

Investment Cycle Planning

GA-DSIF2: Group 6 - Project 2

AMES Housing

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Executive Summary & Problem Statement



Executive Summary & Problem Statement

Problem **Statement**

- Develop predictive model forecasting house-selling price
- Data-driven identification of high-return investment opportunities through remodeling / renovation

Business implications

- Identify actionable renovation levers that increase value in short-term with appropriate investment & risk
- Develop investment plan comprising funding needs and return expectations for General Asset Investments

Recommendation

- Invest in real estate with renovation upside in:
 - Overall house quality
 - **Exterior quality**
 - Kitchen quality
- 46 suitable properties identified over investment period of 4 years that can be remodeled with 1.7m USD profit on an investment of 4.6m USD for a 37% return with very limited cost of capital







Project Scope



Demographics



- Very young population
- Comparably low household incomes
- Strong dynamic growth indicates interesting investment opportunities



Education is the key anchor of the local economy



Project Scope



House ownership drivers

Ames is a college town and the Iowa State University is the largest employer

Rent vs Own

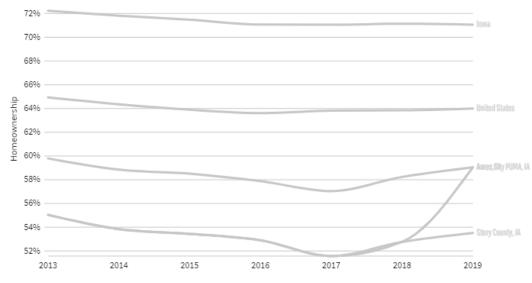
40./%

40.8%

In 2019, 40.7% of the housing units in Ames, IA were occupied by their owner. This percentage declined from the previous year's rate of 40.8%.

This percentage of owner-occupation is lower than the national average of 64.1%. This chart shows the ownership percentage in Ames, IA compared it's parent and neighboring geographies.

Data from the Census Bureau ACS 5-year Estimate.



Retrieved from: https://datausa.io/profile/geo/ames-ia

Point to consider:

Features that appeal for investment property (student rentals) may be dissimilar to owner-occupied property







Approach & Model

Approach & model

Significant effort invested to increase quality of dataset through extensive feature engineering, inclusion of domain knowledge and comprehensive model tuning



Data imputation

Based on categories with low frequency, multicollinearity analysis, missing data Based on domain knowledge and other features



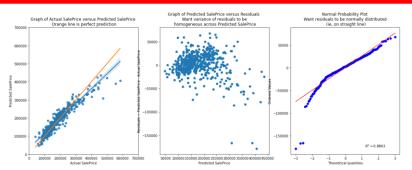
Feature engineering

Transformation and encoding of ordinal features based on domain knowledge

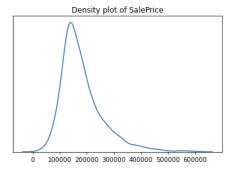


Polynomial

Findings

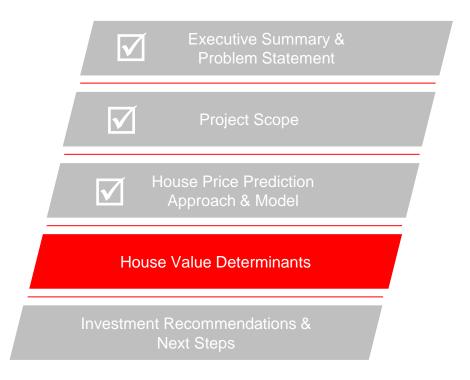


Developed model seems fit to predict house price value drivers with **significant confidence**



- Distribution of house values skewed towards properties on the **lower end**
- Demand for medium-value properties visible allowing exploration of remodeling / renovation opportunities



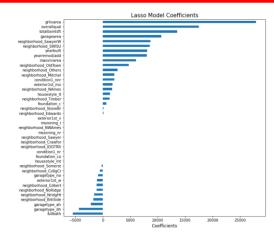




House Value Determinants



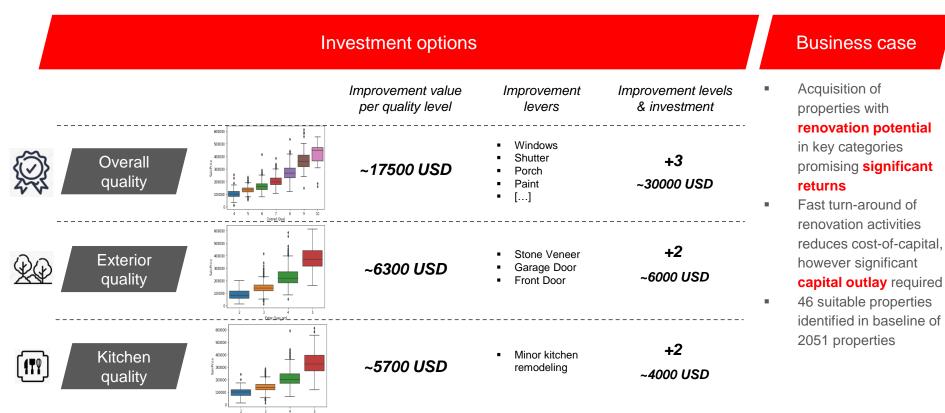
Key findings



- Ensemble method to identify key predictors identified common features with strong significance to determine house prices
- Actionable ones are "Overall Quality", "Exterior Quality" and "Kitchen Quality"



House Value Determinants



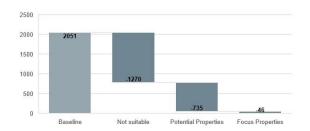






Recommendation & next steps

Investment opportunity



- 46 clear investment opportunities (out of 2051 houses) identified over 4 year period matching renovation criteria with conservative assumptions
- ~37% margin expected after accounting for renovation cost
- Investment of 4.6m USD for return of **6.3m USD** (after cost)
- Scaling to other geographies possible but requiring validation

Risks

- Refreshing of model with more recent data required to consider effect of external anomalies (e.g. Financial Crisis 2008)
- Include additional factors in line with best practices in real estate domain knowledge (e.g. distance to transportation)
- Secondary effects of investment opportunity profitability erosion due to inflation of up-scale properties

Recommendation / Next steps



Investment opportunity

Recommendation to allocate funds to pursue real estate remodeling opportunities as they emerge (~ 1.2m USD annually for AMES region)



Set-up real estate team

Scale-up data science resources to further develop model, explore scaling to other geographies and validate potential properties