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Think Forward

A Framework for Quantifying Airbnb Supply, Occupancy Rates and Travel Purpose

presented to

SCAG Modeling Task Force

presented by

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March 29th of 2018

Background

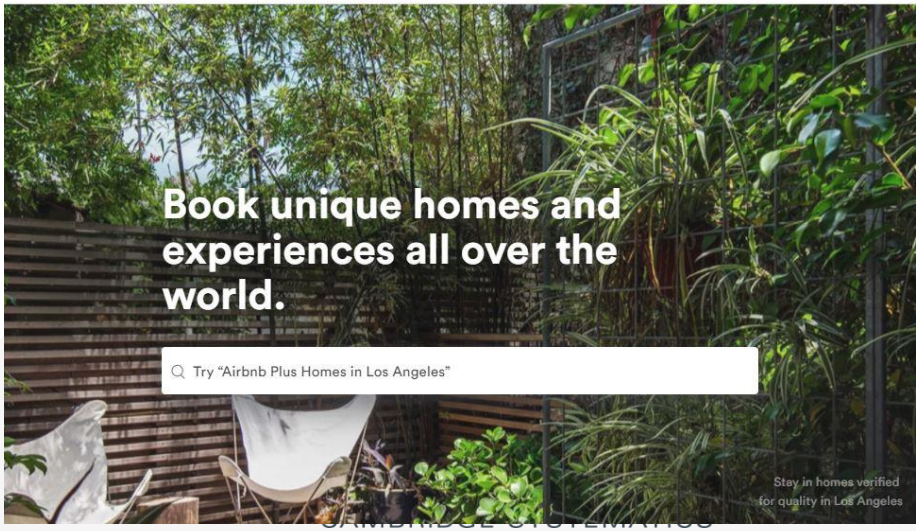
- TRB Paper **18-05542**
  - A Framework for Quantifying Airbnb Supply, Occupancy Rates and Travel Purpose to Support Visitor Modeling
- Authors
  - Chao Wang, Anurag Komanduri, Krishnan Viswanathan, Thomas Rossi and Ronald West

Motivations

- Issues with the existing hotel data
  - Usually obtained from establishment-based databases
  - Often suffer from missing information about number of rooms and room occupancy
- New trends
  - Home-rental services such as Airbnb have continued to grow
  - They have been largely ignored in visitor models

Objectives

- Identify new data sources
- Develop a framework of using Airbnb data for visitor modeling
- Quantify the impact of Airbnb on the transportation system



Hotel Data

- New data sources
  - » Employing web-scraping tools on various hotel aggregation sites
  - » Utilizing data from an application program interface (API) generated by a host of travel websites
  - » and so on...

Hotel Data

Hotel Data

- Information Contained in the New Data Sources
  - Number of rooms
  - Hotel geographical information
  - Star-based rating
  - Pricing
  - Availability of rooms
  - Any other publicly available information

