Predicting parking features with Foursquare

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1. Introduction

1.1 Background

Parking is a big issue nowadays and better understanding its complex structure and functioning is crucial for cities and its residents. Parking rates and availability are the first things that come to mind for most car drivers within the cities. Does the city authorities charge adequate price for parking in different locations? Is the price policy corresponds to this specific area? From the other side government needs to understand how to manage parking lots to keep balance between different areas and its parking rates. This is a multi million dollar industry that can be improved by analysis of real situation within different city areas.

1.2 Problem

Clearly, that downtown areas are most expensive and busy during working hours but are there any correlations between parking availability or rates and parking surroundings? To find out how different types of venues influence on parking we will combine Foursquare data and open sources parking data in San Francisco, CA.

1.3 Interests

This research can help city authorities to improve parking infrastructure in areas which are suffering from cars overloading and it can be useful for global commercial apps such as Parkopedia to predict parking availability for their customers.

2 . Data description

2.1 Data collection

San Francisco publishes data about their parking meters and transactions as open data. The data is made up of several sets:

Meters Inventory – contains data about parking meters more relevant information: geospatial, ID, city zone, parking space type.

Parking meters transactions – contains data about transactions amount, date and time, payment method.

Parking meters operating schedule – operating schedules and time limits for all parking meters.

Foursquare data will be retrieved by API.

Foursquare – contain information about venues in given areas.

2.2 Data description

Parking Meters Inventory:

Column	Description
PostID	Parking meter unique ID
Zone	City zone
Longitude	Coordinates
Latitude	Coordinates
SpaceType	Parking meter category
OnOffStreetType	Parking space type

Parking Meters Transactions:

Column	Description
POST_ID	Parking meter unique ID
PAYMENT_TYPE	Method of payment
SESSION_START_DT	Transaction start date and time
SESSION_END_DT	Transaction end date and time
GROSS_PAID_AMT	Transaction amount

Parking meters operating schedule:

Column	Description
Post ID	Parking meter unique ID
From Time	Schedule start time
To Time	Schedule end time
Time Limit	Time limits applied

Foursquare API:
We can retrieve data about venues in given radius, to reduce number of data request to Foursquare API parking meters will be clastered and centroids of those clasters would become geospatial data for API query.

Above datasets provide enough data to explore parking infrastructure in San Francisco and dependences between parking rates and different venues in certain city areas, find outliers and predict parking availability.