Displaced Voices

Using Data Science Tools for Housing Justice

Project Objectives

- **Primary Goal:** Forecast eviction numbers for 2025 to enable proactive budgeting
- **Target:** Assist Arizona government in allocating rental assistance funds efficiently
- **Approach:** Three-pronged analysis using 2022-2024 eviction data
- **Impact:** Ensure no household is left behind due to funding shortfalls

Track Members

- **Visualization Track**

  Members: Nhi Nguyen, Devang Singhal

- **Statistical analysis Track**

  Members: Sean Skinner, Leticia Favero Lopes

- **Predictive Modeling Track**

  Members: Sai Roy, Harshini Balamurugan Vadivazhagi,

  Rati Tabatadze, Poojitha Nuthalapati, Tylor Vongsenekeo

How each track helps with the project

1

Visualization Analysis - Exploratory data insights through visual patterns

2

Statistical Analysis - Identifying key drivers of eviction risk
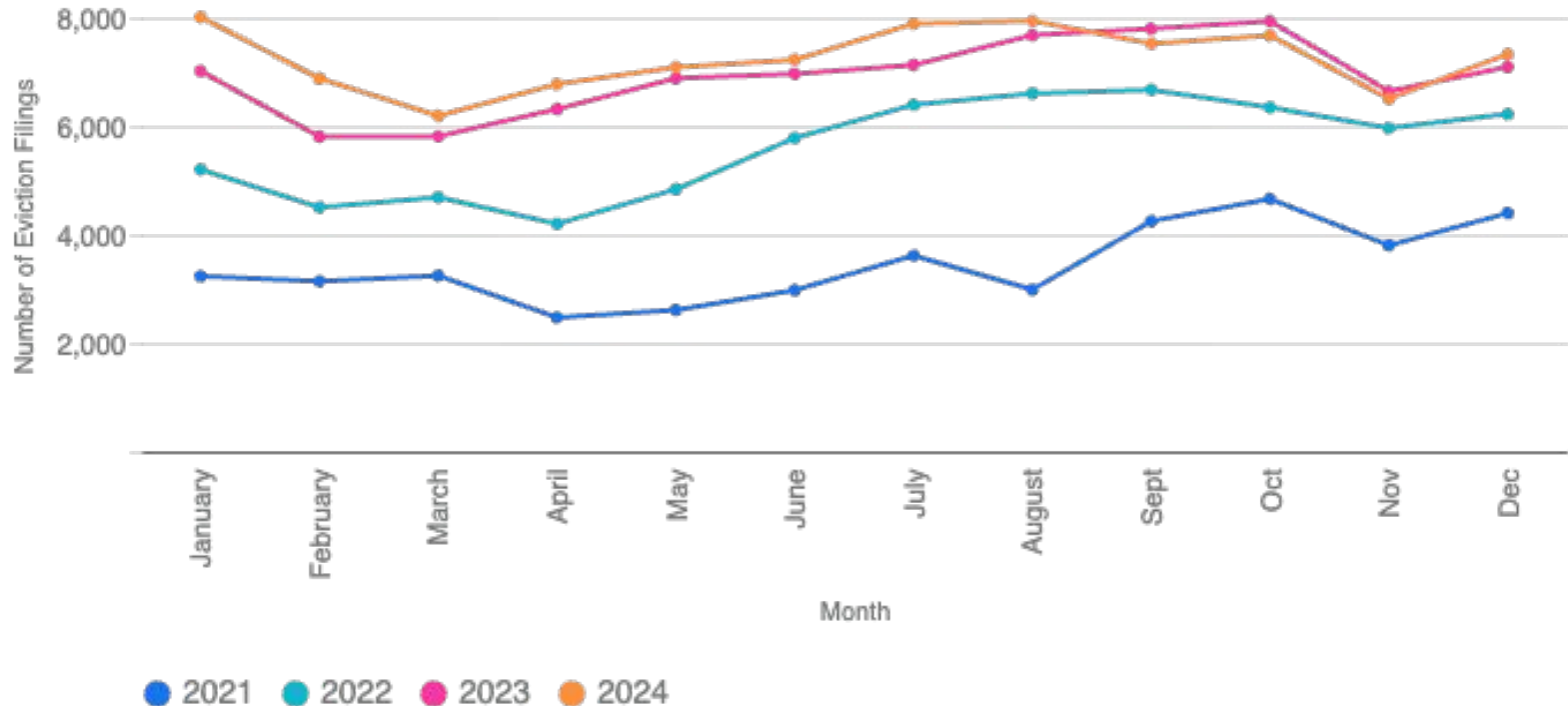
3

