

Neural Networks Project Summary

- **Context:** This presentation was the capstone project for a Neural Networks course taken through [Modal.io](#), a corporate training platform.
- **Purpose:** Create a “product” using AI and a dataset that was provided.
- **Prediction:** The sale price of a home + the time-to-sell.
- **Notice:** How the benefits of the model are translated into business value for a realtor or potential customer.
- **Notice:** How the results of the model are turned into an optimization problem, maximizing a realtor’s total income.
- **Technical architecture:** neural network via backpropagation
 - *Price:* 2 hidden layers, 1 output layer. 29 features, linear activation
 - *Time-to-sell:* 2 hidden layers, 1 output layer. 36 features.
 - Hidden layers have sigmoid activation; output layer uses linear

AI-PRAISE

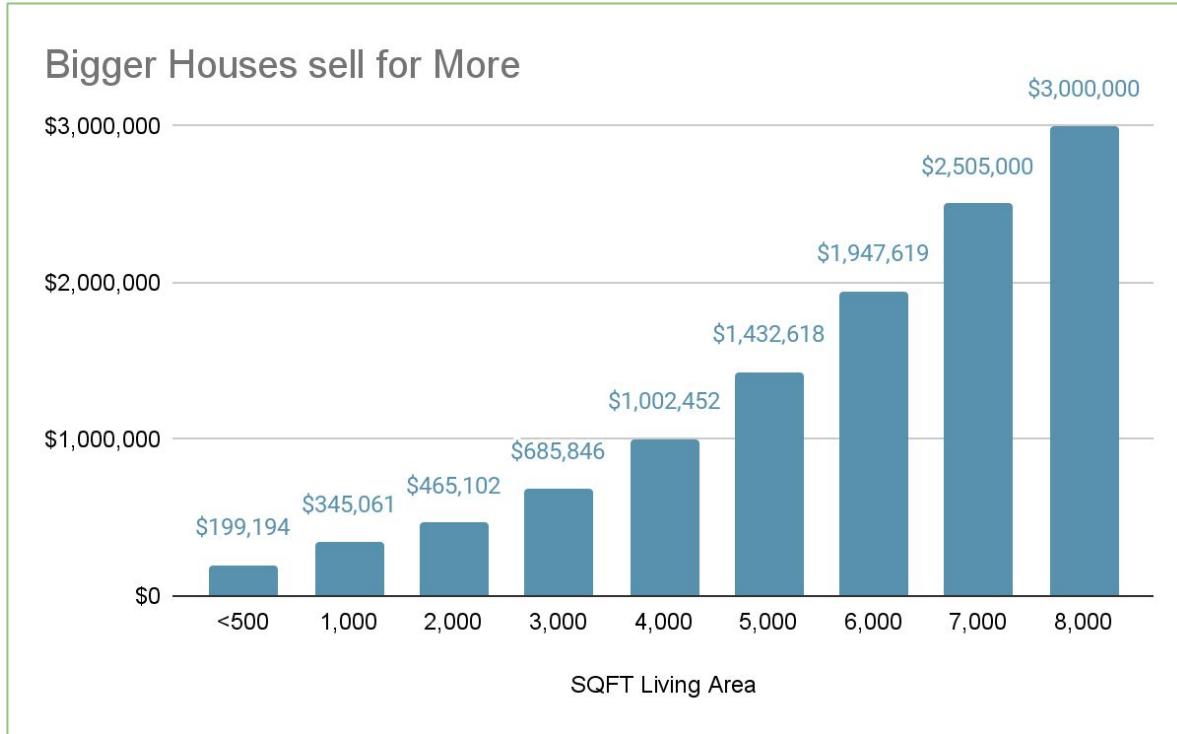
AI-Powered
Real Estate
Appraisal Services



