

INFORMATICS INSTITUTE OF TECHNOLOGY

In collaboration with

UNIVERSITY OF WESTMINSTER

BSc/BSc (Hons) in Computer Science specializing in Web and Mobile
Applications

Final Year Project 2018/2019

“TaxiMate”

Taxi Demand Prediction using
Time Series Forecasting

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Abstract

Taxis are one of the most famous modes of public transportation since the 17th century. With the rapid development of technology and lifestyle, the demand for taxi services has only grown higher over the years. To ensure efficient functionality and profitability, it is important for taxi drivers to have a basic understanding about the future taxi demand in different cities. Usually this understanding is achieved with experience, but it is time consuming and not a very reliable process. The absence of methods to identify this is a large problem in this domain. Previous researchers have attempted to use different approaches such as long short-term memory, gradient boosting techniques and autoregressive moving average models to predict the future demand for taxis.

This study proposes a solution for this problem by predicting the future taxi demand of a city using a new forecasting algorithm known as Facebook Prophet. Taxi demand has a high variance and many independent variables such as weather, holidays and time of the day have a direct impact on its value. These variables in combination with historic taxi data was used to calculate the future taxi demand using Prophet. Results showed that Prophet was able to provide the fastest output with the lowest error percentage from the tested algorithms ARIMA, SARIMA and VAR. Based on these results, the TaxiMate web application was developed to allow taxi drivers to input a date and a location to identify the future taxi demand with ease.

Keywords: Taxi, Demand Forecasting, Time series forecasting, Facebook Prophet