

Provo Student Apartment Rent

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Feature Selection

Original Proposed Features:

Apartment	Walk dist	Drive Dist	Has Bus	Has Pool	Has Hottub	Square ft.	People/apt	Real Price
BlueRidge	15 min	3 min	true	true	false	916	6	\$470 / mo.

Final Features:

Table1 ▾	📊
Apartment Name ▾	# Miles from BYU ▾
	Has Bus ▾
	Has Pool ▾
	Has Hottub ▾
	Allows Pets ▾
	# Apartment sq ft. ▾
	# Bedrooms per apt ▾
# Bathrooms per apt ▾	# People per apt ▾
	# People per room ▾
	# Reviews (google, eg 3.4 / 5) ▾
	🏠 Price per month (OUTPUT FEATURE) ▾

Data Collection

- Wanted 60-100 data points
- Used online apartment lists, and individual apartment websites
- Google Maps for distance, Google Reviews for ratings
- Got 66 data points (very time consuming)


BYU 2024 - 2025 CONTRACTED HOUSING						
Click here to go to the On Campus or Off Campus "Seeking Replacements/Selling Contracts" page!						
Facility Name	Facility Size	Current Contract	Address	Phone	Website	
Campus Plaza Apartments	Large Facility	Aug 2024 - Aug 2025	669 E 800 N	(801) 374-1165	campusplazaapts.com	
Centennial 1	Large Facility	Aug 2024 - Aug 2025	380 N 1020 E	(801) 374-1700	centennialapartments.com	
King Henry	Large Facility	Aug 2024 - Aug 2025	1130 E 450 N	(801) 370-2400	kinghenryapts.com	