1. PRICE YOUR LISTING ACCURATELY
2. MANAGE CLIENT EXPECTATIONS
3. MAXIMIZE YOUR EARNINGS!

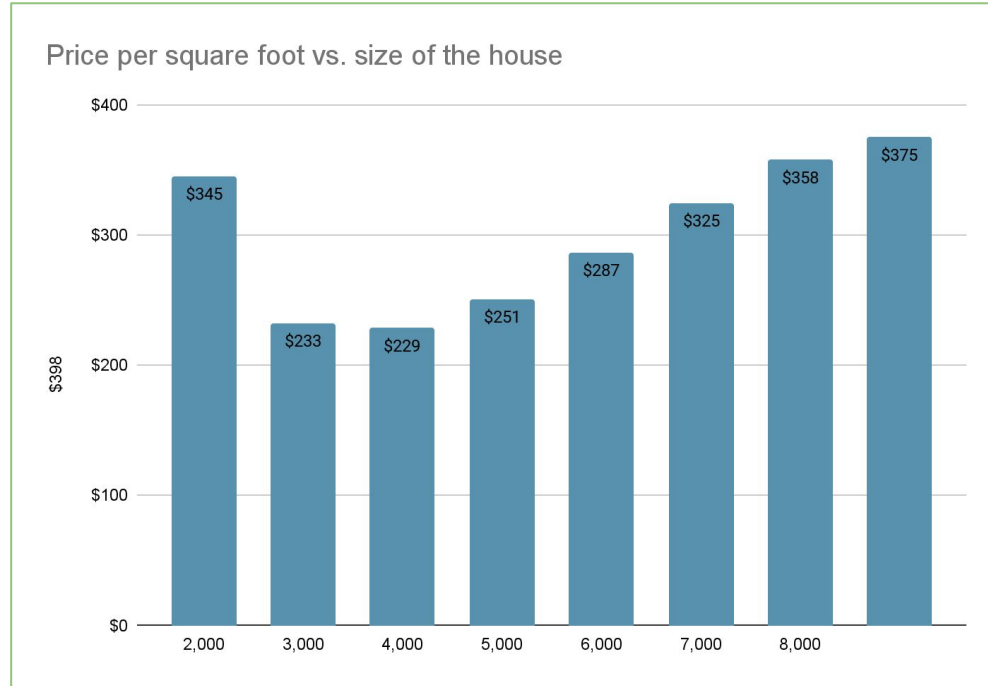


We all know Bigger Houses sell for more...



| SQFT Living | Price |
|-------------|-------------|
| <500 | \$199,194 |
| 1,000 | \$345,061 |
| 2,000 | \$465,102 |
| 3,000 | \$685,846 |
| 4,000 | \$1,002,452 |
| 5,000 | \$1,432,618 |
| 6,000 | \$1,947,619 |
| 7,000 | \$2,505,000 |
| 8,000 | \$3,000,000 |

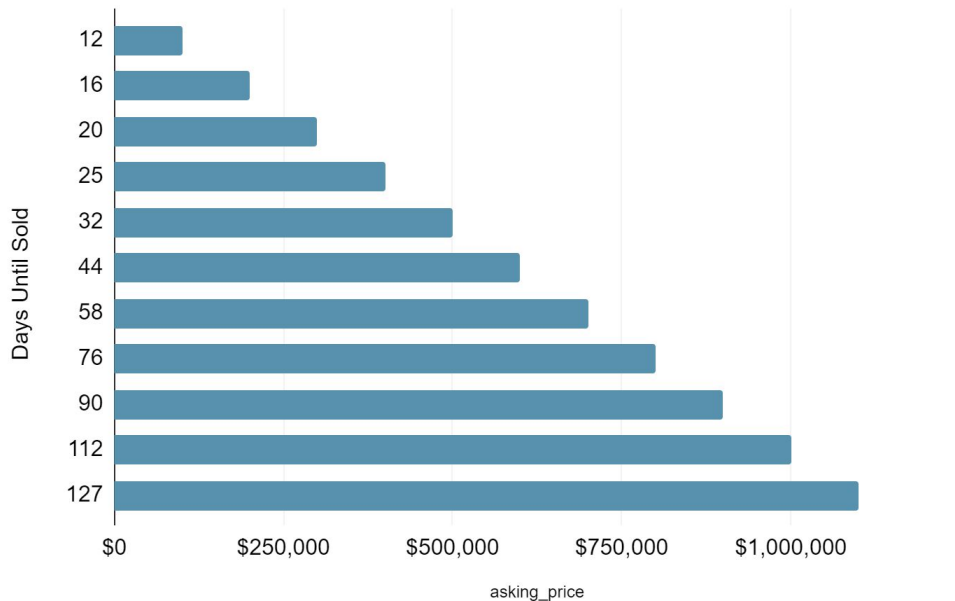
But not all Square Footage is Created Equal!



