USING MACHINE LEARNING TO ANALYZE AND PREDICT IRELAND'S HOUSING CRISIS

AUTHORS
Barbara Weltson

AFFILIATIONS
cct College Dublin
Computing • IT • Business

INTRODUCTION

Ireland is experiencing a severe housing crisis characterized by skyrocketing prices, limited supply, and growing homelessness. Many young adults are unable to leave their parents' homes, with 68% of Irish adults aged 25-29 still living with their parents (Labour Party, 2024), and not having any hope for changes in the near future.

This research applies machine learning to analyze historical housing data and predict future prices for 2025-2026, providing insights for potential homebuyers, policymakers, and developers in navigating this challenging market.

OBJECTIVE

The primary objective of this research is to develop accurate machine learning models that predict house prices in Ireland's major regions for 2025-2026. By analyzing historical price trends and comparing model performance, this study aims to provide actionable insights to stakeholders and evaluate which regions face the steepest projected increases, helping inform both individual decisions and policy responses.

METHODOLOGY

This research combined two complementary datasets: historical housing data from data.gov.ie and more recent transaction data from Kaggle, creating an integrated dataset spanning from 2000 to recent years. Three key features were used for prediction: Year, Area (Dublin, Cork, Galway, Limerick, Waterford, and Other areas), and Property Type (New vs. Second-hand). I developed and compared three machine learning models—Linear Regression, Support Vector Regression (SVR), and Random Forest—each optimized through hyperparameter tuning to ensure maximum predictive accuracy.

RESULTS

The Random Forest model significantly outperformed other approaches with an exceptional R^2 score of 0.9900, compared to SVR (R^2 = 0.8297) and Linear Regression (R^2 = 0.6767). Predictions for 2025-2026 show continued price increases across all regions, with Dublin and Cork experiencing the steepest projected growth. New properties consistently command higher prices than second-hand homes in all regions, and significant regional price disparities persist, with Dublin maintaining substantially higher prices than other areas, contributing to the ongoing affordability crisis.

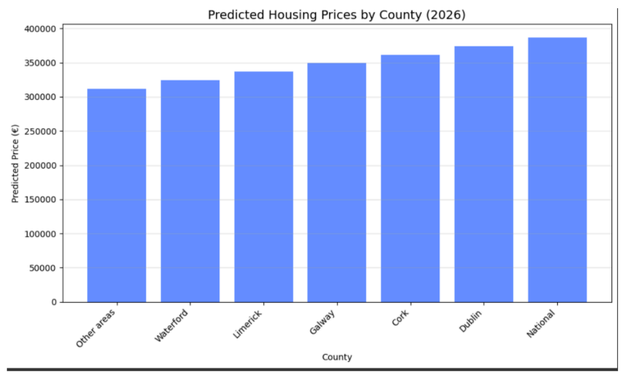
ANALYSIS

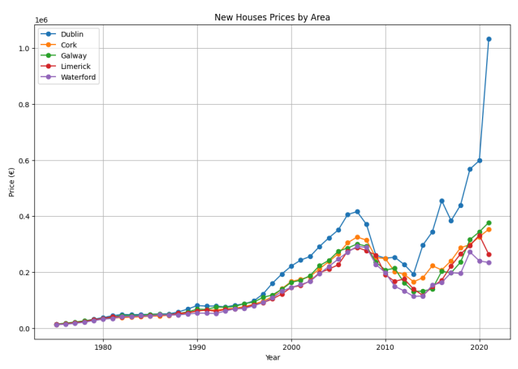
Regional Disparities: Dublin consistently shows the highest housing prices, followed by Cork, while other regions remain relatively more affordable. These disparities reflect differences in economic opportunities and demand patterns.

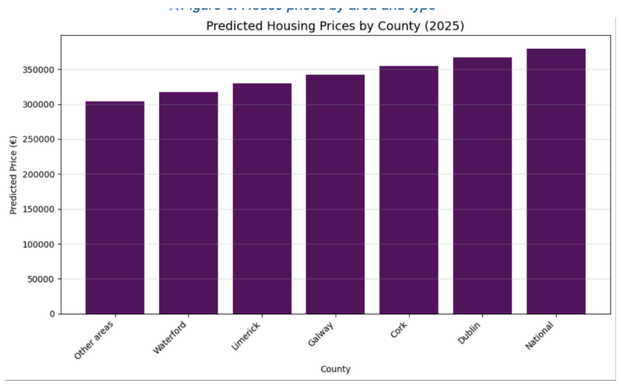
Model Performance Comparison: Random Forest captured complex relationships in the housing data that simpler models missed, suggesting non-linear relationships between features and prices.

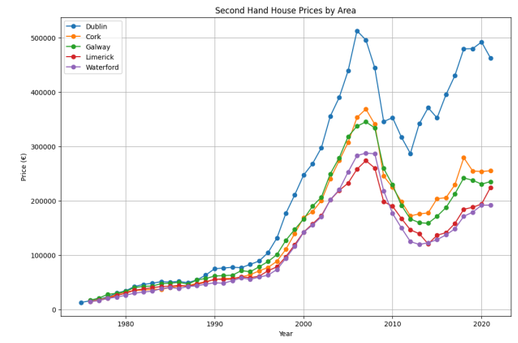
International Lessons: Singapore's Housing Development Board provides affordable housing to nearly 80% of its population through public housing and subsidies. Finland's "Housing First" approach has significantly reduced homelessness by prioritizing immediate stable housing before addressing other issues. These models offer valuable lessons for Ireland's approach.

Future Price Trajectory: Predicted continued price increases suggest that without significant policy interventions, affordability challenges will persist and potentially worsen through 2026.









CONCLUSION

Machine learning analysis reveals that Ireland's housing crisis will likely continue to intensify through 2025-2026, with prices projected to rise across all regions. Dublin and Cork face the steepest increases, potentially exacerbating regional economic disparities. For potential homebuyers, areas outside Dublin offer significantly more affordable options while still providing access to urban amenities.

Policymakers should consider increasing direct state involvement in housing provision, streamlining planning processes, and implementing effective vacant property strategies based on successful international models to address this persistent and worsening crisis.

RELATED LITERATURE

Labour Party (2024) Government Failure: 68% of young adults still live with parents. https://labour.ie/news/2024/03/19/government-failure-68-of-young-adults-still-live-with-parents/

Moosavi, S. et al. (2019) "A Countrywide Traffic Accident Dataset", Arxiv.org.

Data.gov.ie (2023) HSA06 Average Price of Houses. Available at: https://data.gov.ie/dataset/hsa06-average-price-of-houses.