



The Data Incubator Project

# Building Permits Analysis

Jiayuan Guo

University of Washington

Aug. 7<sup>th</sup>, 2017

# Motivation & Data

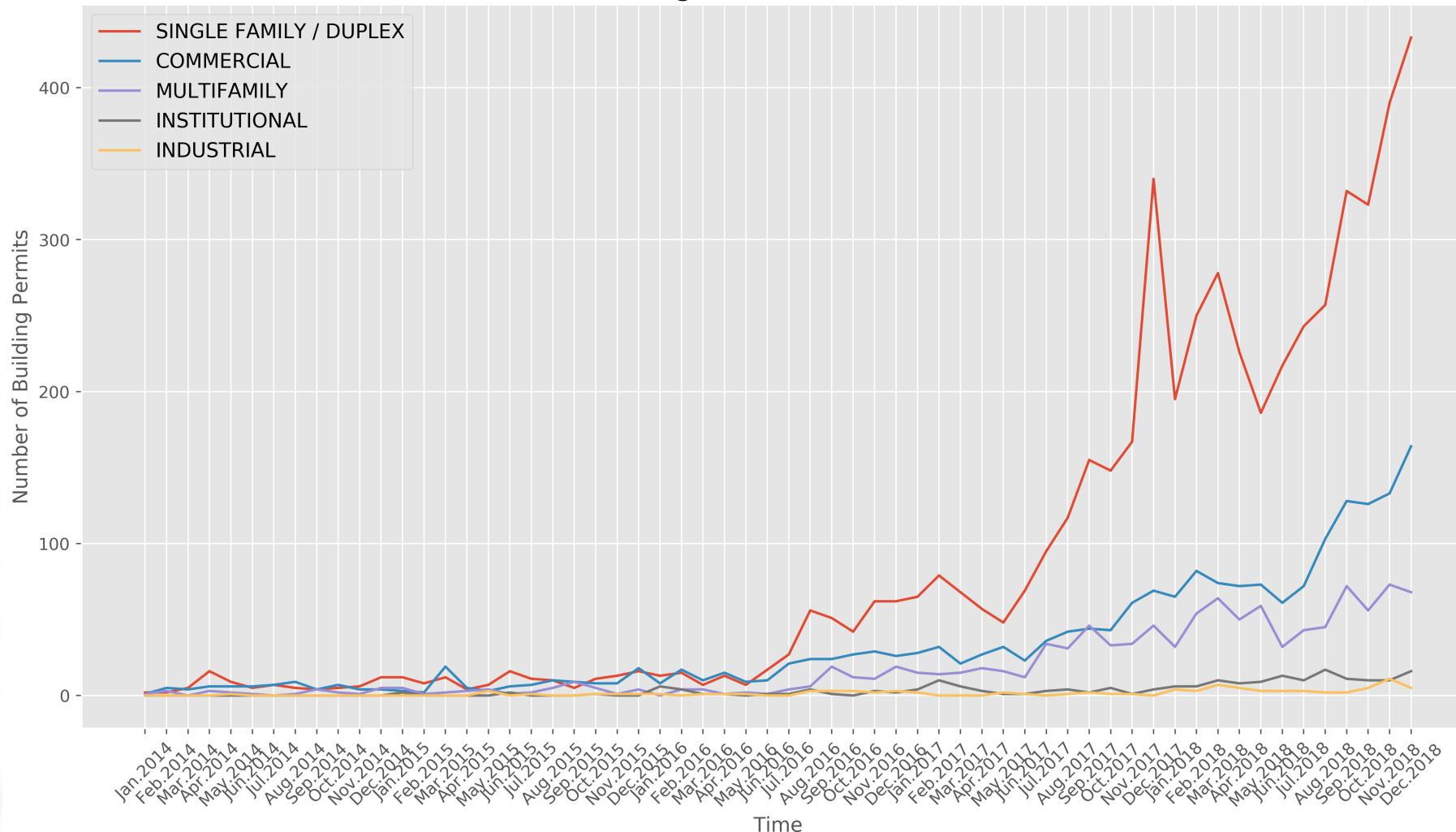
- Building permits data
  - Providing an estimate on the number of buildings planning to be constructed
  - Offering insight for regional economic conditions and potential opportunities
- Data Description:
  - Building Permits Data
    - 2012 – 2017, Seattle
    - Categories: Commercial, Industrial, Institutional, Multifamily, and Single Family / Duplex
  - Commercial Building Licenses Data
    - 2012 – 2017, Seattle
    - Mainly Groceries & Convenience Stores for following commercial prediction