| SQFT Living | Price/SQFT |
|-------------|------------|
| <500 | \$398 |
| 1,000 | \$345 |
| 2,000 | \$233 |
| 3,000 | \$229 |
| 4,000 | \$251 |
| 5,000 | \$287 |
| 6,000 | \$325 |
| 7,000 | \$358 |
| 8,000 | \$375 |

More Expensive Houses take longer to sell...

How Long Does it take to sell a house?



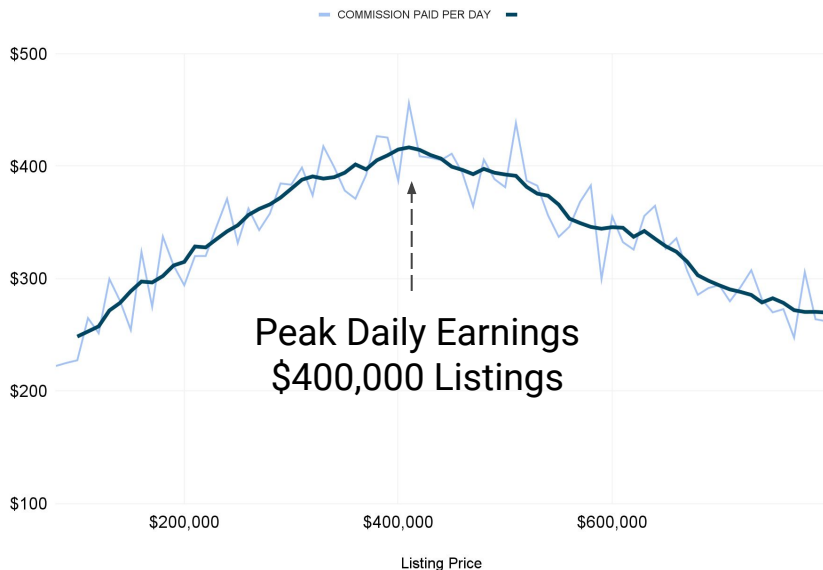
| Asking Price | Avg. Days to Sell |
|--------------|-------------------|
| \$100,000 | 12 |
| \$200,000 | 16 |
| \$300,000 | 20 |
| \$400,000 | 25 |
| \$500,000 | 32 |
| \$600,000 | 44 |
| \$700,000 | 58 |
| \$800,000 | 76 |
| \$900,000 | 90 |
| \$1,000,000 | 112 |

MAXIMIZE YOUR COMMISSIONS

By focusing on \$400,000 listings.

$$\text{Daily Earnings} = \frac{\text{Commissions}}{\text{Time-to-sell}}$$

Daily Commissions/Earnings based on Listing Price

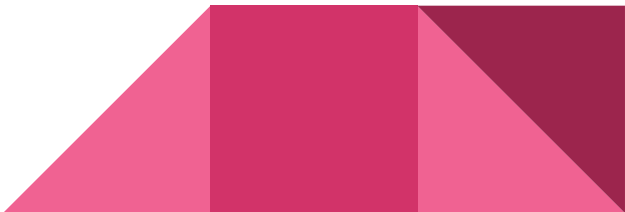


| Price | 2.5% Commission | Avg. Until Sold | Daily Income |
|-----------|-----------------|-----------------|--------------|
| \$100,000 | \$2,500 | 11 | \$227 |
| \$200,000 | \$5,000 | 17 | \$294 |
| \$300,000 | \$7,500 | 20 | \$383 |
| \$400,000 | \$10,000 | 26 | \$387 |
| \$500,000 | \$12,500 | 33 | \$381 |
| \$600,000 | \$15,000 | 42 | \$355 |
| \$700,000 | \$17,500 | 59 | \$294 |
| \$800,000 | \$20,000 | 76 | \$262 |
| \$900,000 | \$22,500 | 90 | \$250 |

