

# Sale Price Prediction of Ames Houses

Ryan      Keely Kinnane      Sai Teja Yapuram      Kavindu Wellalage

## Dataset Description

The Ames Housing Data set curated by Dean De Cock from Truman State University. The original data set describes the sale of individual residential property in Ames, Iowa from 2006 to 2010. The original data set contains 2930 observations and a large number of explanatory variables (23 nominal, 23 ordinal, 14 discrete, and 20 continuous) involved in assessing home values. The version used for this project is a subset of the original data set that contains 766 homes and the 28 variables. The subset is selected by following the steps given below.

- Removed large houses with an above ground living area of more than 1500 square feet.
- Filtered the data set to include houses that had a ‘Normal’ sales condition.
- Included the top five neighborhoods with the most houses for sale.
- Removed rows with NA values.
- Renamed a few variables to make their meaning clearer.

## Data Dictionary

The full data set contains 766 homes and the following 28 variables:

- **LotArea**: Lot size in square feet. A numeric variable.
- **Neighborhood**: Physical location within Ames city limits. A categorical variable with the following levels:
  - “NAmes” : North Ames
  - “Sawyer” : Sawyer
  - “OldTown” : Old Town
  - “Edwards” : Edwards
  - “CollgCr” : College Creek
- **OverallQual**: Overall quality of the house’s material and finish. The scale ranges from 1 (Very Poor) to 9 (Very Excellent). A numeric variable.
- **OverallCond**: Overall condition rating. The scale ranges from 1 (Very Poor) to 9 (Very Excellent). A numeric variable.
- **YearBuilt**: Original construction date. A numeric variable.
- **YearRemodAdd**: Remodel date. A numeric variable.
- **BsmtFinSf1**: Type 1 finished square feet. A numeric variable.
- **BsmtFinSf2**: Type 2 finished square feet. A numeric variable.
- **TotalBsmtSf**: Total square feet of basement area. A numeric variable.
- **FirstFlrSf**: First floor square feet. A numeric variable.
- **SecondFlrSf**: Second floor square feet. A numeric variable.

- GrLivArea: Above grade (ground) living area square feet. A numeric variable.
- BsmtFullBath: Number of full bathrooms in the basement. A numeric variable.
- BsmtHalfBath: Number of half baths in the basement. A numeric variable.
- FullBath: Number of full bathrooms above ground. A numeric variable.
- HalfBath: Number of half baths above ground. A numeric variable.
- BedroomAbvGr: Number of Bedrooms above ground. A numeric variable.
- KitchenAbvGr: Number of Kitchens above ground. A numeric variable.
- TotRmsAbvGrd: Total rooms above ground (does not include bathrooms). A numeric variable.
- Fireplaces: Number of fireplaces. A numeric variable.
- GarageCars: Size of garage in car capacity. A numeric variable.
- GarageArea: Size of garage in square feet. A numeric variable.
- WoodDeckSf: Wood deck area in square feet. A numeric variable.
- OpenPorchSf: Open porch area in square feet. A numeric variable.
- EnclosedPorch: Enclosed porch area in square feet. A numeric variable.
- ThreeSsnProch: Three season porch area in square feet. A numeric variable.
- ScreenPorch: Screen porch area in square feet. A numeric variable.
- SalePrice: The property's sale price in dollars. A numeric response variable.

## Evidence of Data

```
data = read.csv('ames_housing.csv')
head(data, nrow=10)
```

```
##   LotArea Neighborhood OverallQual OverallCond YearBuilt YearRemodAdd
## 1   11622           Names          5           6      1961      1961
## 2   14267           Names          6           6      1958      1958
## 3   11241           Names          6           7      1970      1970
## 4   12537           Names          5           6      1971      2008
## 5    8450           Names          5           6      1968      1968
## 6    8400           Names          4           5      1970      1970
##   BsmtFinSf1 BsmtFinSf2 TotalBsmtSf FirstFlrSf SecondFlrSf GrLivArea
## 1         468         144         882         896           0         896
## 2         923           0        1329        1329           0        1329
## 3         578           0        1004        1004           0        1004
## 4         734           0        1078        1078           0        1078
## 5         775           0        1056        1056           0        1056
## 6         804          78         882         882           0         882
##   BsmtFullBath BsmtHalfBath FullBath HalfBath BedroomAbvGr KitchenAbvGr
## 1             0             0         1         0           2           1
## 2             0             0         1         1           3           1
## 3             1             0         1         0           2           1
## 4             1             0         1         1           3           1
## 5             1             0         1         0           3           1
## 6             1             0         1         0           2           1
##   TotRmsAbvGrd Fireplaces GarageCars GarageArea WoodDeckSf OpenPorchSf
## 1             5           0           1         730         140           0
## 2             6           0           1         312         393          36
## 3             5           1           2         480           0           0
## 4             6           1           2         500           0           0
## 5             6           1           1         304           0          85
## 6             4           0           2         525         240           0
```

##	EnclosedPorch	ThreeSsnPorch	ScreenPorch	SalePrice
## 1	0	0	120	105000
## 2	0	0	0	172000
## 3	0	0	0	149000
## 4	0	0	0	149900
## 5	184	0	0	142000
## 6	0	0	0	126000