FYP-II Chapter 7

Group # 5

Routing Optimization System

**INTRODUCTION:**

This chapter will summarize all of the work completed during the final year project, as well as the challenges, limitations, and future work for this project. In this chapter all the major and minor work will be discussed. This chapter also includes the limitation of research in order to help the user to understand the basics of algorithms. The Future work section will provide an overview of algorithm’s enhancements that can be made in future.

This route optimization system algorithm has the basic features of optimization that is perfect for all industries that have transportation model which includes a pickup and a delivery location. In order to optimizes time, we have designed an algorithm that is more convenient to the companies with a central hub to optimize time and for the better customer experience. We aim to make the algorithm more efficient and accurate with future enhancements.

**SYSTEM LIMITATION AND CHALLENGES:**

The problem that we currently worked on addresses only the orders received till a particular time and suggest the possible riders and the shortest path for that rider. The shortest path suggested by the algorithm does not address the issues such as delay time, traffic congestion, road conditions and other real-time factors that may delay the actual delivery time.

**FUTURE WORK**

In future, further work could be carried out in this domain to make the solutions more effective. An improved solution could be the one that could predict the number of orders for each restaurant in the future using some ML prediction techniques. This way, if we know that a restaurant is going to get crowded with orders in the next hour, we can assign the current orders to more far away riders so that we would have more riders in the next hour closer to that particular restaurant.

Another room of improvement could be to bring into consideration the real-time road conditions such as broken or crowded roads, traffic jams, road closures, construction etc. If we have the real-time road conditions, we would be able to calculate the time taken by each possible route and thus, would be able to suggest shortest routes in terms of time i.e. sometime longer but cleaner route may get the job done in less time than the shorter but bad routes.

**CONCLUSION:**

We can conclude that an optimization algorithm plays vital role for the delivery or transport industry. An effective route optimization algorithm can not only increases efficiency of a company or an organization but can also prove to be fruitful in term of monitory benefits. The algorithm designed by us for the purpose of this project address static orders only i.e. an order is received and optimized. This approach also solves the problem to some extent. But addressing the dynamic orders could help find much better solutions. By dynamic orders we mean the orders received at the moment when the current orders are being processed i.e. when the current orders are being processed, any order received during the time of processing, should also be considered for processing. This would help suggest more optimal solutions. Another great improvement could be to predict future orders and schedule the current orders accordingly or taking into account the real-time road conditions or other such factors that may affect the overall job completion time. In the end, this is a topic with a never ending room of improvement.

To collect data related to VRP i.e. Vehicle Routing Problem, that would contain the information regarding delivery and depot locations, the rider/delivery vehicle capacity and other customer related data.

To apply different clustering techniques to divide the customers or the delivery locations according their delivery needs or their locations or the like features.

To minimize time by formulating an algorithm that would suggest the best possible route given the locations for delivery and the capacity of the delivery entity (i.e. the delivery van or the delivery boy).

To develop a web API that would implement the designed algorithm so that the route data can be fetched when needed.

To develop a demonstration app with maps implemented, that would visually display the routes suggested by the algorithm.