AI-PRAISE models

AI-PRAISE:

- Uses top-of-the-line AI technology built by Google
- Custom Feature Engineering maximizes the power of the model
- We predict: **the Selling Price**
- We predict: **Time-to-Sell**
 - *Probability that the house will sell in 30 days*
 - *Probability that the house will sell in less than 60 days*
 - *Probability that the house will sell in less than 90 days*
- Helps to manage expectations for high-value properties!



AI-PRAISE - Proprietary Scorecard

| 1404 Delancey Street, Capersville, NY 13043 | | | | | | |
|---------------------------------------------|----------|---------|-------|----------|-------|---------|
| SQFT | Lot Size | Stories | Built | Bedrooms | Baths | Heating |
| 4,010 | 8,252 | 2 | 2015 | 5 | 4.25 | Oil |

| Predicted Time to Sell: 134 Days | | |
|----------------------------------|-------------------|-------------------|
| Less Than 30 Days | Less than 60 Days | Less than 90 Days |
| 17% | 24% | 42% |

| Predicted Price |
|-----------------|
| \$1,050,192 |



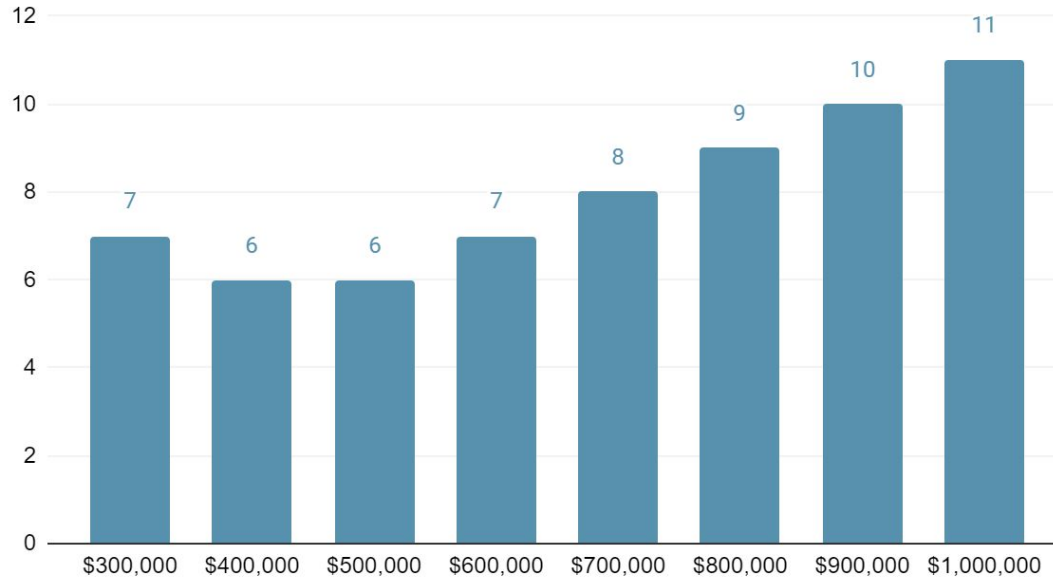
Linda's Properties: Too many High Value = SLOW

Your properties are all very large properties that will take a long time to sell.