Predictive Modeling - Time series forecasting for 2025

Arizona State University

Visualization track

Nhi Nguyen, Devang Singhal

Eviction Filings (2021 - 2024)

Monthly Eviction Filings by Year (2021-2024)

Legend: ● 2021 ● 2022 ● 2023 ● 2024

The Cases With Data and Sealed Cases

9 COURTS HANDLE 47% OF ALL CASES

5,348 Kyrene	5,218 Manistee / 5,065 Moon Valley
	4,681 Country Meadows / 4,442 Maryvale
4,228 Arcadia / 4,000 San Marcos	3,957 Encanto / 3,810 South Mtn

17 other courts
53% of cases
(46,381 cases)
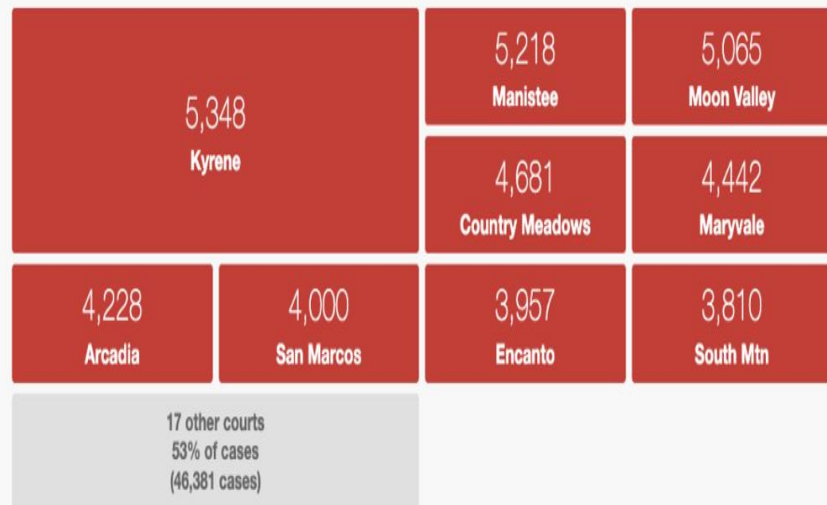
40,749 cases in just 9 courts — extreme volume creates assembly-line justice

THE MISSING CROWD

Each figure = ~871 eviction cases | 34% are sealed with unknown outcomes

66 = Cases with Data (57,704)   34 = Sealed Cases (29,426)

