**Topic:**

Optimizing real road networks by applying time efficient shortest path algorithms

**Problem Description:**

In this pandemic, many people encountered various lethal health problems, therefore it becomes an emergency case and such situation expects an ambulance to reach the patient’s place as soon as possible. Obviously, ambulance must take the shortest possible path from the hospital to patient’s place in the real road network given in the form of a graph to reach the destination faster to save a life.

**Objective:**

Our objective is to suggest the ambulance a shortest possible path in the real road network by applying time efficient shortest path algorithms.

**Solution:**

As a solution in this project,two solving optimizations for the problem description are being proposed:

1.If there are more than one emergency cases at a time,then ambulance is required to visit all places(patient’ home) in the fastest possible way.So Travelling Salesman Problem(TSP) can be applied to provide the shortest possible route that visits each place and returns back to hospital.

2.If there is only one emergency case at a time, then ambulance has only one destination to reach.In this case, dijkstra algorithm can be applied to provide the shortest path from the hospital to the patient’s home.

TSP and dijkstra algorithm take much time (execution time of algorithm) to compute the shortest possible path when the graph is complex and large. In that case, heuristic/nature-inspired optimization technique can be a good solution to optimize(In terms of time complexity) the TSP and dijkstra solution which results in decreasing the execution time and shortest possible path is computed relatively faster despite of a complex and large graph.