# Analysis & Goals

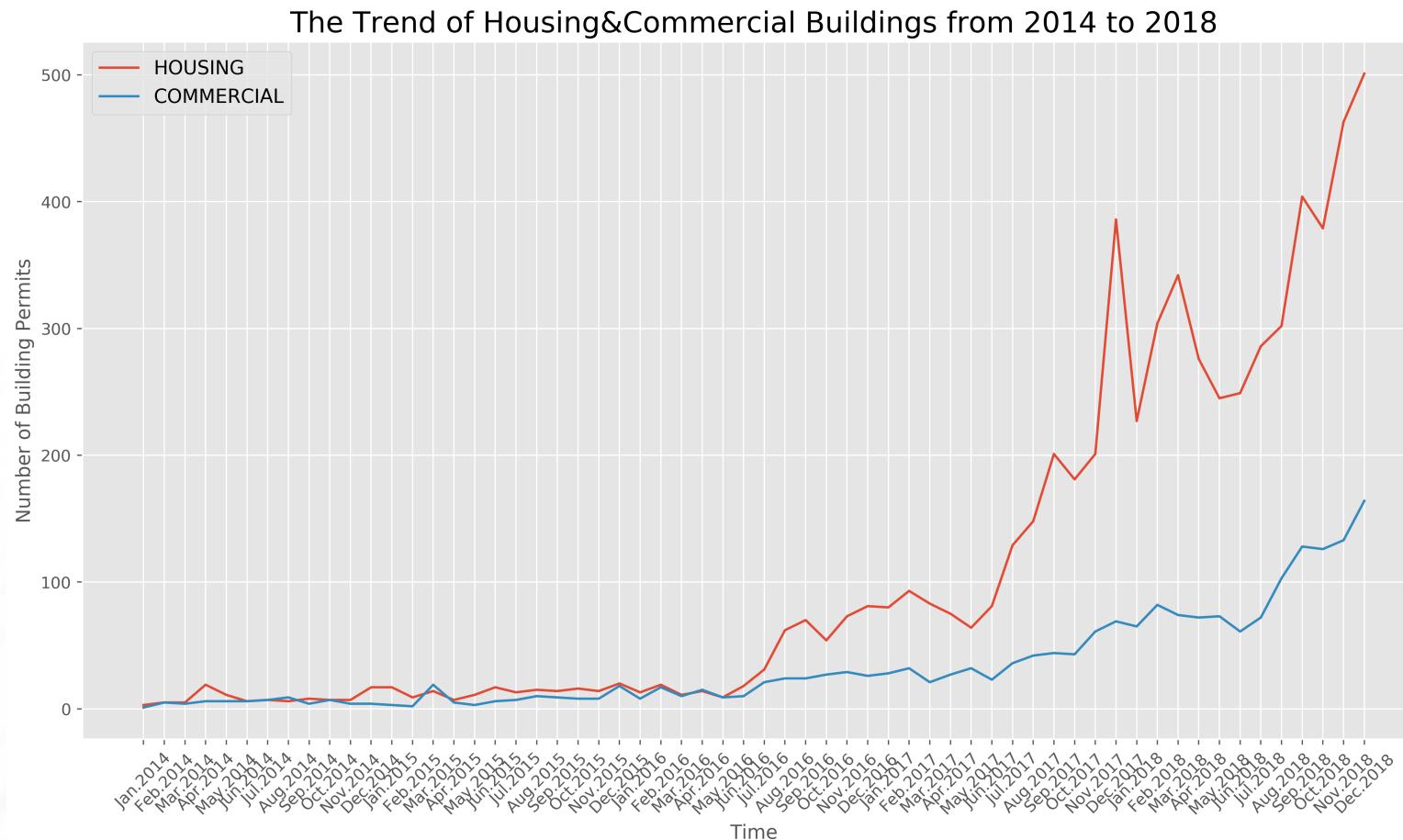
- Analysis
    - Temporal analysis
    - Regional analysis
  - Goals:
    - Finding potential relationship between business factors
    - Predicting business activities, eg. Groceries and convenience stores arrangements, roadwork planning
- } Find specific pattern of building permits data

