an elements which is well-studied task determined by search problems stored in

data structure or computed within discussed problem of any form either discrete or continuous values.

### 1.2 Informed Search Algorithm

Informed Search Algorithms endorse the prior knowledge for attaining the goal state, furthermore the fewer [6] search space takes place and finds goal node efficiently. This division of search algorithm is more useful for large search space so we labelled them heuristic. This heuristic is basically a function which works for finding the most auspicious paths. As it takes the initial node as an input and leads further to get goal estimation.

### 1.3 Uninformed Search algorithm

It is a general concept of search Algorithms which promote operations in "Brute Force Way". Uninformed Search Algorithms work without preserving any definitive intelligence of their domain or simply they don't know how to traverse tree so we termed them blind search.

## 2- RELATED WORK

In the literature, the most relevant work in this domain is carried by [1] the main tool for minimal path set is used for network measuring which searches for ordered node subsets with time complexity  $O(ne^n)$ , where  $n$  is taken as total number of nodes and the problem is solved by Depth First Search (DFS) Algorithm likewise [2] Automated Teller Machine (ATM) services for immediate response from banking, the said problem focused "Padang Sidempuan" city which has multiple "ATMs" in various places thus researcher followed Depth First Search (DFS) Algorithm in comparison with Greedy Algorithm [1] for searching nearer Automated Teller Machine (ATM) from current location. The main motive of Researcher is to apply two different algorithms on same problem and compare the results achieved by proposed techniques. Hence the result were similar for both applied algorithms Depth First Search and Greedy Algorithm in terms of complexity so the acquired average running time [7] for Depth First

Search is 239.9675 milliseconds with average distance 3033.555 meters and average running time for Greedy Algorithm 274.8501 milliseconds and the average distance is 2035.2568 meters. Therefore an analyst concluded that Depth First Search (DFS) is more efficient than Greedy Algorithm in running time though Greedy Algorithm generates better shorter distance than Depth First Search (DFS). The work anticipated by researcher [3] based on network edge connectivity where node synchronization is not dealt for proposed algorithm Depth First Search (DFS), therefore methodology focuses on available edges within tree and root node start as a distributed Depth First Search (DFS) moreover the results got from proposed technique are 48% for an average accuracy ratio. Another work in this field is carried by [4] whose objective were to develop “fast algorithm of graph coloring” which give vertices sequence in the graph followed by Depth First Search (DFS). To implement this idea researcher has [12] used “large and small benchmark graphs” and applied four different coloring algorithms like BC-COL Algorithm, DSATUR algorithm, A cutting plane Algorithm and new DSATUR algorithm. Wamiliana *et al.* [8] recommended work for minimum spanning tree problem followed by Depth First Search (DFS) and Kruskal’s Algorithm where they have directed for [10] total minimum connection sin weighted graph and its maintenance for maximum number of edges for each vertex. Researcher exhibit the work from the base of Minimum Spanning Tree and had applied restrictions on each of the vertex. Hence connection [5] can be poor with involvement of few factors like fund and weather.

### 3- METHODOLOGY

#### 3.1 Shortest Path:

Shortest path (SP) is an intelligent way to find optimum routes between nodes in the graph, here the confer problem is directing routes among facilitator which is dough making company for pizza making and its delivery to the nearest branches, the basic goal to achieve such targets we have focused on the

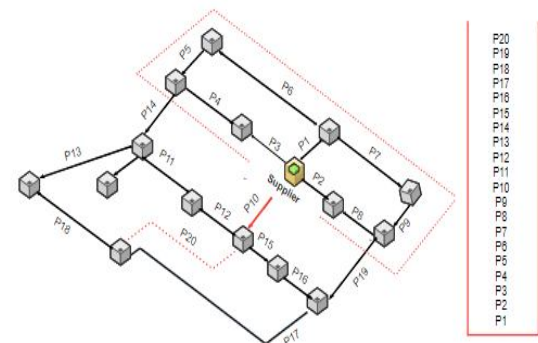
The above figure depicts the movement of all paths from one destination to the next here supplier is the main source from which dough is delivered to all branches of Pizza Hut in Karachi, Pakistan. The number of branches located in Gulshan District are 20 which are receiving dough services from company on daily basis. Supplier inclined to deliver dough at

technique of Depth First Search, Depth first Search searches the solution till the last node it has for any suggested problem.

#### 3.2 Depth First Search

To figure out the working of depth first search, it expands the nodes as deep as the solution found or simply the knot which doesn’t expand to anymore children. Here, if any of the node is not visited then the tree may traverse to check for each possible node. The said problem can be solved by the technique Depth First Search (DFS) P is called as the abbreviation for Pizza which is locating its nearby branches for early and timely delivery of ingredients like pizza dough (PD), where the initial node Is taken as P0, from where the tree started to find the optimum solution, and the total number of targeted pizza hut branches are 20 at first phase which cover Gulshan district P1 is taken as the first node from where the graph will start finding paths and P2 is the step which will be taken for new node, when cursor locates for the next node while station at P2 and chooses which is the next path similarly each of possible nodes will be visited until all 20 nodes are visited properly in sequence

