



# **DSO 597: Data Driven Real Estate to Maximize ROI**



# HELLO!

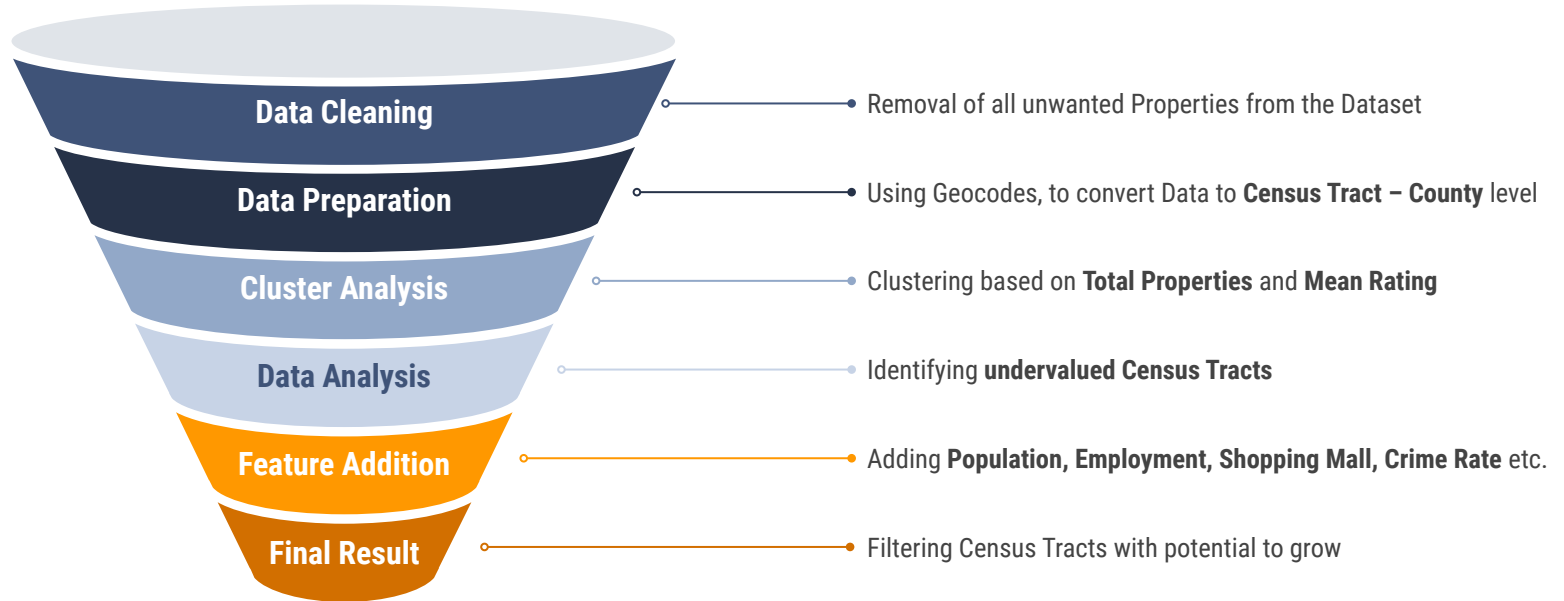
## We are **Team 4**

Abhinav Chadha  
Vivian Kong  
Shruthi Nair

Shree Vidya  
Hemanth  
Yuqi Zhang



# Analysis Funnel





## Data Cleaning and Preparation

1. Selected Properties which are:
  - a. Completed
  - b. Not a Student/Military/Age Restricted housing
  - c. Have complete Rent, SQFT, Submarket and IMP/LOC Rating
2. Using **censusgeocode library**, we identify the **Census Tracts** for Properties based on their Latitude and Longitude



## Cluster Analysis

1. For each Unique **Census Tract - County** pair, we Identify the following features and standardise them:
  - a. Total number of Properties
  - b. Mean Rating =  $(\text{Weighted IMP Rating} + \text{Weighted LOC Rating})/2$
2. Optimal value of 'k' (4) in K-Means Clustering using Elbow Method



