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**Assessment Cover Page**

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| *Module Title* | Strategic Thinking |
| *Assessment Title* | CA 1 – Capstone Project Proposal |
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**Declaration**

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I further confirm that this work has not previously been submitted for assessment by myself or someone else in CCT College Dublin or any other higher education institution.

**Assessment Task: Capstone Project Proposal**

**Title:** *Predicting Housing Prices Using Machine Learning*

Introduction

The housing market plays an essential role in economic stability and development. Housing prices directly influence household wealth, investment decisions, and urban planning. Fluctuations in housing prices affect not only individual homeowners but also investors and governments, making the prediction of housing prices a critical task for many sectors. Predicting housing prices with accuracy can help stakeholders make informed decisions about investments, development, and economic policies. Traditional statistical methods have long been used to forecast housing prices, but these techniques often fall short when it comes to capturing the complex and dynamic nature of the housing market. However, advances in machine learning offer new opportunities to improve the accuracy and reliability of prediction models by analyzing large datasets and identifying patterns in housing prices more efficiently than traditional methods (Case and Quigley, 1991).

The increased availability of housing data allows machine learning techniques to provide a reliable solution for forecasting housing prices based on various features such as property size, location, nearby amenities, and infrastructure. This project aims to develop a machine learning model capable of accurately predicting housing prices by analyzing data from European Union sources, focusing on the factors that drive price fluctuations. The outcomes will have practical applications for real estate companies, investors, urban planners, and policymakers who need data-driven insights for decision-making in the ever-changing housing market.

# Objectives

The primary objective of this project is to develop a machine learning-based prediction model that can accurately predict housing prices based on key factors. This will involve the design and implementation of various machine learning algorithms, such as regression models, decision trees, and random forests. A significant part of the project will focus on evaluating the performance of these algorithms to determine which is most suitable for predicting housing prices. Additionally, the project will explore real-world applications, providing a tool that helps real estate companies, investors, and urban planners make informed decisions on property investments by forecasting future price trends.

Another key objective is to create an interactive visualization tool that offers real-time insights into housing price predictions and market trends. This dashboard will provide stakeholders with user-friendly access to the model’s predictions, making it easier to interpret the results and apply them to their decision-making processes. Finally, the model will be designed with scalability in mind, ensuring that it can handle large datasets and be adapted for use in different regions within Europe. This adaptability will broaden the model’s applicability and allow it to serve a wider audience.

Problem Definition

The housing market is subject to constant fluctuations due to various factors, including economic conditions, supply and demand, and location-specific variables. Traditional statistical models used for predicting housing prices often struggle to capture the complex relationships between these variables, resulting in inaccurate or incomplete forecasts. As a result, there is a growing need for more sophisticated prediction techniques that can account for these complexities and offer better accuracy. The goal of this project is to address this need by utilizing machine learning techniques that can automatically learn from historical data and improve predictions over time (Mueller and Tibshirani, 2020).

Machine learning algorithms are well-suited for this task because they can process large amounts of data, identify patterns, and adapt to changing trends in the market. By incorporating various factors such as economic conditions, property features, and location characteristics, the machine learning model developed in this project will offer a more accurate and timely prediction of housing prices. This model will be particularly beneficial for stakeholders such as real estate companies, urban planners, and investors, who rely on accurate forecasts to make data-driven decisions in a dynamic market.