FLOOR PLANS

AMENITIES

▼

Two Bedroom



Large 2BD/1BA

BED / BATH

2bd / 1ba

ROOM TYPE

Vaulted Shared \$539

Garden Shared \$529

DEPOSIT


SQ. FT

\$750

672

DETAILS >

APPLY NOW



Standard 2BD/1BA

BED / BATH

2bd / 1ba

ROOM TYPE

Vaulted Shared \$469

Garden Shared \$459

DEPOSIT

SQ. FT

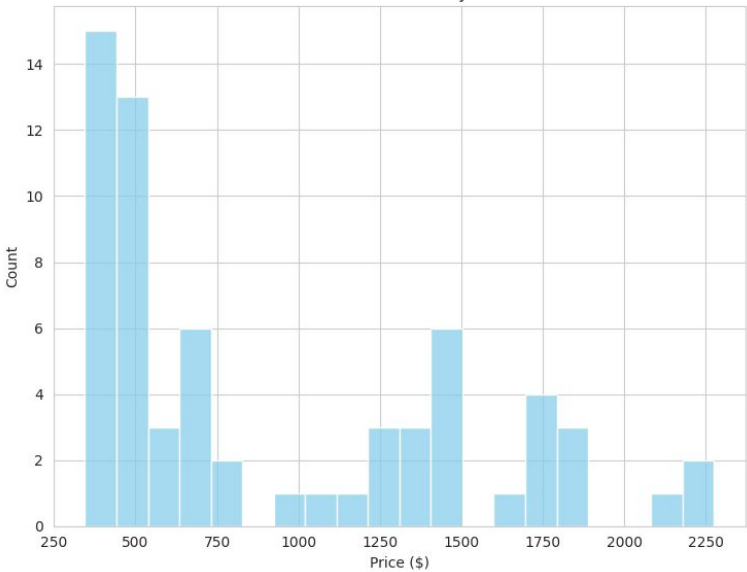
\$750

583

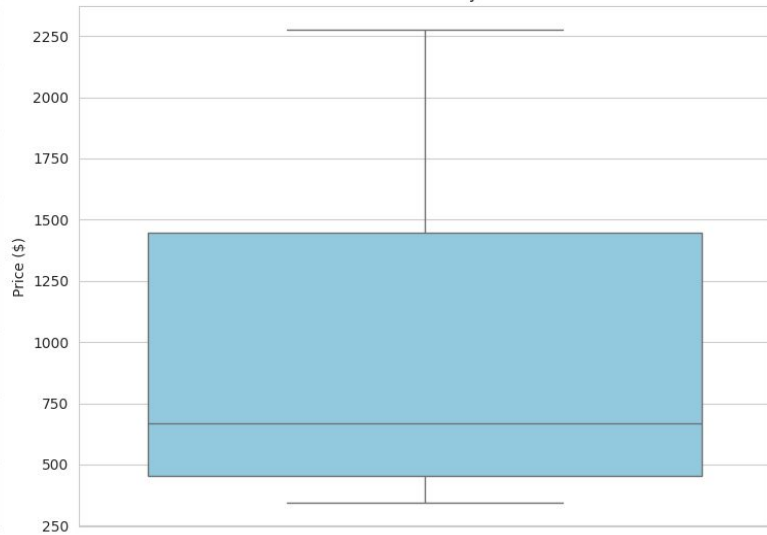
DETAILS >

APPLY NOW

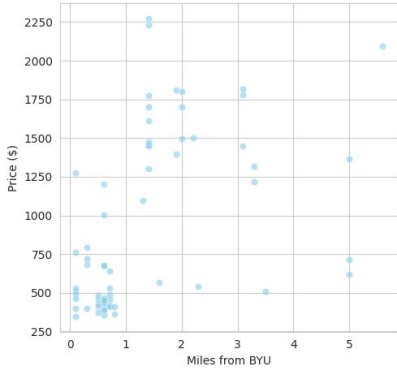
Distribution of Monthly Prices



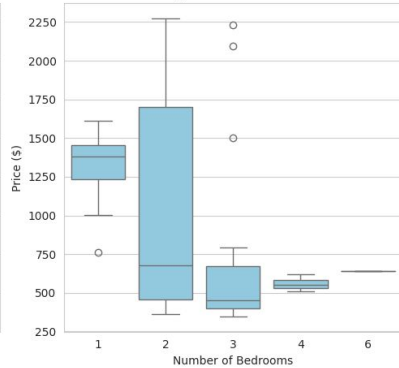
Box Plot of Monthly Prices



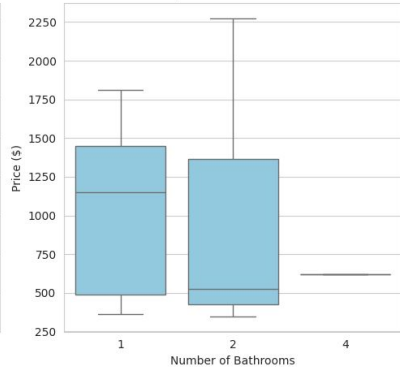
Price vs Distance from BYU



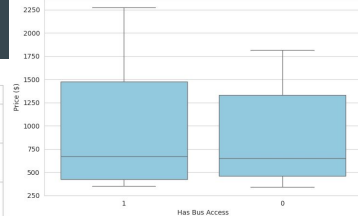
Price by Number of Bedrooms



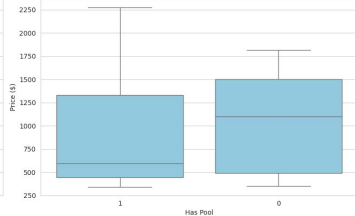
Price by Number of Bathrooms



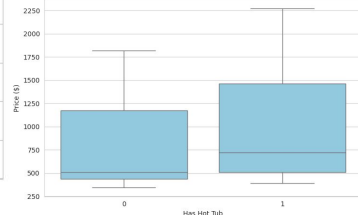
Price by Bus Access



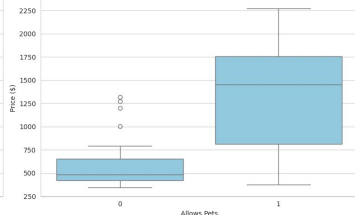
Price by Pool Access



Price by Hot Tub Access



Price by Pet Policy



Data Cleaning and Model Selection

- Drop non-predictive values (eg. Apartment Names)
- Convert categorical values (eg. hasBus becomes 0 or 1)
- Remove extraneous symbols (eg. \$ or ,)
- Filled in missing values with fillna function
 - Used X.mean
 - In the future could use model to create more accurate data to fill in missing values

