Home buying : Predicting the future

What makes a house a home?

What Metrics will help evaluate the right Home for the right price

What are the traditional factors?

- Location
- House Measurements
- House Quality
- A few more not purely metric requirments
  - Year built
  - Pool? No pool?
  - Fence no fence

Overall Qual (Ordinal): Rates the overall material and finish of the house

10 Very Excellent

9 Excellent

8 Very Good

7 Good

6 Above Average

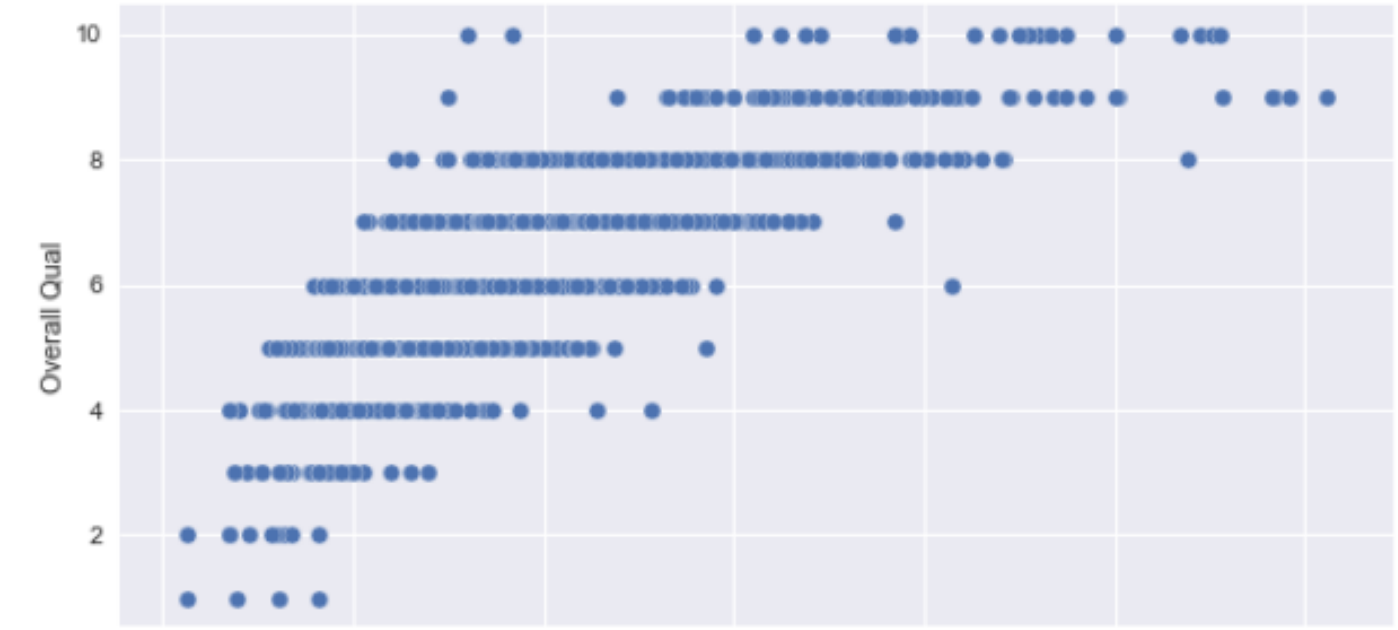
5 Average

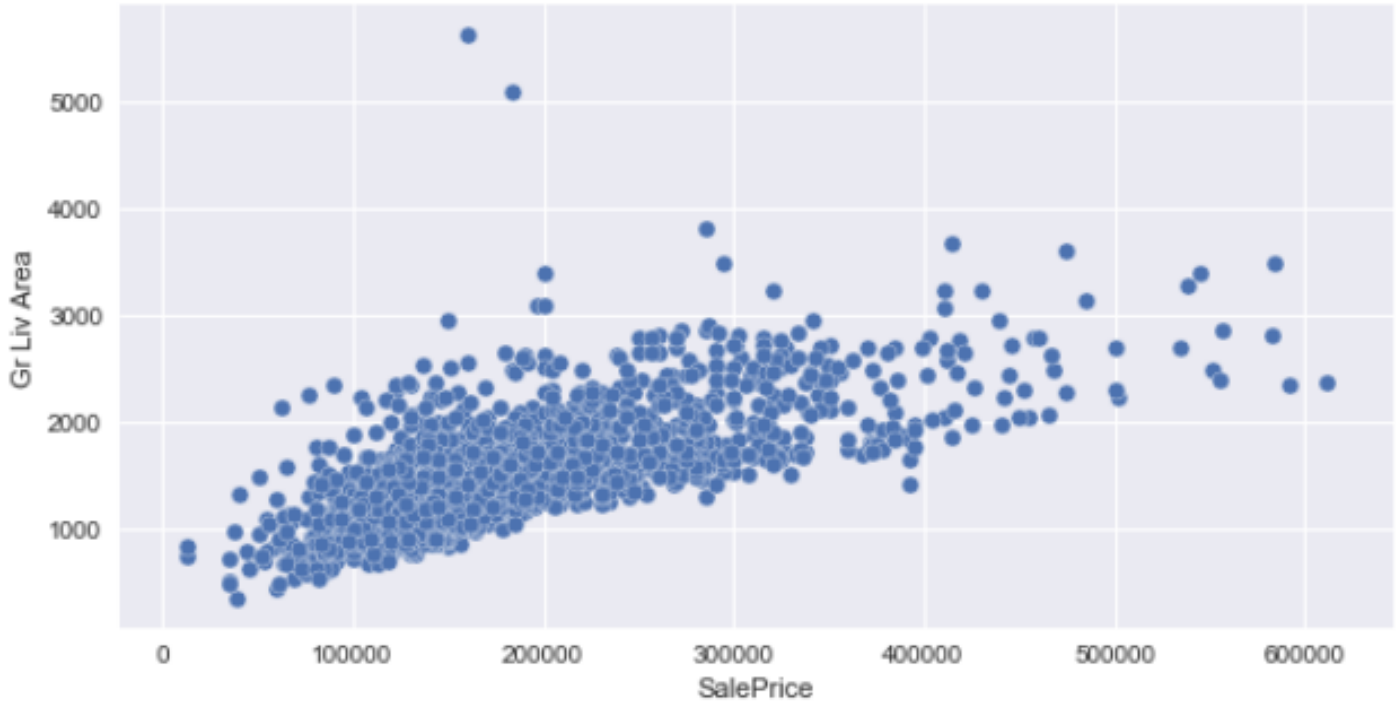
4 Below Average

3 Fair

2 Poor

1 Very Poor



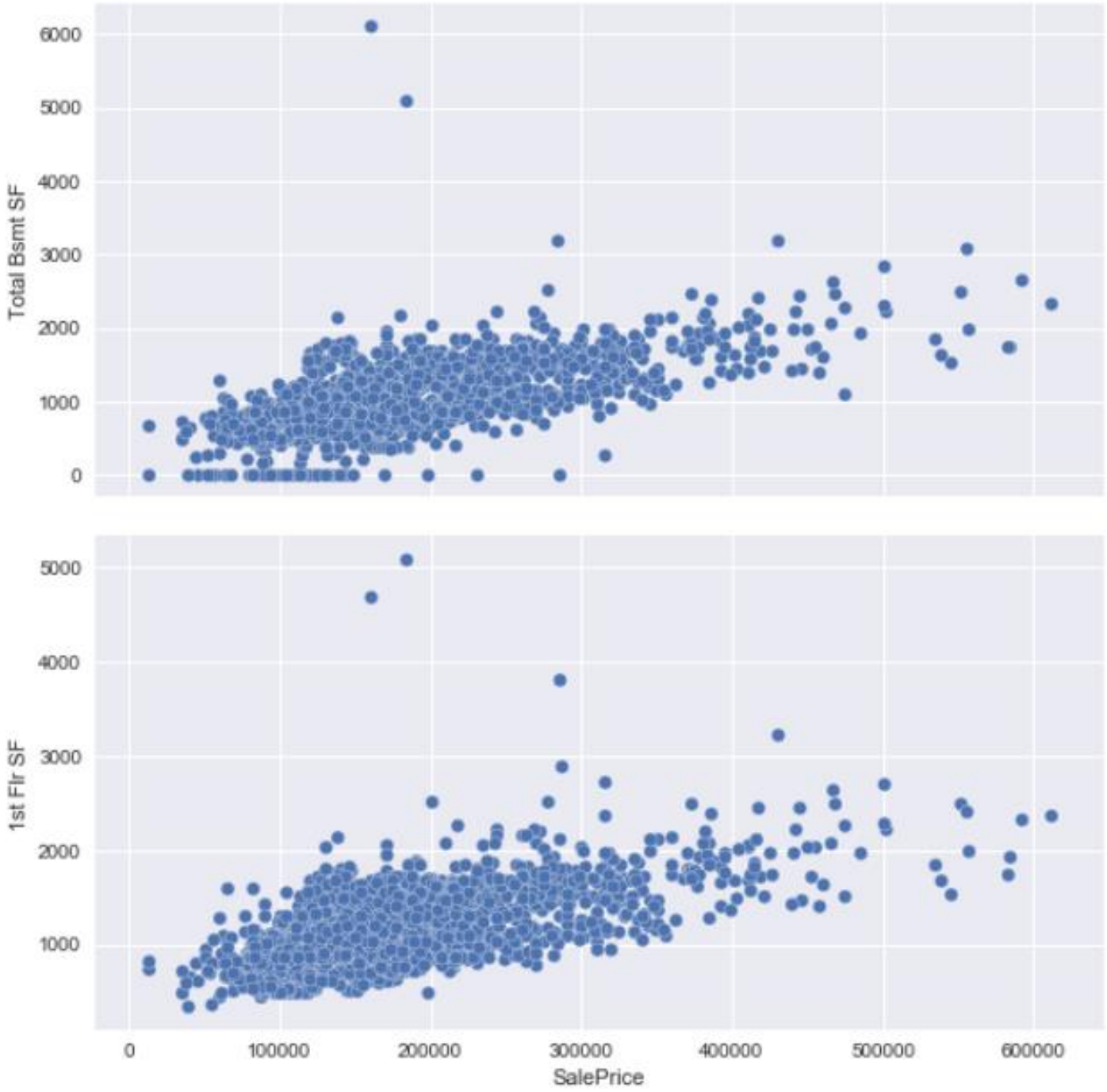


Total Basement Squarefeet

- Increase sqft, increase sale price

First Floor Squarefeet

-Increase sqft, increase sale price



Account for the Intangible

- To make our model predictive
  - Correlate with house features
  - Correlate with location
  - Correlate with external factors

List of All list of Categories for reference

- inside_numerical_house_features
- outside_numerical_house_features
- cat_inhouse_features_dummies
- cat_location_features_dummies
- cat_outhouse_features_dummies
- cat_utilities_features_dummies
- cat_time_features_dummies

```
cat_inhouse_features = ['Exterior 1st',
                        'Exterior 2nd',
                        'Mas Vnr Type',
                        'Exter Qual',
                        'Exter Cond',
                        'Bsmt Cond',
                        'BsmtFin Type 1',
                        'BsmtFin Type 2',