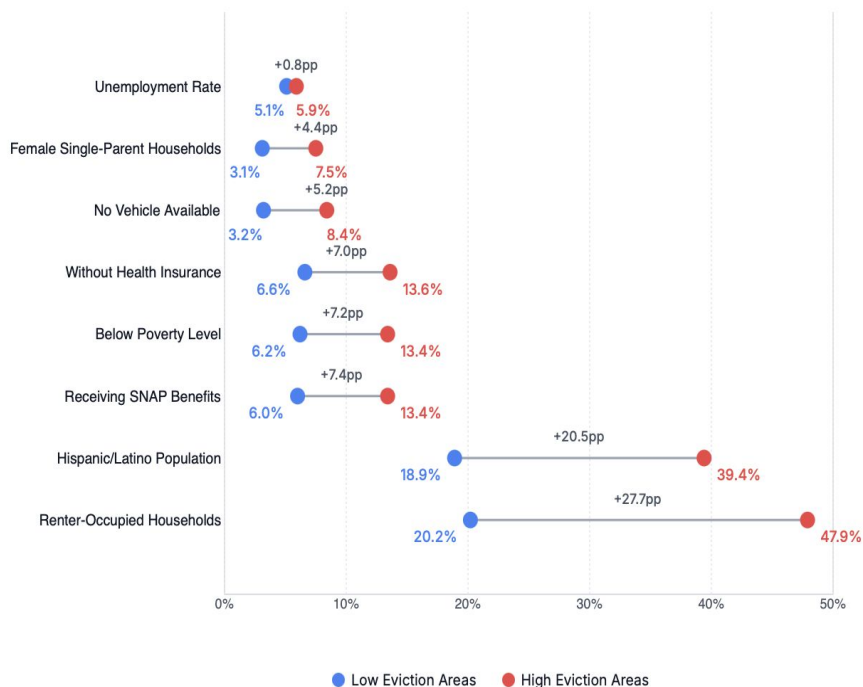Maricopa County Evictions 2024

Courts process: Legal representation and Cases filed

- **94.2 %** of landlords had legal representation.
- **99.8 %** of tenants did not have legal representation.

87,130

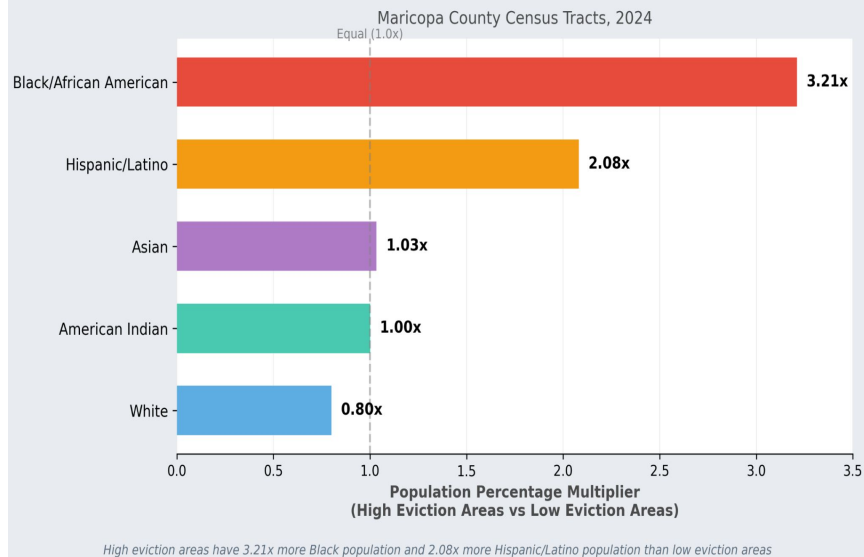Total eviction cases filed in 2024

	87.1K
83.2K	2024
2023	

68.7K			67.5K		
2019	37.7K	41.4K	2022		
	2020	2021			

| 238 | 10 | 1 |
| Cases filed per day | Cases filed per hour | Case every 6 minutes |
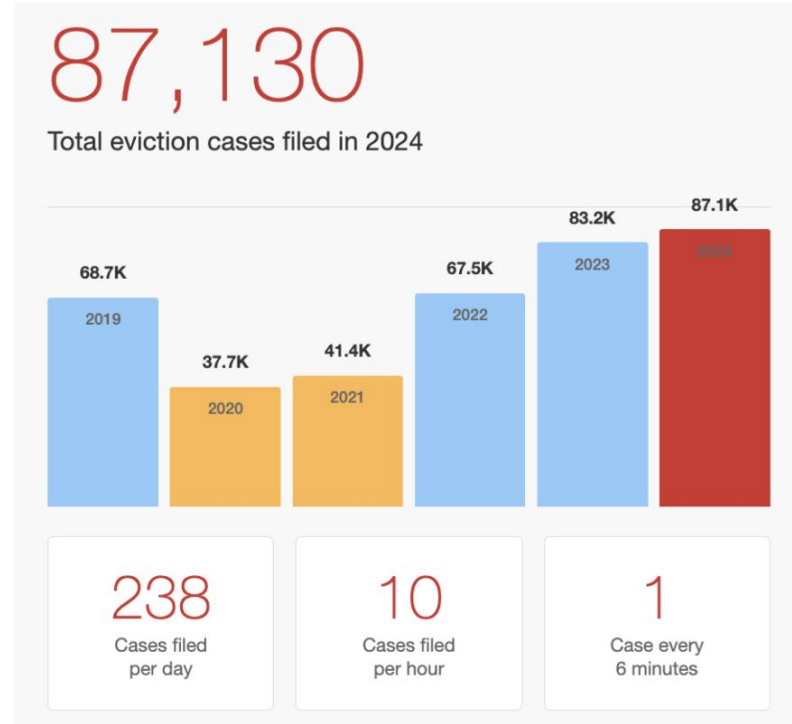
Demographics of the tenants

