CS 564 Computational Geometry Project
Proposal:
Forecasting Top-k Taxi Demand Hot Spots for Profit Maximization
Arda Unal
February 28, 2016

Abstract
It is not always an easy task for an inexperienced taxi driver to select their next waiting spot for the new passengers. Due to the dynamics of the traffic and the complex road network of big cities, even the experienced taxi drivers might not be able to select the most profitable waiting spots. Some might prefer to return to their taxi stands whereas some prefer to cruise around downtown. One might be more profitable than the other given the time and the distance to taxi stand or downtown from the last drop off location. In this paper, I propose a solution to find the top-k hot spots which maximizes taxi drivers’ profits using large-scale taxi trip records clustering the pick up and drop off points with farthest point Voronoi Diagrams. I will implement the system using historical data set of 2009-2015 taxi trips in NYC obtained from New York City Taxi & Limousine Commission website.

1 Introduction

The basic Voronoi diagram describes the areas that are nearest to a set of given points. Furthest point Voronoi diagrams on the other hand are the opposite of Voronoi diagrams. These identify the areas which have the greatest distance from the given points.

Since the data set has the drop off and pick up locations for each taxi trip, after clustering these points with farthest point Voronoi diagrams we can assign a score to the hot spots depending on number of trips originated from that hot spot and end up in the farthest region. This would imply that we could pick the trips with highest income since they would be the longest trips originated from that hot spot.