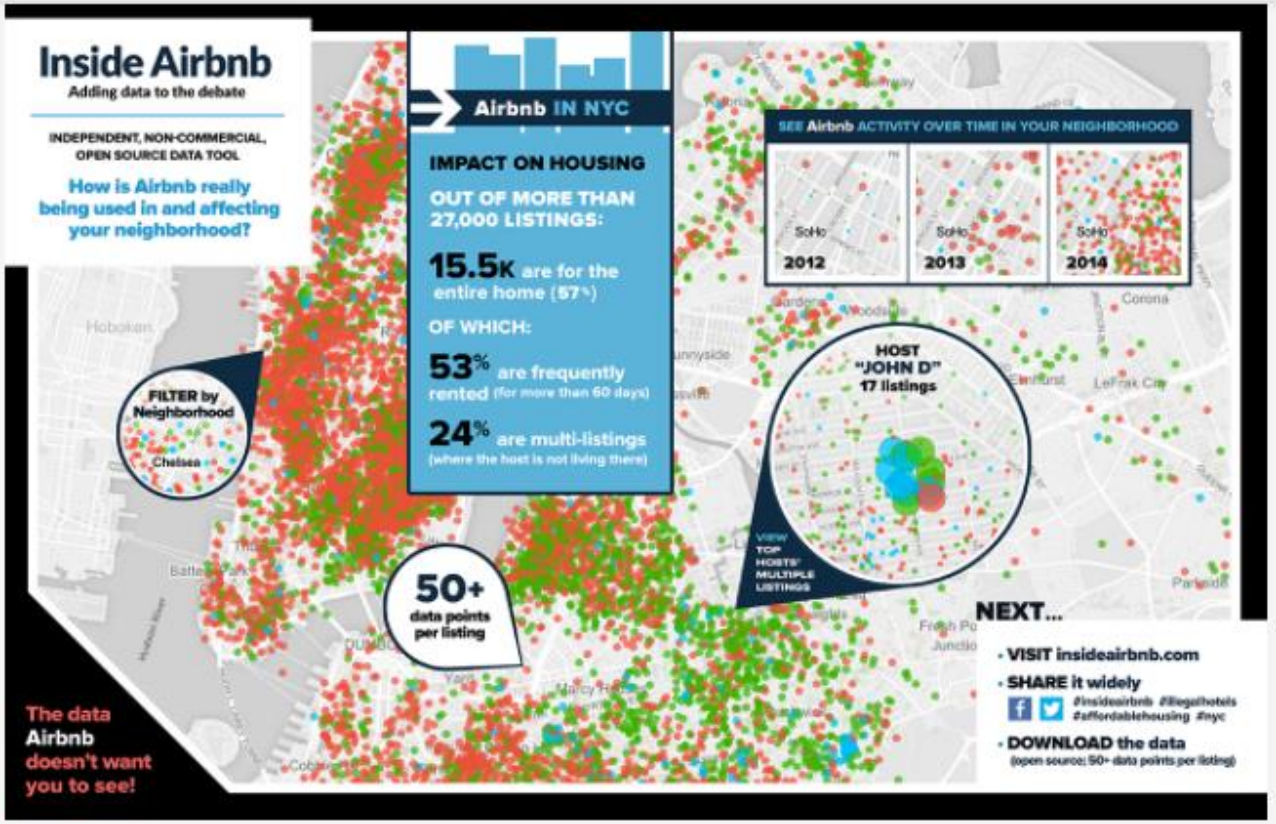
Airbnb Data

Airbnb Data

- Insideairbnb.com

Inside Airbnb
Adding data to the debate

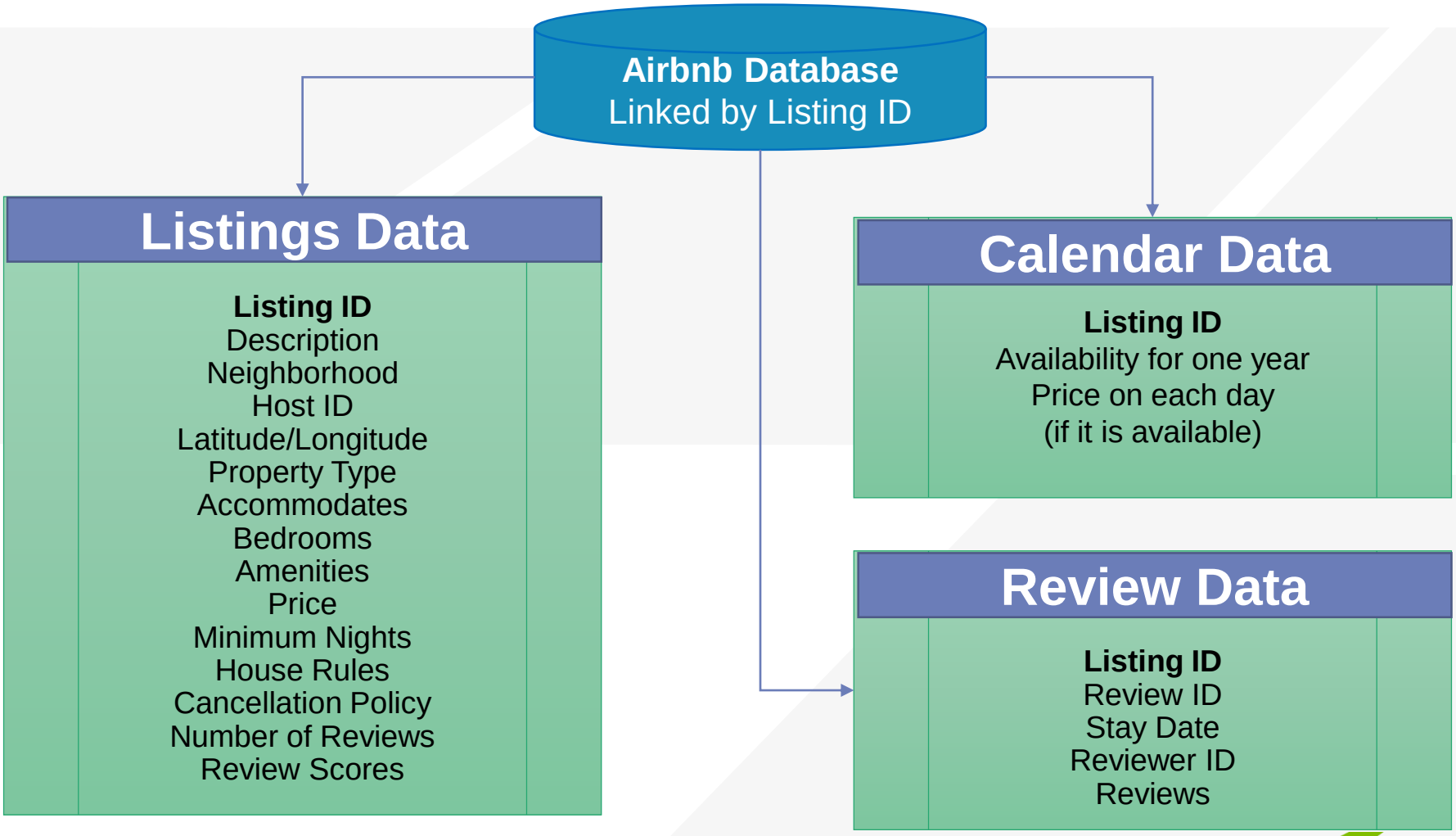
About Behind Get the Data



Airbnb Data Overview

- Insideairbnb.com
  - Independent, non-commercial web-site
  - Compiled public information from the Airbnb web-site
  - Locations are anonymized (up to 450 feet from the actual address)
  - Provided a snapshot of listings
  - Three types of data
    - Listings
    - Availability calendar for 365 days in the future
    - User reviews for each listing