Demographic Disparity in Eviction Tracts
Comparing Metrics in Low vs. High Eviction Areas

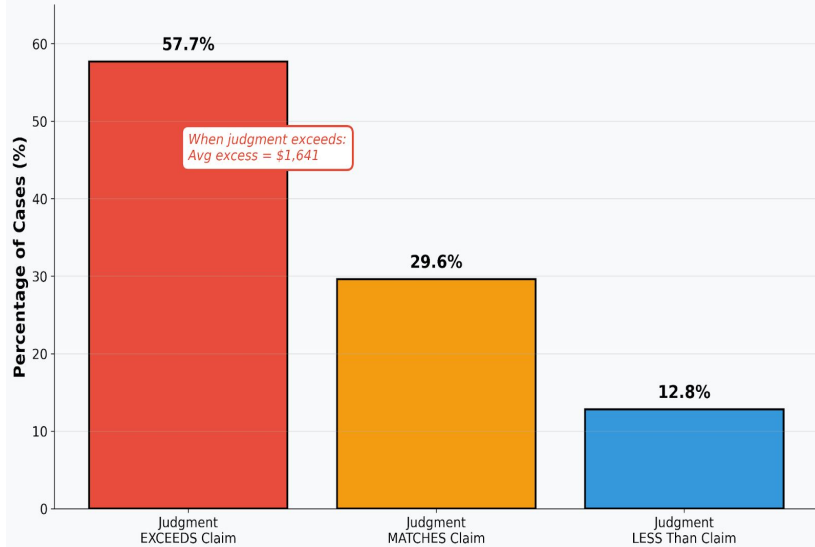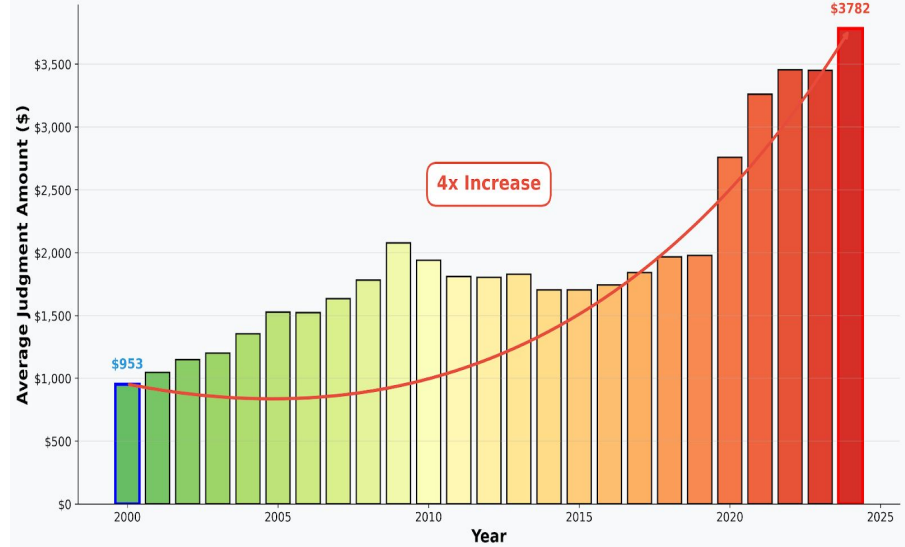| Metric	Low Eviction Areas	High Eviction Areas	Difference
Unemployment Rate	5.1%	5.9%	+0.8pp
Female Single-Parent Households	3.1%	7.5%	+4.4pp
No Vehicle Available	3.2%	8.4%	+5.2pp
Without Health Insurance	6.6%	13.6%	+7.0pp
Below Poverty Level	6.2%	13.4%	+7.2pp
Receiving SNAP Benefits	6.0%	13.4%	+7.4pp
Hispanic/Latino Population	18.9%	39.4%	+20.5pp
Renter-Occupied Households	20.2%	47.9%	+27.7pp

