Part 1: Hedonic Price Model Analysis

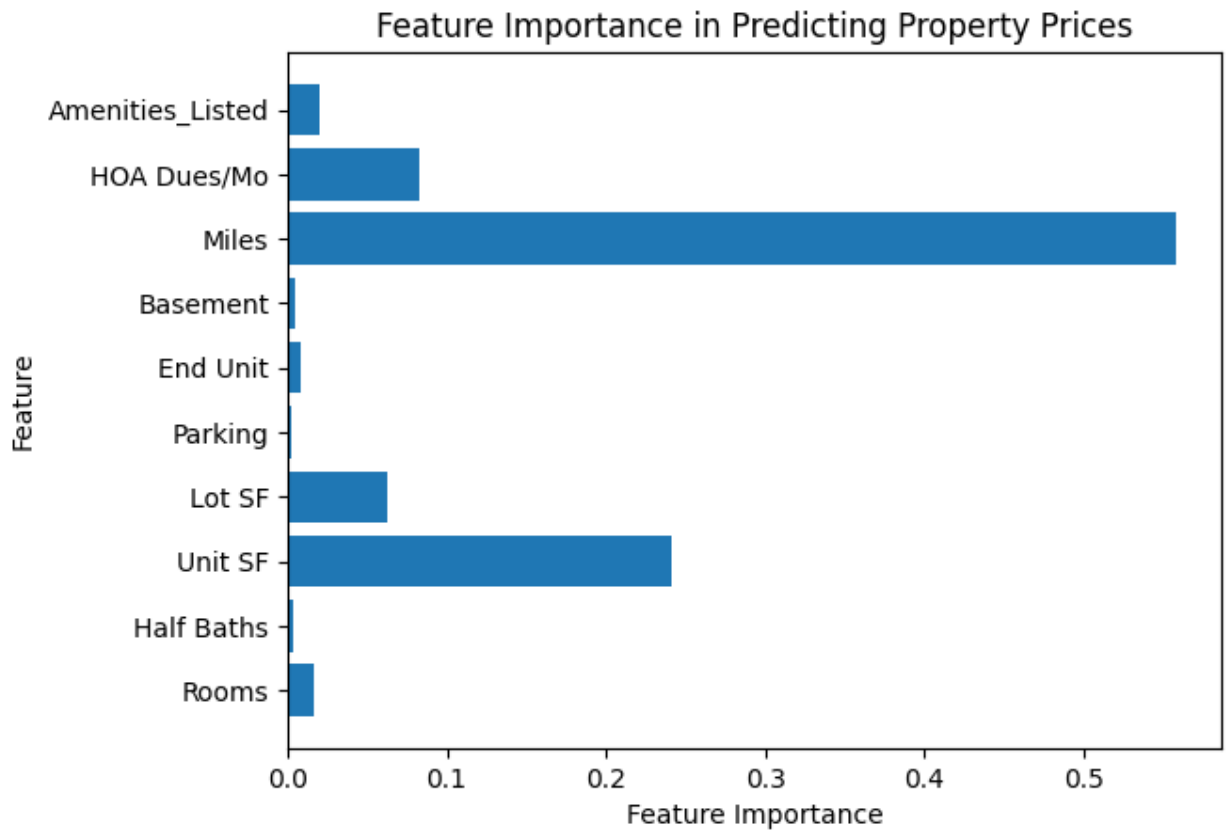
a) Explanation of Variables and Transformations: Our hedonic pricing model strategically includes variables crucial to assessing the value of townhomes in Woodstock. The combination of 'Beds' and 'Full Baths' into 'Rooms' addresses multicollinearity, recognizing that both the number of bedrooms and bathrooms jointly contribute to the functional space of a home, a known determinant of value. The inclusion of 'Half Baths,' 'Unit SF,' and 'Lot SF' further enriches our model by accounting for additional nuances in living space and land that directly influence livability and desirability. 'Parking' is quantified to reflect the value added by garage spaces, and binary variables for 'End Unit' and 'Basement' capture premiums for privacy and functionality. Proximity to downtown ('Miles') is incorporated to gauge locational desirability, a primary factor in property valuation. 'HOA Dues/Mo' considers the impact of ownership costs on affordability and valuation, while 'Amenities_Listed' signals the property's lifestyle appeal.

b) Functional Form Assumed: We adopt a linear functional form, leveraging a linear regression framework consistent with economic theory, suggesting that property attributes contribute proportionally to pricing. This approach facilitates the interpretation of model coefficients and enables a straightforward assessment of the marginal impact of each feature.

c) Explanatory Power of the Model: Cross-validation reveals a Mean Squared Error (MSE) indicative of the model's robustness in capturing the variability in townhome prices. The MSE's magnitude suggests that the model, while not capturing all variability, provides substantial explanatory power and serves as a credible tool for property valuation.

d) Signs and Significance of Explanatory Variables: The model underscores 'Unit SF' as a significant predictor, with a positive coefficient aligning with market expectations that larger properties command higher prices. The negative relationship between 'Miles' and price reinforces the value placed on proximity to downtown, with properties further away from this desirable location being less expensive.

