Using SAS with over 80 variables and 1400 rows of data this team puts together two multilinear models to predict a home’s sell price in Ames, Iowa.

Kaggle Project

Century 21 Ames: Home Sell Price Prediction Model

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# Introduction

## When someone starts the processes of buying a home it is usually filled with daydreams of must haves and a few needs. This investigation is going to examine [through multilinear regression] the different components that contribute to the pricing of house buying and what Century 21 Ames can do to predict the pricing for home buyers in Ames, Iowa.

## With conservative methods our first analysis will provide a house sell price prediction model based solely on square footage and sell prices from only active Century 21 Ames neighborhoods [NAmes, Edwards, BrkSide]. With this initial model Century 21 Ames will be armed with a model to help them predict the sell prices of homes in the neighborhoods in which they are actively working.

## Using four different model selections we will be completing a second analysis that will build a predictor model for the selling price of house across all of Ames, Iowa. With this model analysis, Century 21 Ames, will have a strong predictor of all variables that highly affect sell prices across all the neighborhoods in Ames, Iowa; effectively empowering them to expand from their three active neighborhoods to much more.

# Data Description

## The data in this evaluation contains over 1400 rows and 80 different variables that could contribute to the selling price of a home in Ames, Iowa. The data was collected across 25 different neighborhoods from houses that have been built between 1872 – 2010.

## In our first analysis we will be using the following variables to predict sell price: *GrLivArea* [living area square footage], *SalesPrice* [sales prices of homes in neighborhoods], and *Neighborhoods* [NAmes, Edwards, BrkSide].

## In our second analysis we will be building a predictive model for sales prices of all the homes in Ames, Iowa. This will include the follow variables: XXX [] XXX [] XXX [] XXX [] XXX [] XXX [] XXX []XXX []XXX [].

## To find out more about this data and the definitions of all individual variables you can visit the Kaggle competition website [here](https://www.kaggle.com/c/house-prices-advanced-regression-techniques/data) [https://www.kaggle.com/c/house-price-advanced-regression-techniques/data].

# Analysis Question 1

## Problem Statement

## Century 21 Ames wants an estimate of how the sale price of a house is related to the square footage of the living area of the home in their three active neighborhoods: NAmes, Edwards, and BrkSide.

## Build and Fit the Model

### Assumptions and Corresponding Plots

#### Linearity

#### Met with the original data set we see in Figure 5.1.1 judging by the scatter plot alone the data does reasonably fall along a straight (nonhorizontal) line and nearly passes through the origin. However, we do see evidence of three influential outliers in the data.

#### Outliers Influential point analysis (Studentized Residual, Cook’s D, and Leverage)

#### In Figure 5.1.8 we see a potential outlier in our Studentized Residual Plot. This point will need to be reviewed further.

#### There was an outlier identified with Leverage in Figure 5.1.9 and Cook’s D in Figure 5.1.10. In reviewing the data this point is specifically identified as a ‘partial sale’. As this is not a completed sale thus the dollars being spent not actualized. We will remove this observation from our analysis.

#### After review of the outliers it is determined these were listed as abnormal and partial sales. With research into these that can be found [here](https://www.irr.com/news/partial-interest-properties-how-to-sell-what-no-one-wants-to-buy-5765); we’ve decided to exclude these outliers from our data set.

#### Normality

#### Not met with the original data judging from the histogram and QQ-plots Figure 5.1.3 and 5.1.4, there is evidence against normality of sale price on fixed values of square footage and neighborhood.

#### Judging from the histogram and QQ-plots Figure 5.1.5 and 5.1.6, once the linear-log transformation has taken place, there is no evidence against normality of sale price on fixed values of square footage and neighborhood.

#### Equal variances

#### Judging from the residuals scatter plot Figure 5.1.7, once the linear-log transformation has taken place, there is no evidence against constant variance of sale price against constant variance of square footage and neighborhood. The residual plot resembles a random scatter of points around the 0 line.

#### Independence

#### Homes within the same neighborhoods are often linked in sale price. Homes that

#### We will move forward with caution that the sales prices of homes gathered are independent.

#### Multicollinearity

#### Note that multicollinearity is resolved with a VIFS < 1 [Figure 5.1.11]

### Comparing Competing Models

#### Adj R2

#### Internal CV Press

## 

## Parameters

### Estimates

### Interpretation

### Confidence Intervals

## 

## Conclusion

### A short summary of the analysis

# Analysis Question 2

## Problem Statement

## Build and Fit the Model

### Model Selection

#### Stepwise

#### Forward

#### Backward

#### Custom

### Assumptions and Corresponding Plots

#### Linearity

#### Normality

#### Equal variances

#### Independence

#### Outliers: Influential point analysis (Cook’s D and Leverage)

#### Multicollinearity.

### Comparing Competing Models

#### Adj R2

#### Internal CV Press

#### Kaggle Score.

## Parameters

### Estimates

### Interpretation

### Confidence Intervals

## 

## Conclusion

### A short summary of the analysis

# Appendix

## Analysis 1

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## Analysis 2

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# Codebook

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