● Low Eviction Areas ● High Eviction Areas

Racial Eviction Disparity Index

Maricopa County Census Tracts, 2024
Equal (1.0x)

Race	Population Percentage Multiplier
Black/African American	3.21x
Hispanic/Latino	2.08x
Asian	1.03x
American Indian	1.00x
White	0.80x

Population Percentage Multiplier
(High Eviction Areas vs Low Eviction Areas)

High eviction areas have 3.21x more Black population and 2.08x more Hispanic/Latino population than low eviction areas

The monetary burden of eviction cases

JUDGMENT INFLATION CRISIS
How Judgments Compare to Claims

When judgment exceeds:
Avg excess = $1,641

57.7% — Judgment EXCEEDS Claim
29.6% — Judgment MATCHES Claim
12.8% — Judgment LESS Than Claim

THE RISING BURDEN
Average Eviction Judgment Over Time

$953 — $3782
4x Increase

Statistical Analysis track

Sean Skinner, Leticia Favero Lopes

Initial Factors

- **Dependent Variable**: Eviction Rate
- **Independent Variables**: Income and
- **Demographics**:
  - Median Income, Median Monthly Cost, Median Gross Rent
  - Racial Percentages
  - Single Male Parent, Single Female Parent, Disability, Below Poverty Line Percentages

First Steps

- Cleaned data to account for missing values
- Removed outlier
  - One region had an eviction rate over ten times the next highest (ZIP code 85008, near Papago Park)
- Generated linear regression, analyzed multicollinearity

Iterative Regression

- Removed ethnic demographic variables due to high levels of multicollinearity
- Performed log transformations on dependent and some independent variables for goodness-of-fit
- Iterated through until best fit found

Final Regression

- Most Statistically Significant Term: Percentage of Single Female Parent Households
- Interpretation: an increase of 1 percentage point in single female parent households corresponds to an increase in the eviction rate by a factor of approximately 5%
- Other variables included:
  - Median Rent (logarithm)
  - Median Income (logarithm)
  - Percentage Below Poverty Level
  - Percentage of Single Male Parent Households
  - Percentage Not US Citizen
  - Median Monthly Housing Cost

Predictive Modeling

Sai Roy, Sudamshu Rao, Harshini Balamurugan Vadivazhagi, Rati Tabatadze, Poojitha Nuthalapati, Tylor Vongsenekeo