| Property | Beds | Baths | SQFT Living | SQFT Above | Lot SQFT | Floors | Condition | Built | Predicted Price | Predicted Days |
|-------------|------|-------|-------------|------------|----------|--------|-----------|-------|-----------------|----------------|
| Sequoia Way | 5 | 3 | 2,660 | 1,670 | 7,700 | 1.5 | good | 1962 | \$509,000 | 99 |
| Mongrove | 5 | 4.25 | 4,010 | 4,010 | 8,252 | 2 | average | 2015 | \$1,090,500 | 103 |
| 7th Street | 3 | 3.25 | 4,720 | 3,190 | 32,467 | 2 | average | 1998 | \$1,340,000 | 103 |
| Lemon St. | 4 | 3.25 | 4,110 | 4,110 | 15,488 | 2 | average | 1995 | \$1,620,000 | 103 |
| Beach Blvd. | 3 | 2.5 | 4,010 | 2,600 | 12,105 | 1 | very good | 1983 | \$1,707,500 | 103 |

It takes “disproportionately longer” to sell Big Houses!

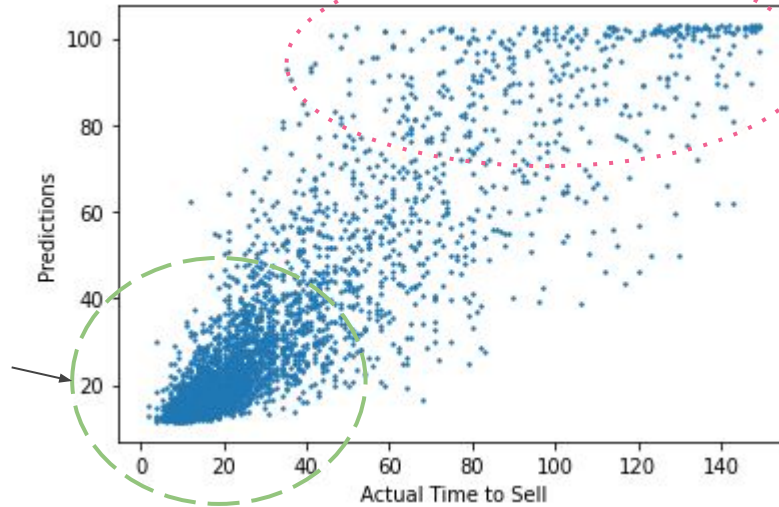
Days per \$100,000 of List Price



| Price | Days per \$100k |
|-----------|-----------------|
| \$300,000 | 7 |
| \$400,000 | 6 |
| \$500,000 | 6 |
| \$600,000 | 7 |
| \$700,000 | 8 |
| \$800,000 | 9 |
| \$900,000 | 10 |

Manage your high value customer's expectations

Houses that we predict will sell between 20 and 40 days will generally sell within 20 to 40 days



But it's much harder to predict the time-to-sell for High Value properties.

You can show this to your client when they get impatient...

AI-PRAISE

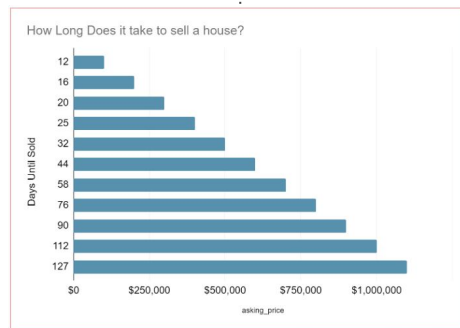
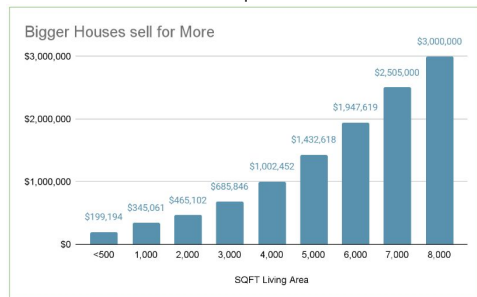
PREDICT
Selling Price

+

PREDICT
Time-to-Sell



MAXIMIZE
Earnings



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