# Temporal Analysis

The Trend of Building Construction from 2014 to 2018



# Temporal Analysis

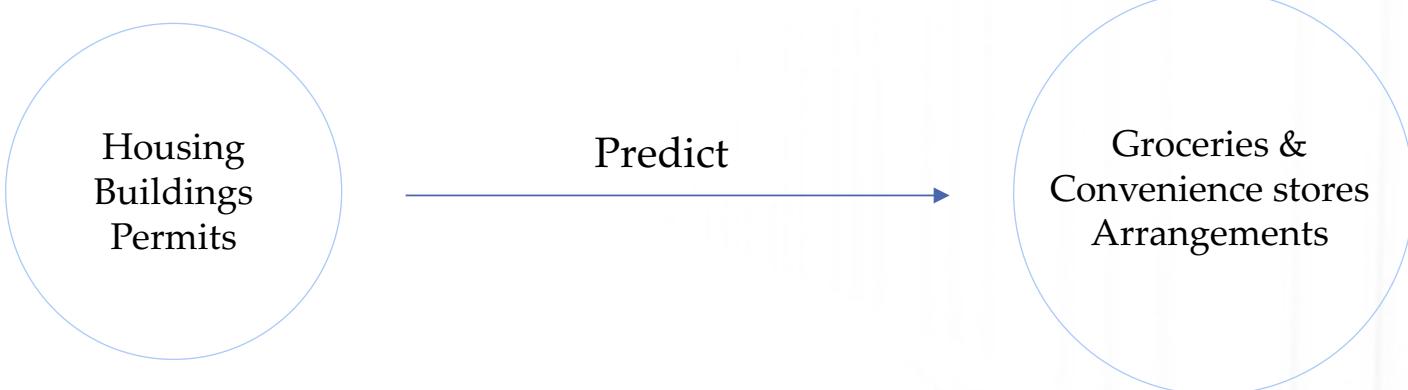


Pearson's correlation coefficient = 0.97;

P\_value = 3.9e-37,  
much less than 0.01

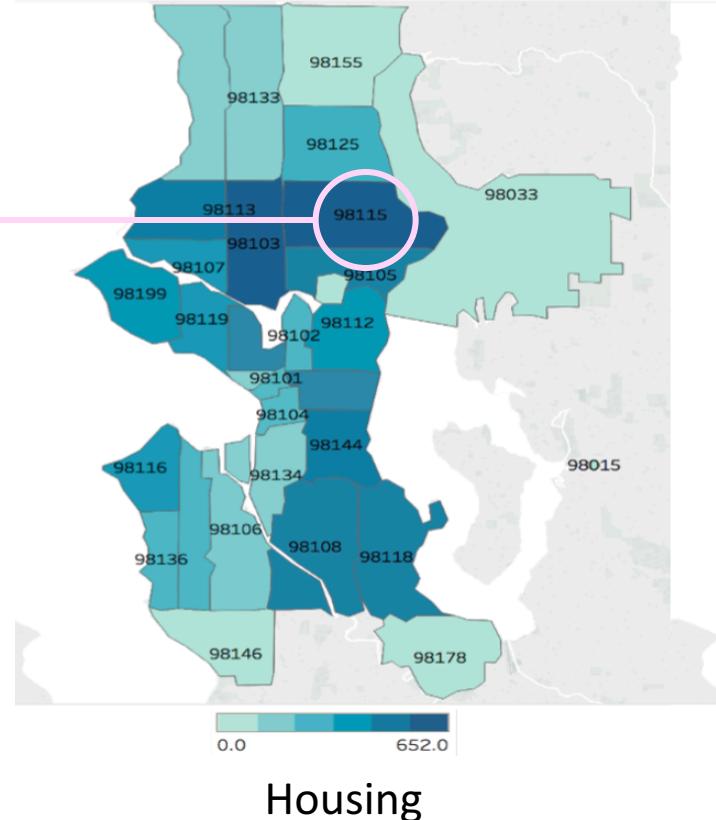
From the temporal analysis above, the trend of housing buildings and commercial buildings have a significant correlation.

## Let's take a small step...



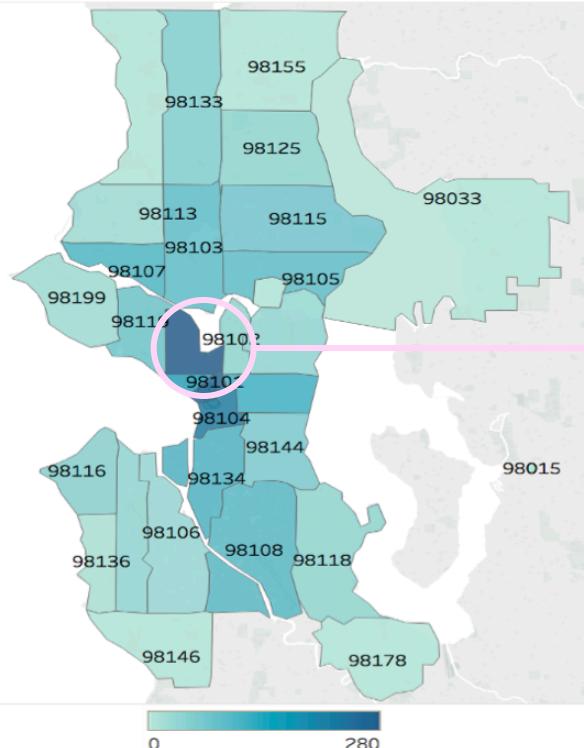
# Regional Analysis

Zip code: 98115



Housing

Zip code: 98109



Commercial

Find two areas that have strong potential for housing and commercial building construction as examples for following analysis.

