Project Idea:

One is given a two-dimensional map of a state for example (Georgia). This map includes corona virus affected regions (dangerous regions) that are to be avoided. A region is defined as a county in a state to make things simple. The goal of the project is to find the paths that pass with maximum clearance around the affected regions. Firstly, we define a threshold of what constitutes a safe region as follows:

1. Dangerous - should be avoided at all costs (Similar to a mandatory obstacle in our paper reference) – (total affected – recovered) / population say > 0.7
2. Moderate - Can be avoided if better alternative path exists between 0.5 and 0.7
3. Safe - Can be used at all times <0.5

Then we define an approximation algorithm based on simpler problem of computing Voronoi diagram for a set of discrete points as follows:

1. we can approximate the boundaries of affected regions with large number of points that result from subdividing into smaller segments.
2. Constructing Voronoi Diagram for the collection of points
3. Eliminate the Voronoi edges which have one or both endpoints lying inside any of the affected regions

Locate the starting and ending points. Compute the Voronoi vertices which are nearest to these points. Then using Dijkstra's / A* algorithm we can find the best path that connects the begin and end points. This gives relatively safe path.