For a visual representation of the discussed feature importance, refer to the following graph which illustrates how each variable contributes to the predictive power of our model.



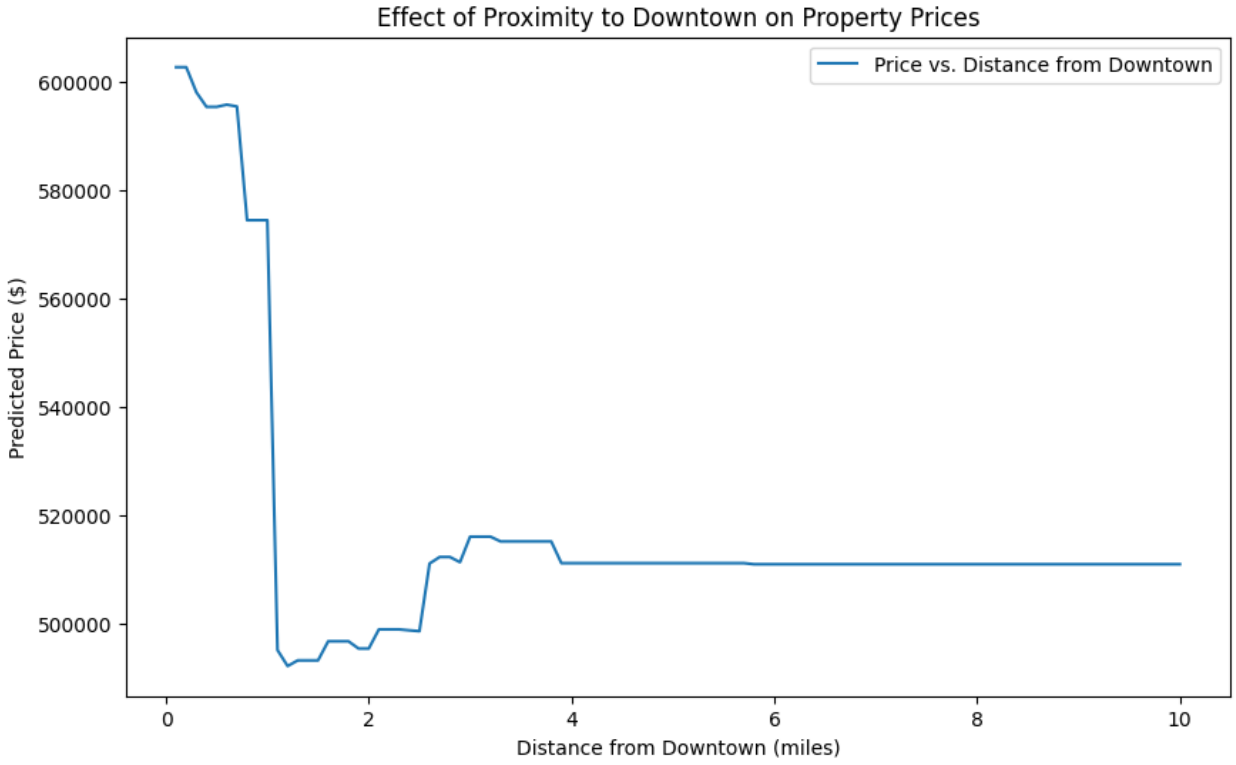
Part 2: Market Analysis with the Hedonic Model

a) Base Unit Price Estimation: 'The Juliet,' a proposed base unit in The Lakes, is valued at approximately $595,280.15 according to our model. This estimate derives from specific features including square footage, room count, and location, all pivotal factors in the real estate market.

b) Marginal Amenity Value Assessment: Our analysis indicates no significant price fluctuation with the addition of a full bathroom, suggesting market insensitivity between half and full baths. Conversely, the model confirms a clear valuation gradient with respect to downtown proximity, emphasizing the premium on location within the townhome market.

c) Price Profile at Varying Distances from Downtown: The visual analysis depicts a pronounced depreciation in predicted prices as the distance from downtown Woodstock increases, only to plateau beyond a certain point. This pattern articulates a strong initial valuation of downtown proximity which stabilizes, likely due to compensatory factors or a threshold beyond which distance ceases to significantly impact pricing.

The following graph depicts the relationship between the distance from downtown Woodstock and the predicted property prices, as discussed, highlighting the premium placed on closer proximity to downtown amenities.



References:

1) Some assistance taken from Generative AI tools