

**CPE341 Optimization Design and Reliablity Engineering**

**Topic :**

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**Short path to travel around the airbnb hotel based in New york city using Simulated annealing**

**Created By**

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**Semester 2/2022**

**Chapter 1: Introduction**

**1.1 Project Description and Scope**

This project applies Simulate Annealing(SA) to solve the Traveling Saleman Problem(TSP).This Project simulate the situation of person who want to travel hotel in New York City and minimize the distance to travel all of the hotel.In this project will study on how each parameter affect to the converage of the solution.Then we solved the problem with multiobjective function by simulate the situation that someone want to travel 2 trip with the minimum distance and those two trip doesn’t has the same hotel to visit.

**Chapter 2: Model Formulation**

**2.2 Variable Definition**

- Path to travel all hotel

- Path to travel in the first trip

- Path to travel in the second trip

- Path to travel form hotel i to hotel j

) - Total distance to travel in path

**2.2 Objectives**

**2.2.1 Haversine Formula**

Minize the distance route to travel 10 hotels in New york city. The total distance can be calculated by sum all of the distance between each hotel.In order to calculate the total distance between the hotel by using latitude and longitude The haversine formula have been used as shown in the following equation.

d - Distance between to hotel i and hotel j

r - Earth radius

- Destination latitude

- Starting latitude

- Destination longitude

- Starting longitude

**2.2.1 Minimize First Trip Distance**

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**2.2.2 Minimize Second Trip Distance**

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**2.2.3 Weight Sum Method**

In This study

**2.3 Decision Variable**

**2.4 Contraints**

In this problem doesn’t have any contraints