                        'Functional',
                        'Fireplace Qu',
                        'MS SubClass']

cat_location_features = ['MS Zoning',
                         'Street',
                         'Alley',
                         'Lot Shape',
                         'Land Contour',
                         'Lot Config',
                         'Land Slope',
                         'Neighborhood',
                         'Condition 1',
                         'Condition 2']

cat_outhouse_features = ['Bldg Type',
                         'House Style',
                         'Roof Style',
                         'Roof Matl',
                         'Foundation',
                         'Garage Type',
                         'Garage Finish',
                         'Garage Qual',
                         'Garage Cond',
                         'Paved Drive',
                         'Pool QC',
                         'Fence']

cat_utilities_features = ['Utilities',
                          'Heating',
                          'Heating QC',
                          'Central Air',
                          'Electrical']
```

Test Against Sale Price

Test those features categories

- In house features
- Location features

```
model_selection(train_1, inside_numerical_house_features, "SalePrice")
```

```
Linear Regression Score:  0.7500909189446548
RidgeCV Score:  0.7515849504447694
LassCV Score:  0.7509468036139747
ElasticNetCV Score:  0.1202834392301703
```

```
model_selection(train_1, outside_numerical_house_features, "SalePrice")
```

```
Linear Regression Score:  0.1875564726234896
RidgeCV Score:  0.18801835661849267
LassCV Score:  0.18958442054111668
ElasticNetCV Score:  0.016252897260074617
```

```
model_selection(train_1, cat_inhouse_features_dummies_list, "SalePrice")
```

```
Linear Regression Score:  -1.5439835510683107e+26
RidgeCV Score:  0.65398741053605
LassCV Score:  0.6574923514911343
ElasticNetCV Score:  0.09291467095470811
```

```
model_selection(train_1, cat_location_features_dummies_list, "SalePrice")
```

```
Linear Regression Score:  -1.0476447059267859e+26
RidgeCV Score:  0.587001569727484
LassCV Score:  0.5869865285387269
ElasticNetCV Score:  0.05705942983752136
```

```
model_selection(train_1, cat_outhouse_features_dummies_list, "SalePrice")
```

```
Linear Regression Score:  -1.3471145562995322e+26
RidgeCV Score:  0.48592746757246247
LassCV Score:  0.48828406124605545
ElasticNetCV Score:  0.08348672677448998
```

In-Tangibles Matter

- The best models Include
  - The house measurements: sqft, room count, bathroom count, basement
  - Location criteria: Lot size, configuration, neighborhood
  - Features of the house: Garage, Home Style, Roof Style
- Recommendations
  - Location, Particular Features, and Home size matter
  - Tailor the home models to these criteria will ---
    - Improve traffic to Zillow through tailored feature selection
    - Improve home purchases by reducing features non-essiential to buyers
    - Improve realtor consultation by advising them of features