

Task 6

Shortest path algorithms

December 19, 2021

Dijkstra algorithm

```
8 import sys
9 def to_be_visited():
10     global visited_and_distance
11     v = -10
12     for index in range(number_of_vertices):
13         if visited_and_distance[index][0] == 0 \
14             and (v < 0 or visited_and_distance[index][1] <= \
15                 visited_and_distance[v][1]):
16             v = index
17     return v
18 vertices = [[0, 1, 1, 0],
19             [0, 0, 1, 0],
20             [0, 0, 0, 1],
21             [0, 0, 0, 0]]
22 edges = [[0, 3, 4, 0],
23          [0, 0, 0.5, 0],
24          [0, 0, 0, 1],
25          [0, 0, 0, 0]]
26 number_of_vertices = len(vertices[0])
27 visited_and_distance = [[0, 0]]
28 for i in range(number_of_vertices-1):
29     visited_and_distance.append([0, sys.maxsize])
30 for vertex in range(number_of_vertices):
31     to_visit = to_be_visited()
32     for neighbor_index in range(number_of_vertices):
33         if vertices[to_visit][neighbor_index] == 1 and \
34             visited_and_distance[neighbor_index][0] == 0:
35             new_distance = visited_and_distance[to_visit][1] \
36                 + edges[to_visit][neighbor_index]
37             if visited_and_distance[neighbor_index][1] > new_distance:
38                 visited_and_distance[neighbor_index][1] = new_distance
39     visited_and_distance[to_visit][0] = 1
40 i = 0
41 for distance in visited_and_distance:
42     print("The shortest distance of ",chr(ord('a') + i),"\
43           " from the source vertex a is:",distance[1])
44     i = i + 1
```

Output

```
In [9]: runfile('C:/Users/mylap/untitled2.py', wdir='C:/Users/mylap')
The shortest distance of a from the source vertex a is: 0
The shortest distance of b from the source vertex a is: 3
The shortest distance of c from the source vertex a is: 3.5
The shortest distance of d from the source vertex a is: 4.5
```

Dijkstra's algorithm is an algorithm for finding the shortest paths between nodes in a graph, which may represent, for example, road networks. Lorem ipsum dolor sit

Shortest path algorithms

- Dijkstra's Algorithm
- Ellman-Ford Algorithm
- Floyd-Warshall Algorithm
- Johnson's Algorithm
- Final Note