Information in the Airbnb Data

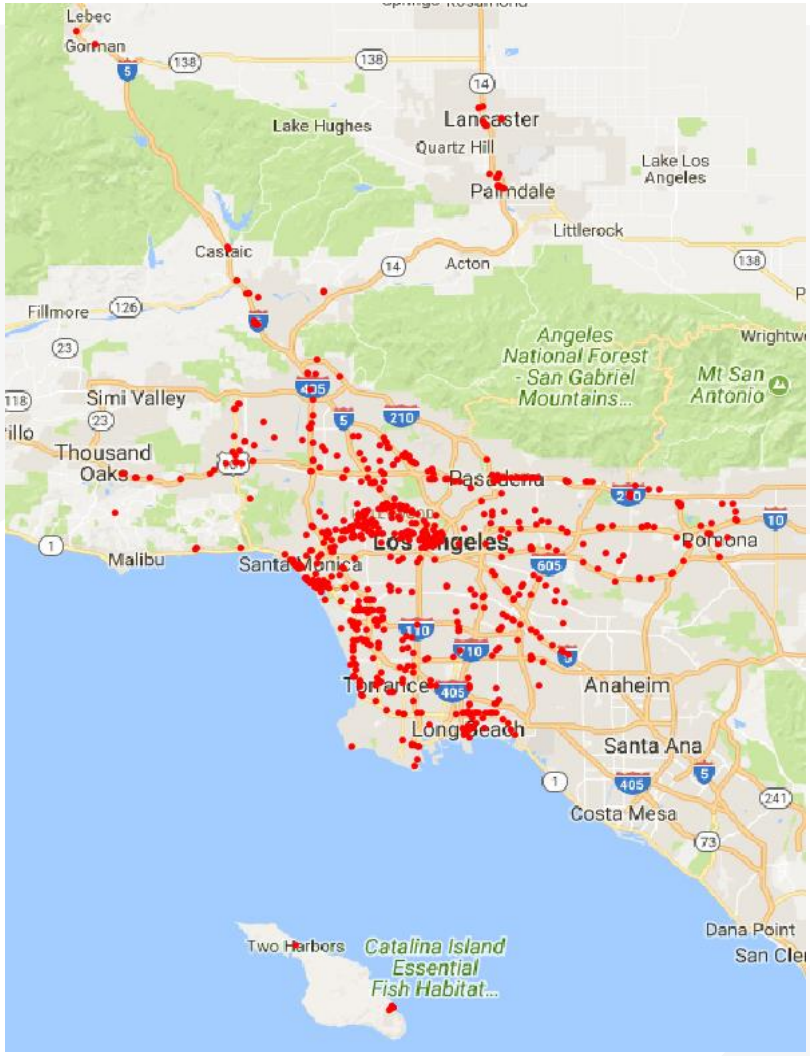


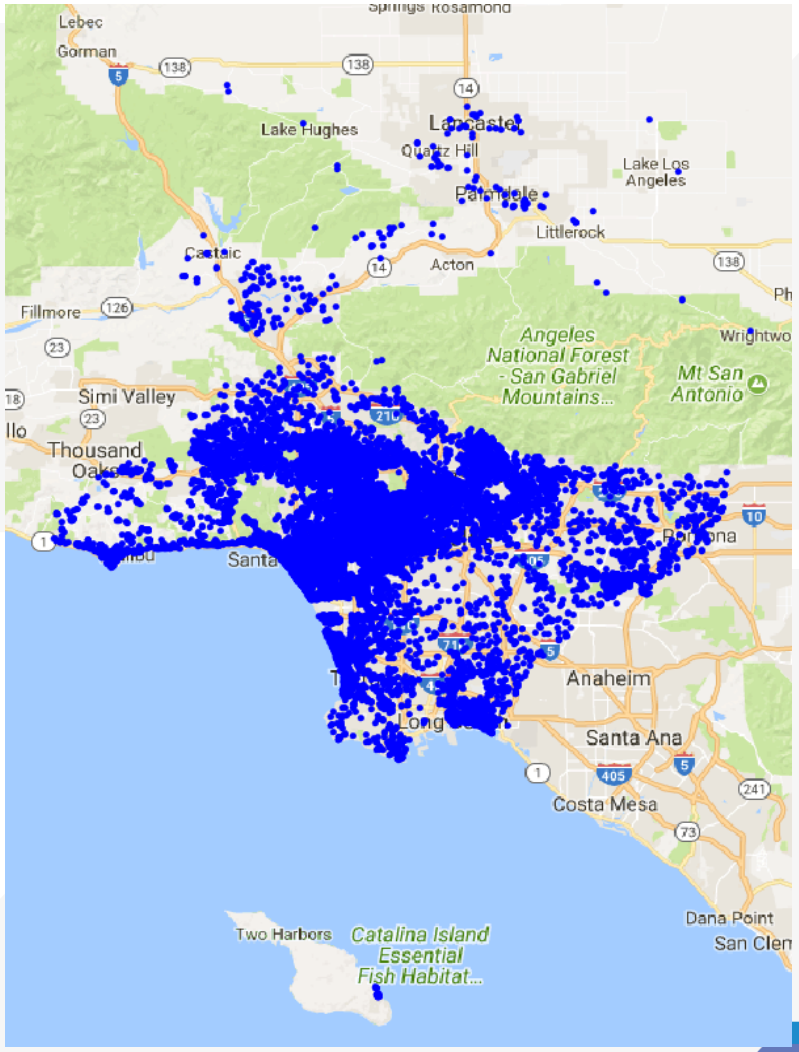
Data used for the Analysis

- **Hotel Data**
  - A detailed database of hotel rooms in *Los Angeles County* as of March 2017

- **Airbnb Data**
  - Four months' worth of data for *Los Angeles County* (August 2016, March 2017, April 2017 and May 2017)

Comparison of Hotel vs. Airbnb



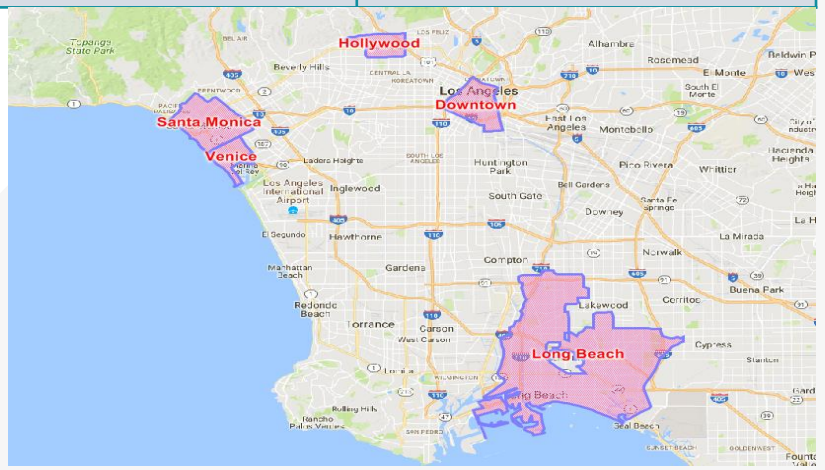


Comparison of Hotel vs. Airbnb

	Hotel	Airbnb			
	All Hotels	Entire Home/Apt	Private Room	Shared Room	All Listings
Number of properties	740	17,995	11,623	1,635	31,253
Number of bedrooms	80,460	28,664	11,849	1,635	42,148
Accommodates	241,380	79,493	24,159	3,413	107,065
Accommodates per room	3	2.77	2.04	2.09	2.54
Average rate	$223	$252	$87	$58	$180
Minimum duration of stay	1 day	3.75 days	2.50 days	2.15 days	3.20 days