Results

- **Lasso Regression:**

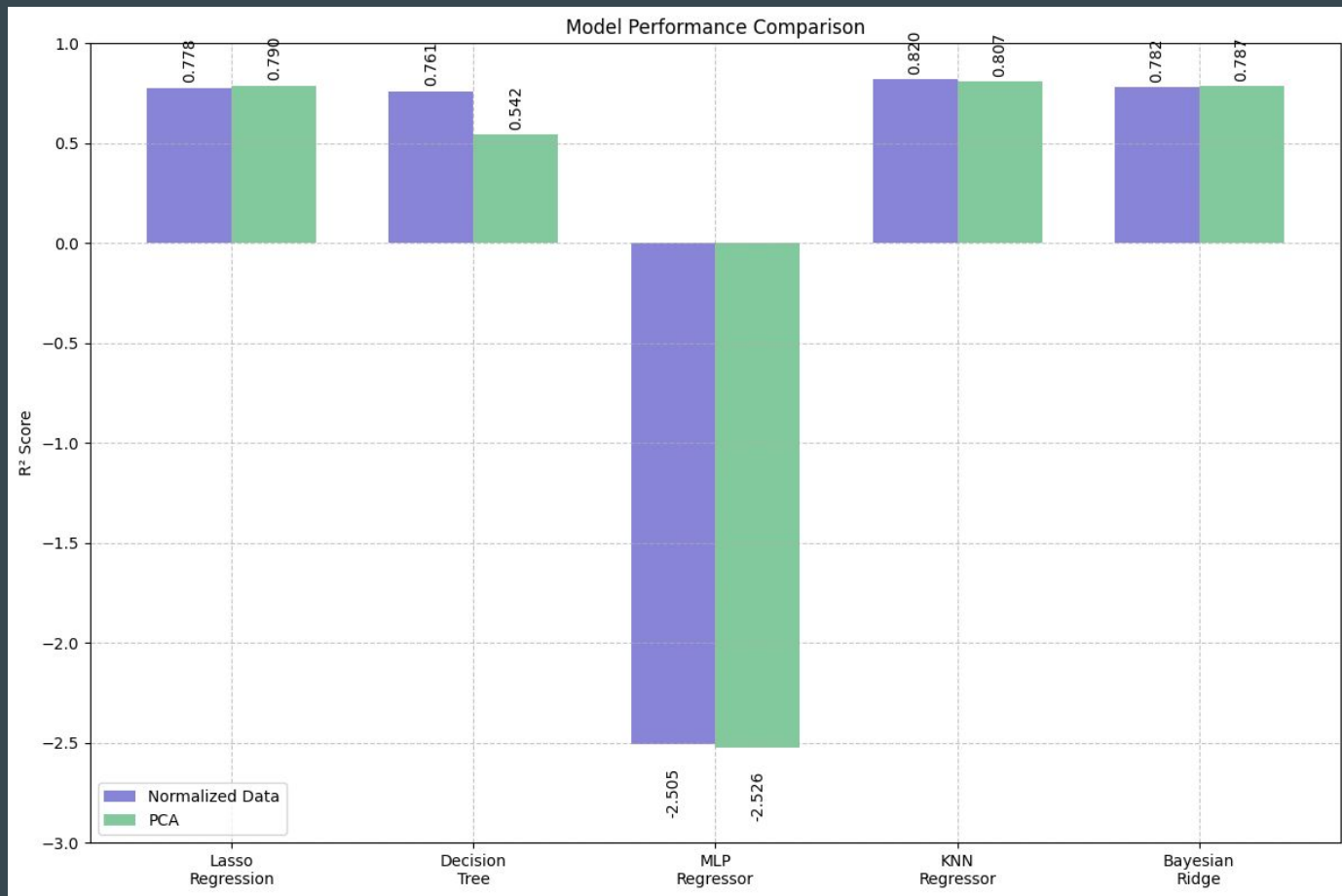
- Using normalized data: Test $R^2 = 0.7778$
- Using PCA: Test $R^2 = 0.7899$

- **Decision Tree:**

- Using normalized data: Test $R^2 = 0.7614$
- Using PCA: Test $R^2 = 0.5422$

Results

- **MLP Regressor:**
 - Using normalized data: Test $R^2 = -2.5052$
 - Using PCA: Test $R^2 = -2.5261$
(Convergence issues likely caused poor performance. Need more data)
- **KNN Regressor:**
 - Using normalized data: Test $R^2 = 0.8195$
 - Using PCA: Test $R^2 = 0.8073$
- **Bayesian Ridge:**
 - Using normalized data: Test $R^2 = 0.7821$
 - Using PCA: Test $R^2 = 0.7874$



Note any
disparity?

**Normalized
Data:** Average
Test R^2 =
0.1271

PCA Data:
Average Test
 R^2 = **0.0801**

Future Development and Features to Examine

1. **Broadening the Geographic Scope:** Extending the analysis to include other cities in Utah, such as Salt Lake City, Draper, and Ogden, would provide a broader context for rent predictions.
2. **Incorporating More Housing Types in Provo:** While our current study focuses on apartments, including other housing types such as townhomes, single-family rentals, and student housing complexes could provide a more comprehensive understanding of the local market.
3. **Looking at Different Property Management Companies and Other Features:** In addition to previously mentioned features, it is worth noting that a majority of properties in Provo are owned by a relatively small number of companies.