Project Synopsis

Project Title: Dynamic Pricing Model for E-Commerce Platforms Using Machine Learning

Interns: Reva (IGDTUW), Kanika (IGDTUW)

Internship: Python and Machine Learning Internship - Summer 2025

Objective

The objective of this project is to build an intelligent dynamic pricing system using machine learning that enables e-commerce platforms to adaptively set product prices based on real-time market data, competitor pricing, demand fluctuations, and user behavior, maximizing overall profitability.

Problem Statement

Traditional pricing models are often static and do not respond well to market changes, leading to revenue losses. This project aims to create a pricing model that dynamically adjusts prices based on various real-world factors to stay competitive and increase revenue.

Methodology

- Collect and clean data containing product prices, categories, demand trends, and competitor prices.

- Perform feature engineering to extract meaningful signals like demand-supply ratio, price elasticity, etc.

- Train and evaluate models including Linear Regression, XGBoost, Random Forest, and Neural Networks.

- Validate using metrics like RMSE and R² Score.

- Integrate business logic to generate final optimized prices based on predictions.

Dataset

We are using publicly available datasets from Kaggle such as the 'E-Commerce Product Data' and 'Online Retail Dataset'. Simulated datasets are also used for competitor and real-time demand generation.

Tools & Technologies

Summer Internship on Python and Machine Learning

Python, pandas, numpy, scikit-learn, xgboost, matplotlib, seaborn, Flask/Streamlit (optional for deployment), Jupyter Notebook, GitHub.

Expected Outcomes

A machine learning-based system capable of recommending optimal dynamic prices for products. Visual insights to compare price vs. revenue impact. Demonstrated potential for revenue increase based on test simulations.

Sample Graph: Revenue Comparison
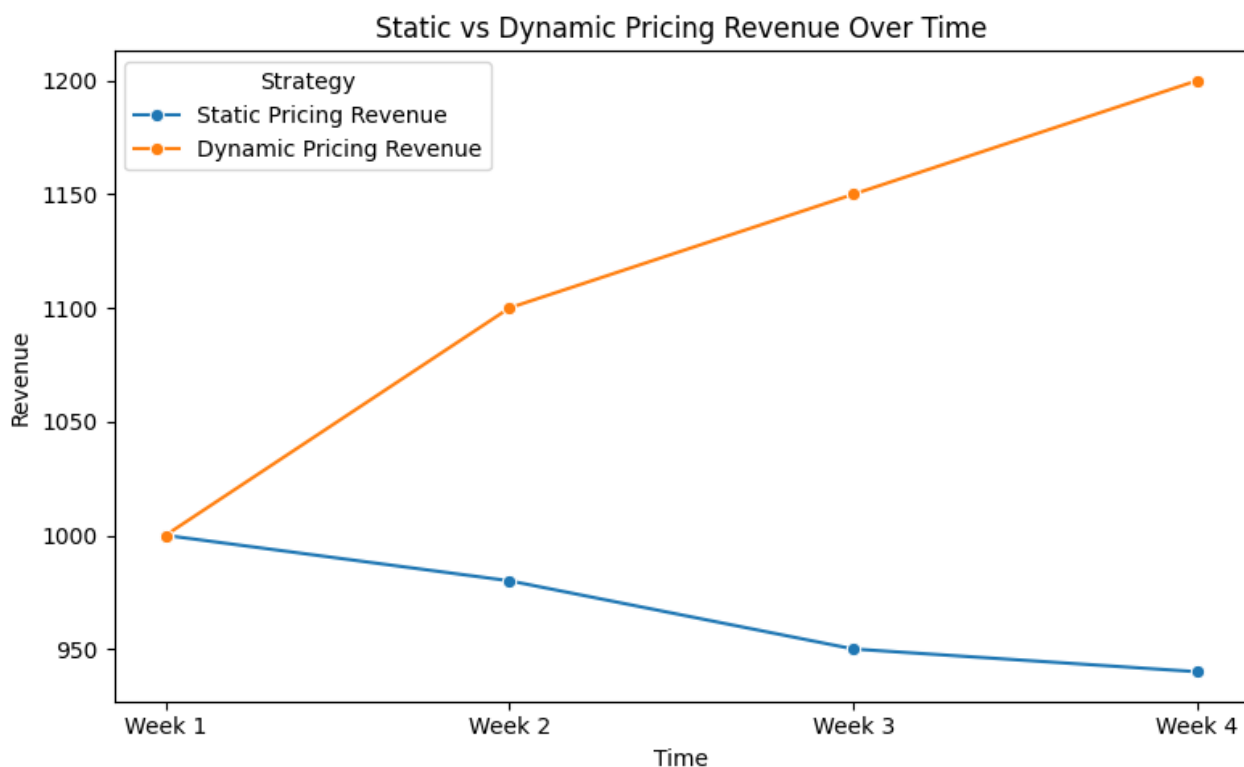
Future Scope

The project can be extended using reinforcement learning for real-time decision-making and integrated with live APIs for competitor tracking. The solution may also be deployed as a scalable microservice.