## Data Analysis

Identify Census Tracts pair with Mean Property Rent lower than 1 Standard Deviation from their Cluster Mean Rent aggregated on City  
**(undervalued CTs)**



For each City, identify total Census Tracts and Proportion of them undervalued



**Select Census Tracts** of those cities, which have:

1. Total Census Tracts above State Average
2. Proportion of undervalued CTs below 8%



## Numbers and Figures

Steps/Dataset	SouthWest	Western	Florida	South	SouthEast
# of Properties (after Data Cleaning)	6,774	2,675	2,890	3,176	3,578
# of Census Tracts County Pairs	2,827	1,480	1,595	1,460	1,662
# of Undervalued CTs	317	177	194	133	182
# of Selected Undervalued CTs Based on Data Analysis	17	4	6	14	24



## Feature Addition

1. For each Unique **Census Tract - County** pair, we add the following features:
  - a. Population (2019)
  - b. Employment Rate
  - c. Proportion of Population earning above \$25k annually
  - d. # of Public and Private Schools
  - e. Racial Distribution
  - f. Crime Rate
  - g. # of Shopping Malls





## Final Result

1. Based on these 7 features we **compare our selected undervalued CTs** with the rest of Census Tracts in their City and Cluster
2. We handpick out of these CTs, which show an almost similar or better value in these features with the **potential of increasing Rent** to earn more revenue



## Recommendation: Dataset SouthWest

Steps/Dataset	Population (2019)	Employment Rate	Income Data (proportion above \$25k)	Racial Majority	Rent per SQFT (Avg.)	Total Properties
Undervalued CT (23.23 - Travis)	3,905	43%	57%	Race-White 52%	\$1.37	1
Other CTs from same City and Cluster (Austin, TX)	1,206 to 8,375	33% to 58%	36% to 76%	Race-White 32% to 92%	\$1.88	12
Potential Gain from investing in the underperforming Census Tract					\$0.51	1



## Recommendation: Dataset Western

Steps/Dataset	Population (2019)	Employment Rate	Income Data (proportion above \$25k)	Racial Majority	Rent per SQFT (Avg.)	Total Properties
Undervalued CT (21.05 - Washoe)	3,472	84%	72%	Race-White 66%	\$1.39	2
Other CTs from same City and Cluster (Reno, NV)	1,040 to 4,417	70% to 84%	25% to 72%	Race-White 40% to 88%	\$1.77	107
Potential Gain from investing in the underperforming Census Tract					<b>\$0.76</b>	<b>2</b>



## Recommendation: Dataset Florida

Steps/Dataset	Population (2019)	Employment Rate	Income Data (proportion above \$25k)	Racial Majority	Rent per SQFT (Avg.)	Total Properties
Undervalued CT (15 - Leon, FL)	4,620	77%	47%	Race-White 61%	\$0.95	1
Other CTs from same City and Cluster (Tallahassee, FL)	2,180 to 6,330	74% to 79%	42% to 68%	Race-White 55% to 65%	\$1.17	8
Potential Gain from investing in the underperforming Census Tract					\$0.22	1



## Recommendation: Dataset South

Steps/Dataset	Population (2019)	Employment Rate	Income Data (proportion above \$25k)	Racial Majority	Rent per SQFT (Avg.)	Total Properties
Undervalued CT (108.1 - Shelby, TN)	5,931	70%	34%	Race-White 76%	\$0.69	1
Other CTs from same City and Cluster (Memphis, TN)	754 to 8,526	67% to 87%	22% to 66%	Race-White 63% to 98%	\$1.10	13
Potential Gain from investing in the underperforming Census Tract					\$0.41	1



## Recommendation: Dataset SouthEast

Steps/Dataset	Population (2019)	Employment Rate	Income Data (proportion above \$25k)	Racial Majority	Rent per SQFT (Avg.)	Total Properties
Undervalued CT (1306.02 - Clarke, GA)	2,747	62%	36%	Race-White 77%	\$1.13	2
Other CTs from same City and Cluster (Athens, GA)	1,750 to 3,812	30% to 79%	6% to 47%	Race-White 60% to 70%	\$1.54	5
Potential Gain from investing in the underperforming Census Tract					\$0.41	2



# THANKS!

Any questions?