Our Prediction Strategy

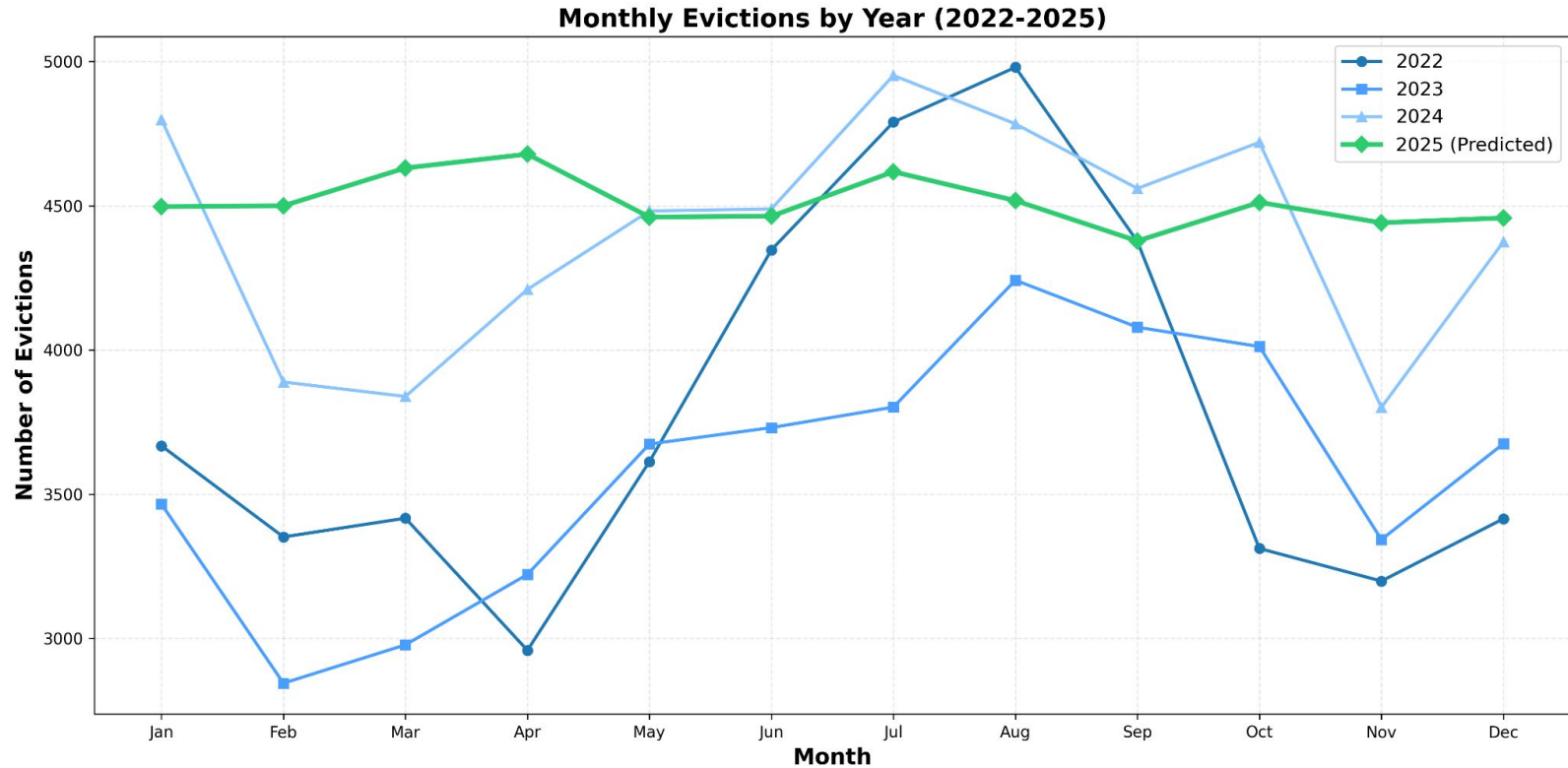**The Method:** Learning from the past to predict the future

The Data: Three years of Maricopa County eviction records (2022-2024)

The Goal: Forecast monthly evictions throughout 2025

The Benefit: Helps Arizona plan and budget before families are in crisis

Time Series Graph

Monthly Evictions by Year (2022-2025)

Dataset

Using sealed records from 2022–2024 to predict eviction rates for 2025.

Year	Total Records	Average per Month
2022	45,428	3,785
2023	43,069	3,589
2024	52,900	4,408
2025 (Predicted)	**54,143**	**4,513**

What the data says

Key Takeaways:

- **16% increase** from 2022 to 2024 - trend continues into 2025
- **Summer months (July-August)** consistently highest risk across all years
- **2025 prediction: 54,143 evictions** - highest year yet
- **Monthly average rising:** From 3,785 (2022) to 4,513 (2025)
- **Intervention window:** Spring months show early warning signs before summer peaks

Compare with the 2025 actual evictions data

Current Statistics

Month	Evictions
January	7,613
February	7,070
March	5,996
April	6,788
May	7,101
June	7,029
July	7,250
August	7,565
September	7,310

Month	Prediction
January	4,497
February	4,500
March	4,631
April	4,679
May	4,461
June	4,464
July	4,618
August	4,518
September	4,378

Prediction Results

Moving Forward

Current Limitations:

- **Data Scope:** Analysis limited to unsealed eviction records; sealed cases not captured in dataset
- **Variable Coverage:** Model focuses on temporal patterns; additional socioeconomic factors could enhance accuracy
- **Geographic Granularity:** County level analysis; census tract detail would enable targeted interventions

Future Enhancements:

- **Expanded Data Integration:** Incorporate datasets like the labor statistics and american community survey data
- **Advanced Modeling:** Deploy neural networks to discover complex cross dataset relationships

Conclusion

UDS Displaced Voices

" These predictions aren't just numbers, they're real individuals needing support and each statistic represents families, children, and communities we can protect.