Top Five Airbnb Neighborhoods

Neighborhood	Number of Airbnb Rooms	Number of Hotel Rooms	Difference
Venice	2,939	449	2,490
Hollywood	2,220	2,304	-84
Long Beach	1,360	5,494	-4,134
Santa Monica	1,190	2,469	-1,279
Downtown	982	6,902	-5,920



Study Framework

Listings Data	Quantifying Airbnb Supplies
Calendar Data	Measuring Occupancy Rates
Review Data	Capturing Travel Purposes

Study Framework

Listings Data | Quantifying Airbnb Supplies

Quantifying Airbnb Supplies

- **Listings data** contain Airbnb supply information such as **property type**, **number of rooms**, etc.
- Property **latitude and longitude** can be used to summarize Airbnb supply at any given geographic level, such as at a TAZ level

Study Framework

Calendar Data | Measuring Occupancy Rates

Measuring Occupancy Rates

- **Calendar data** provide property availability for 365 days in the future—however, they **do not differentiate** between **a booked night versus an unavailable night** (listing is off the market)
- An approach is proposed to measure occupancy

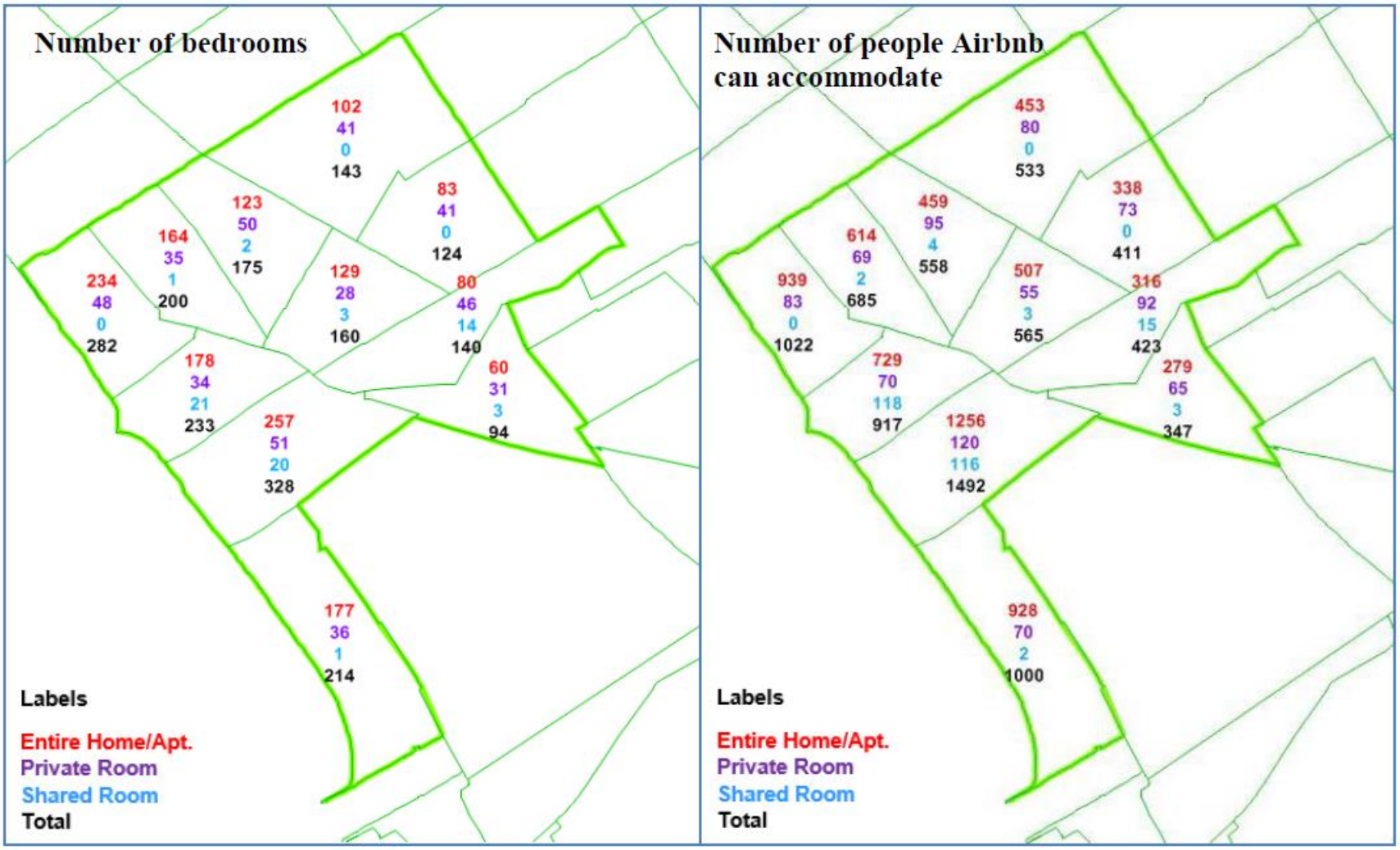
Study Framework

Review Data	Capturing Travel Purposes

Capturing Travel Purposes

- **Review data** are the reviews of the Airbnb listings by Airbnb customers
- **Text mining** technique is used to analyze customer reviews to **segment business and non-business visitors**

Quantifying Airbnb Supplies



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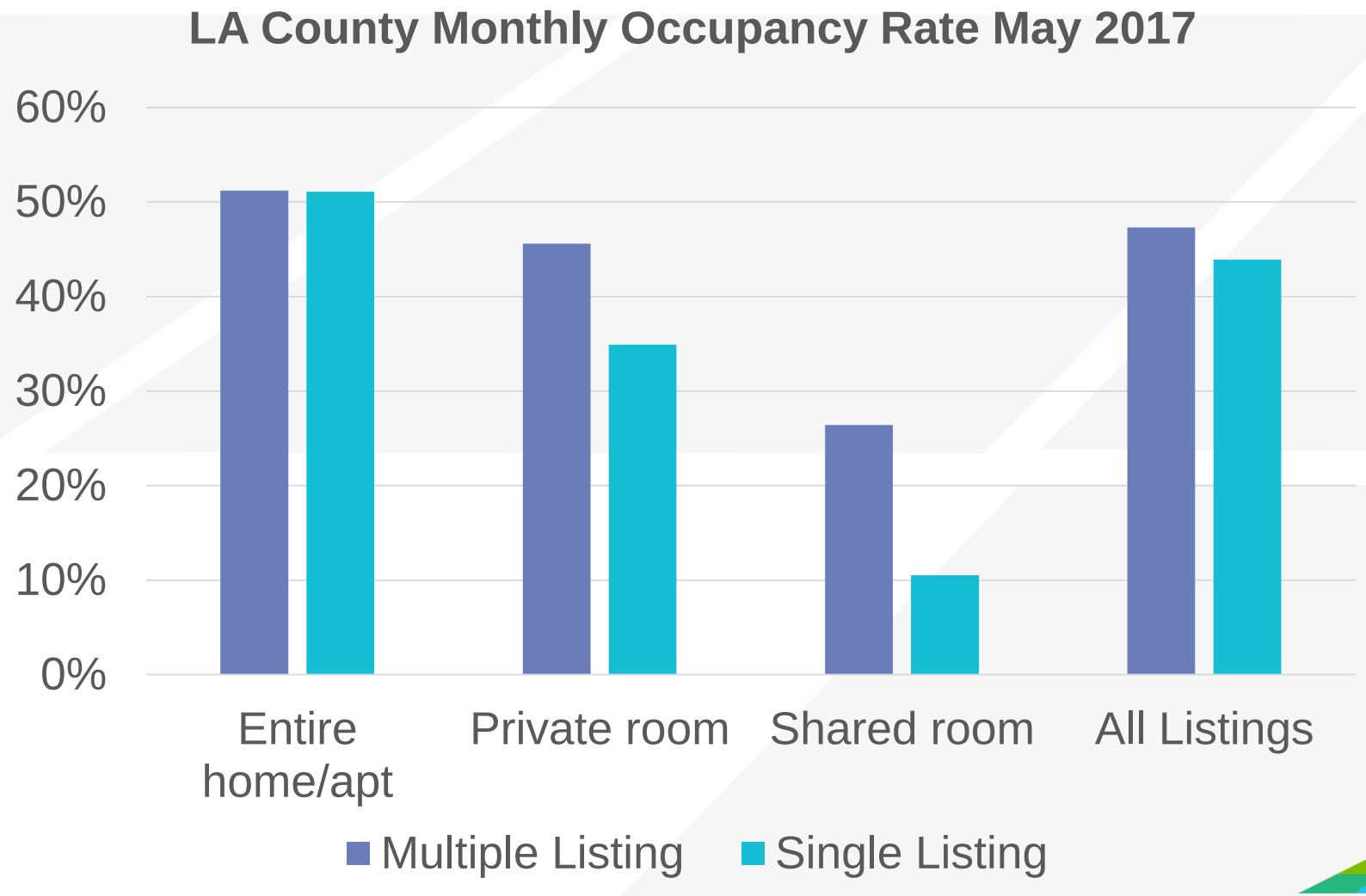
Measuring Occupancy Rates

