Real World Applications of Maximum Capacity Path Algorithms

Berman & Handler (1987) suggest that emergency vehicles such as ambulances and firetrucks should use minimax paths when returning from a service call to their base. In this application, the time to return is less important than the response time if another service call occurs while the vehicle is returning. By using a minimax path, where the weight of an edge is the maximum travel time from a point on the edge to the farthest possible service call, drivers can plan a route that minimizes the maximum delay between service call and arrival of a emergency vehicle.[1] Ullah, Lee & Hassoun (2009) use maximin paths to model the reaction chains that are dominant in metabolic networks. In their model, the weight of an edge is the free energy of the metabolic reaction represented by the edge.[2]

Time Complexity of Modified Dijkstra Algorithm

Time complexity of my implementation of the Modified Dijkstra Algorithm is $O(E + V^2)$. Explanation: Since every node expect starting node becomes fringe at some point in the algorithm, we search the wt table v times and search is a linear search, The complexity from here is $O(V \cdot V) = O(V^2)$. Since we traverse the each edge twice since we look from source to destination and from destination to source. So we obtain $O(E)$ from this part. Total complexity is $O(E + V^2)$

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Bibliography

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[2] E. Ullah, K. Lee and S. Hassoun, "An algorithm for identifying dominant-edge metabolic pathways," 2009 IEEE/ACM International Conference on Computer-Aided Design - Digest of Technical Papers, 2009, pp. 144-150.