[EFFECTIVENESS OF PREDICTIVE ANALYSIS FOR PRICING IN E-COMMERCE:A MACHINE LEARNING APPROACH]

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Introduction

The study finds pricing trends and elements, given companies the information they need to adjust to shifting consumer needs and maximize profits in the competitive marketplace of online shopping.

Motivation

The primary objective is to give e-commerce businesses the ability to move away from purely reactive methods and toward proactive, data-driven pricing strategies that are sensitive to shifting market conditions in real time.

Literature Review

Ong, k., Haw, S.C. and Ng, K.W. (2019) paper reviews deep learning recommender systems (MLP,AE,CNN,RNN,RBM,DRL), datasets (movieLens,Epinions,Amazon),and Evaluation metrics.
In this research we are going to use eBay dataset and apply Traditional Machine Learning models like (Linear Regression etc) and predicting prices instead of Amazon data.

Research Questions

▶ Impact of Data Scaling and Outlier.Elimination Techniques for Competitive Pricing.

▶ Reliability and quality of the data Decision Making Based on the Client Predictive Pricing Models

▶ Feature importance and customer value

Methodology

▶ Web Scraping was used to extract mobile phone data from eBay listings.

▶ Cleaning and normalization of the dataset handled outliers and missing values, and exploratory data analysis (EDA) Yielded insights.

▶ Used a variety of machine learning techniques, such as Random forest,XGBoost,k Nearest Neighbors,Decision Tree and SVM Regression,Linear Regression;metrics including MSE,RMSE were used to assess the models interpretability and accuracy.

▶ Examined trends and variables related to price.

Methodology

1. Data Processing and Collection
2. Model Development and Training
3. Evaluation and Results

Result

Model performance is increased when the RMSE amd MSE values are lower.The results show that due to decreased error, the K Nearest Neighbors regression is highly accurate in estimating the cost of mobile phones.Although Decision Tree, SVM,XGBoost, and Random Forest demonstrated strong performance, their error measurements were somewhat greater than K Nearest Neighbors regression.

Result

Table: MSE and RMSE values For each Algorithm

Model	MSE	RMSE
Linear Regression	27808507342.901222	166758.8298798634
Decision Tree	16780.952509067345	129.54132583810374
Random Forest	16732.2117468851	129.35305078306078
SVM Regression	49651467725.104256	222826.09300776303
XGBoost Regression	16726.95122918556	129.3327152316287
K Nearest Neighbors	16708.26047412715	129.26043661587698

Conclusion

By utilizing web scraping and sophisticated machine learning algorithms such as K Nearest Neighbors regression, this technique provides a strong basis for predicting mobile phone prices.Its capacity to instantly and dynamically modify prices in response to demand,seasonality,updated data, and competitiveness pricing puts businesses in a position to increase their competitiveness and optimize profit margins through well-informed pricing strategies.

Recommendations

1. Recommendations
   - Focusing on improving current regression models and exploring innovative methods,such as adjusting hyperparameters, practisting regularisation techniques.
2. Recommendation
   - Future research should focus on cutting edge techniques such as deep learning models, reinforcement learning, and transfer learning.These techniques can handle complex patterns and unstructured data, improving prediction accuracy.

Thanks for listening!