# Regional Analysis

**Assumption:** The construction of housing buildings have great influence on the the construction of neighboring commercial buildings **in a certain period.**

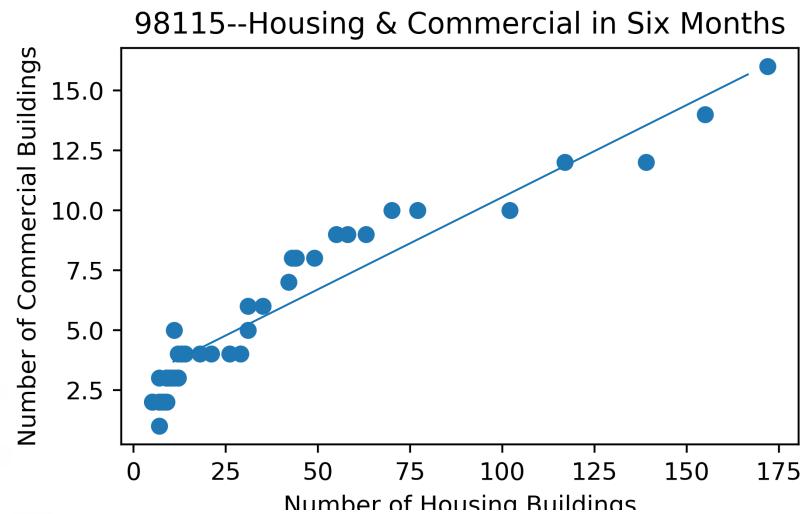
**Table. 1 T-test Results in different period**

Zip Code		3 Months	6 Months	9 Months	12 Months
98115	T-statistic	4.94	5.39	5.79	6.19
	P-value	2.58e-6	3.66e-7	5.88e-8	8.91e-9
98109	T-statistic	3.65	5.97	5.49	4.43
	P-value	0.0093	7.02e-5	2.38e-5	8.23e-4

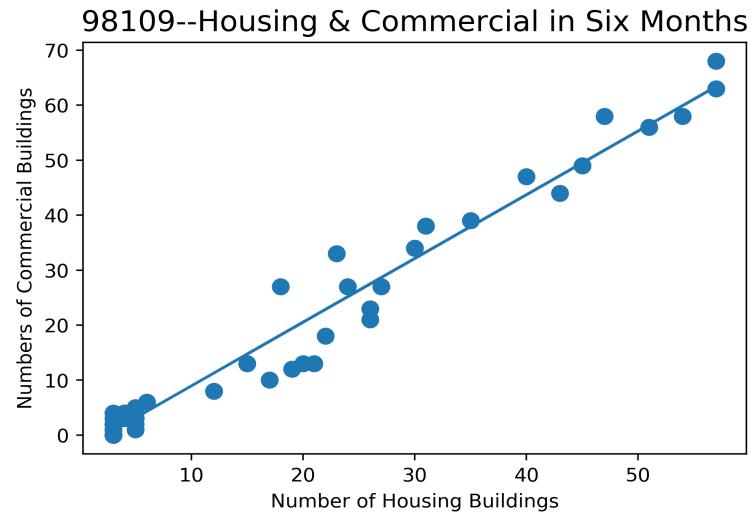
The construction of housing buildings and neighboring groceries & convenience stores **in the following 6 months** have a significant correlation.

# Regional Analysis

**Assumption:** The construction of housing buildings have great influence on the the construction of neighboring commercial buildings **in the following six months.**



$$R^2 = 0.8781$$



$$R^2 = 0.9654$$

# Future Work

- Evaluating more data source to improve the accuracy of prediction model
- Adding more factors into building permits model
  - Location: Residential Areas & Business Area
  - Type and Number of existing markets: Supermarkets or Small convenience store
  - Issue periods for different permit types
- Building a website to show regional business opportunities and offer suggestions on business activities based on existing building permits data and regional information

# Thank You!