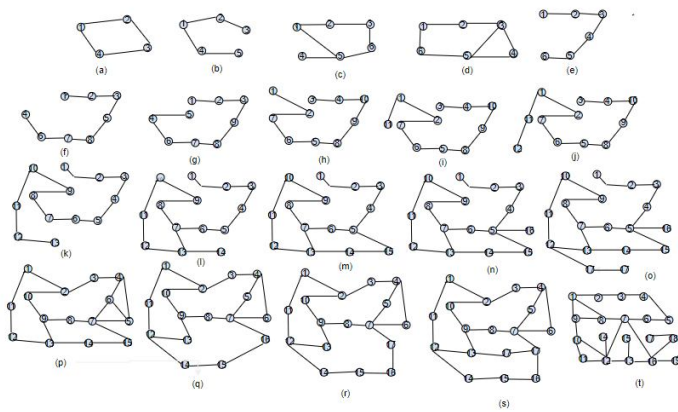
$P1 \rightarrow P2 \rightarrow P3 \rightarrow P4 \rightarrow P5 \rightarrow P6 \rightarrow P7 \rightarrow P8$   
 $\rightarrow P9 \rightarrow P10$   
 $P11 \rightarrow P12 \rightarrow P13 \rightarrow P14 \rightarrow P15 \rightarrow P16 \rightarrow P17$   
 $\rightarrow P18 \rightarrow P19 \rightarrow P20$



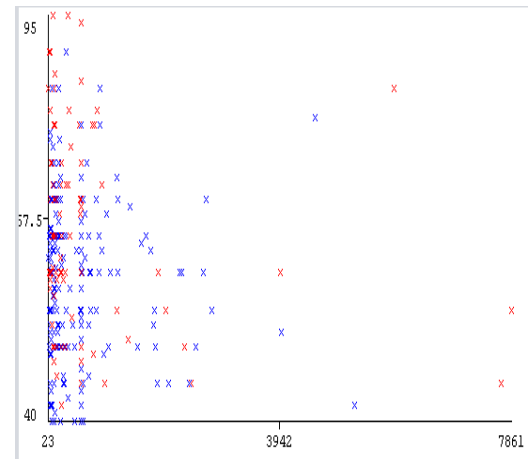
**Figure 1** Schema represents minimum possible paths

minimum time to all existing Pizza Hut branches in Gulshan district, however the graph shows the possible routes which needs to be visited once to check the distance moreover stack displays the number of visited noted from P1 till the last node P20 the node which is visited last it will be removed first from stack, similarly all nodes will be removed from stack.





**Figure 4** All possible paths for pizza dough delivery



**Figure 5** Optimal path using DFS(10 branches)

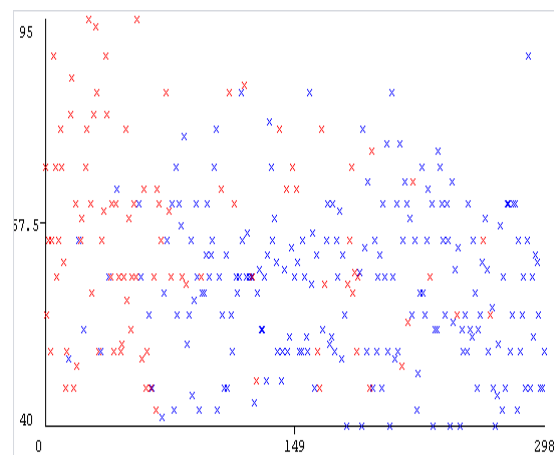
**4- RESULTS**

We have used genetic algorithm to propose path representation, where we have targeted 20 branches of Karachi Pakistan and have calculated distance among each points, on the basis of distance measure from Google map we have concluded the best path for all routes from supplier to discussed 20 number of branches for their nodes and edge counts.

The transition table represents the distances measured from map and have eliminated those paths which were visited once. The representation of numbers from 1 till 5 is basically group of branches who are near to each other from base location.

**Table 1** Transition table for pizza branches

Branch	Distance	1	2	3	4
P01	7KM	10	1	2	3
P02	5KM	4	1	14	17
P03	8KM	15	20	5	12
P04	3KM	8	9	13	19
P05	4KM	x	x	2	3
P06	2KM	x	x	14	17
P07	1KM	x	x	5	19
P08	3KM	x	x	13	x
P09	5KM	x	x	x	x
P10	5KM	x	x	x	x
P11	6KM	x	x	x	x
P12	6KM	x	x	x	x
P13	7KM	x	x	x	x
P14	7KM	x	x	x	x
P15	1KM	x	x	x	x
P16	3KM	x	x	x	x
P17	2KM	x	x	x	x
P18	5KM	x	x	x	x
P19	3KM	x	x	x	x
P20	5KM	x	x	x	x



**Figure 6** Optimal path using DFS (20 branches)

**5- CONCLUSION AND FUTURE WORK**

This work presents the efficient concept for finding the minimum path. This method is implemented on finding all possible paths with time complexity  $O(ne)$  on ordered nodes and subsets. Depth first search algorithm works for finding the nodes which connect to the route as it may not obtained the optimal solution always. Even if the path is find at the first child node we can conclude it with the optimal solution for any path relating problem. Hence the dependency occur on the first node. The extensive experiments on several problems are representing through figure 4 which actually depicts the all possible paths on benchmark network. The proposed algorithm is capable to hold and work on such problems like path finding, minimum pathor suitable path in efficient time. In addition, we can extend the work on such benchmark dataset to acquire more efficient results on benchmark problems as well.

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