Tepper School of Business

Group 1 - Machine Learning For Business Application

Real Estate Machine Learning Pricing Model

Final Summary Report

(End-to-End Data-Driven Pricing Strategies for Selling Your Home)

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What's your price?

Outline

- ❑ Introduction
- ❑ Model Selection I: Training
- ❑ Model Selection II: Model Performance
- ❑ Model Demo: Real Estate Pricing Machine
- ❑ Product Performance: Latency
- ❑ Conclusion

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Introduction

Problem Statement:

How should a house-owner/seller justified the price of this house? You could buy a mansion in Texas for $300k, but that same price will only get you a bathroom-sized apartment in New York City…

Objective: **Machine Learning Model - Regression Model**

Our team wants to use machine learning to build a model that addresses such questions and helps sellers **identify the optimal price point** when selling their lovely home

Our model, Lasso Regression is crushing in out-of-sample prediction

We chose Lasso Regression model because…

1. *Model Explainability*
2. *Model Out-of-Sample Performance*

	Trainning	Testing	Trainning	Testing	Trainning	Testing	Trainning	Testing
	Linear Regression		Ridge Regression		Lasso Regression		Random Forest Regressor	
RMSE	376948256.2	838489129.1	787637033.4	834920508.3	359429913.3	564302181.7	102215287	661977933
MAE	13718.53	19194.52	19309.85	19815.06	13477.55	15784.72	6540.41	16340.22
R-square	92.69%	86.23%	84.73%	86.29%	93.03%	90.73%	98.02%	89.13%

Figure 1: Model Performance Comparison

Baseline Model

1. *Comparison to other models as a metric*

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Our selected regression model is carefully train and adjusted.

01

Clean/Format Data & Data Leakage

Q: *"What are the variables that are present when predicting?"*
Q: "Are any data has a lot of N/A?"

02

Baseline Model Training

Q: *"What current model tells us?"*
Q: "Cross-validation, training, validating, and testing…."

03

Model Results Comparison

Q: *"What are the models' results and performance compared to each other ?"*

04

Model Adjustment After Implementation

Q: *"After deployment, do we need to change anything? "*

DEMO

Our system displays a smooth operation and zero failures.

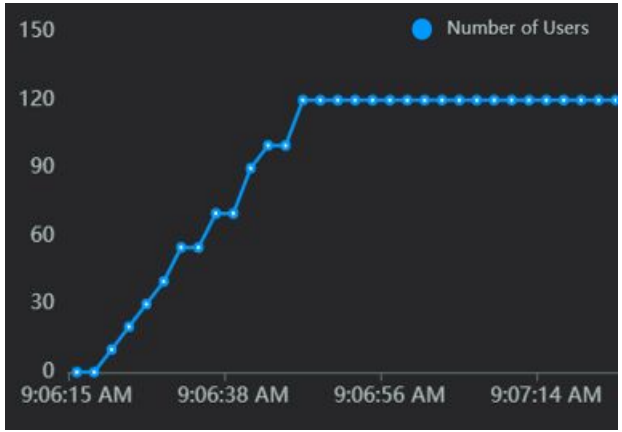

Figure 2: Number of User Over Same Time Frame

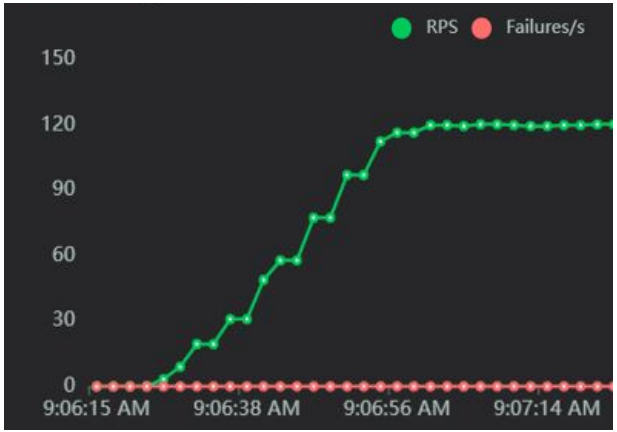

Figure 3: Total Request Per Second (RPS)

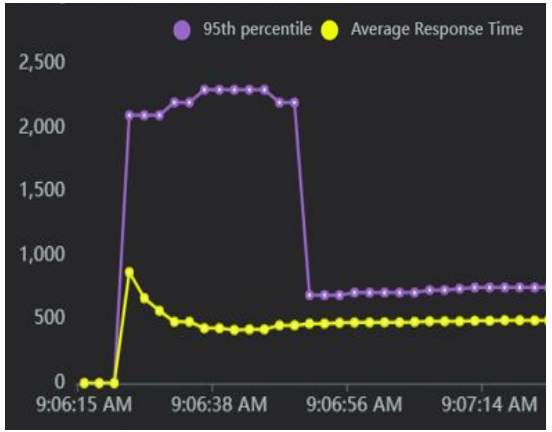

Figure 4: Average Response Time/Rate & 95 Percentile

Now we know:

The Optimal Price Using Regression Model, but…

NEXT  **Better Pricing Model**

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Thank You!

Questions?

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