- Calculated as

$$\frac{\text{the number of days that a listing is booked}}{\text{the number of days that this listing is on the market}}$$

- Hosts with multiple listings leave their listings on the market at all times
- Hosts with a single listing take their properties off the market periodically—old calendar data are used to determine whether a listing is booked or simply off the market

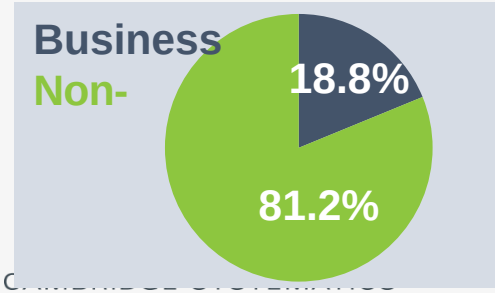
Measuring Occupancy Rates



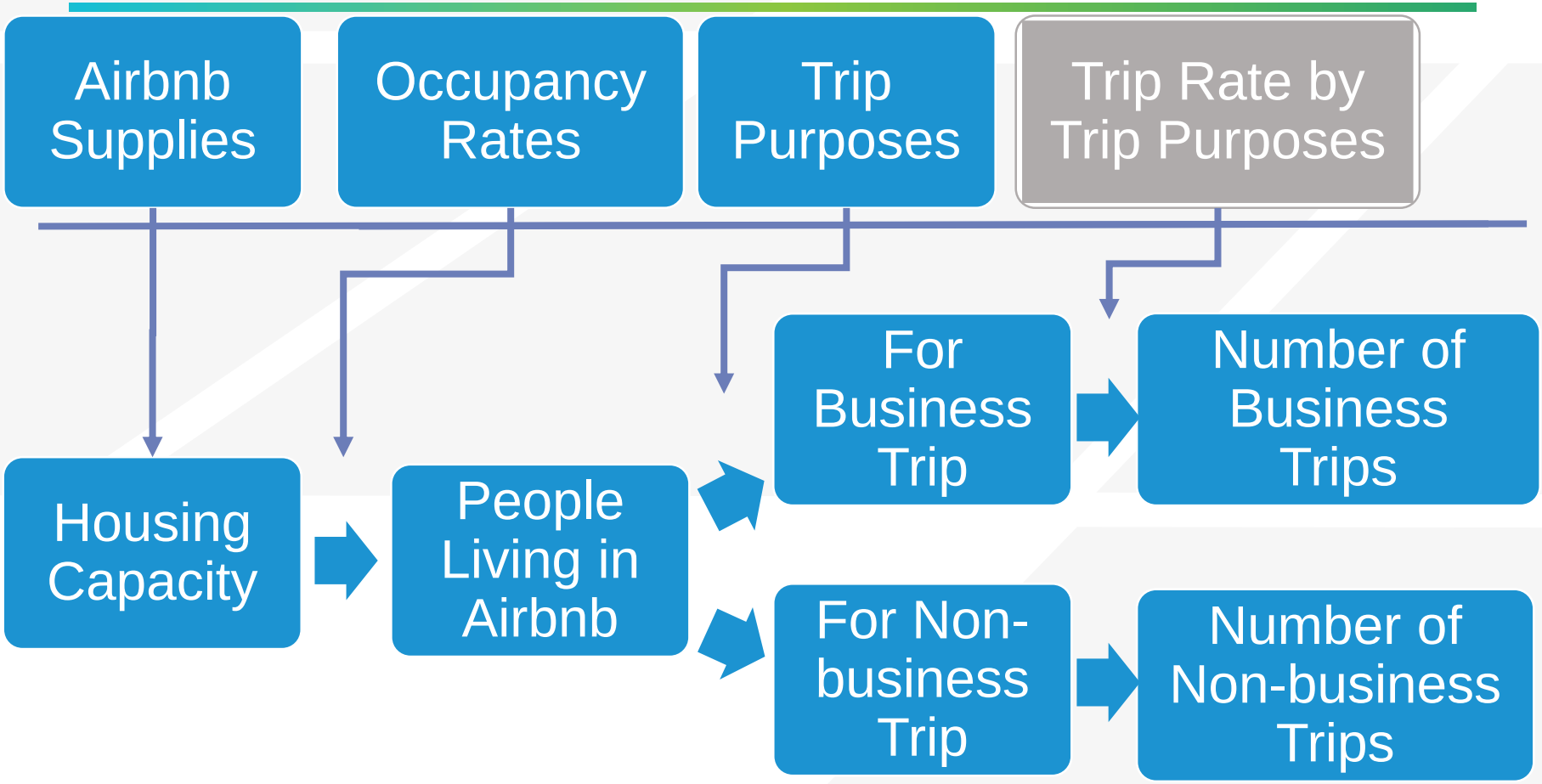
Capturing Travel Purposes (Text Mining)

- Business travel (20%)
  - business trip
  - work trip
  - went for work
  - went for business
  - close to work

- Leisure travel (80%)
  - pleasure trip
  - vacation
  - with family
  - with children/grandchildren
  - grandparents
  - with friends
  - with my partner/ my boyfriend/my girlfriend
  - with my wife/my husband



Impacts of Airbnb Visitors



Trip Rate by Trip Purposes

- San Diego Visitor Survey
  - business visitor: 3.17 trips per person
  - non-business visitor: 2.73 trips per person

Trips Generated in the Top 5 Airbnb Neighborhoods in LA

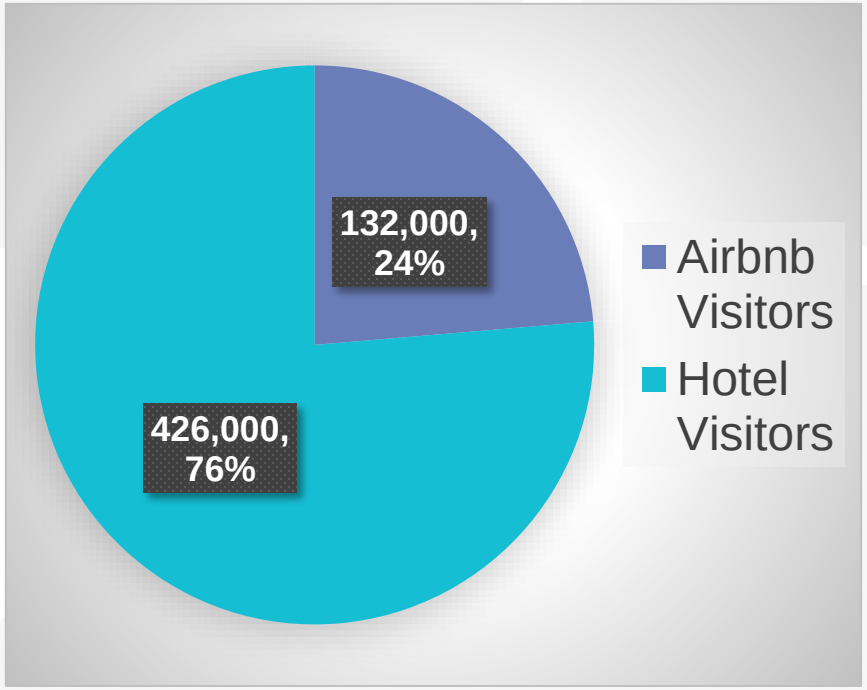
Neighborhood	Single-Listing Properties		Multi-Listing Properties	
	Accommodates	Occupancy Rate	Accommodates	Occupancy Rate
Venice	3,264	63%	4,663	63%
Hollywood	2,377	50%	4,247	61%
Long Beach	1,921	54%	1,551	59%
Santa Monica	1,680	57%	1,288	62%
Downtown	1,664	64%	1,940	68%
Summary	**10,906**		**13,689**	

Trips Generated in the Top 5 Airbnb Neighborhoods in LA

Neighborhood	Business Visitors	Non-Business Visitors	Trips
Venice	937	4,046	14,026
Hollywood	710	3,066	10,630
Long Beach	367	1,585	5,494
Santa Monica	331	1,430	4,956
Downtown	449	1,938	6,718
Summary	**2,794**	**12,065**	**41,824**

Summary

- There are 47,000 Airbnb users in the LA County
- They make 132,000 trips per day
- Airbnb visitors make 24 percent of total visitor trips in the LA County
- This growing market of travelers should not be ignored



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Questions?

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