

**LAPTOP PRICE ANALYSIS AND PREDICTION  
USING MACHINE LEARNING**

**A Project Report**

Submitted in partial fulfillment of the requirements  
for the Internship Program

**Submitted by**

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## **ABSTRACT**

Laptop prices vary widely based on specifications such as brand, processor, RAM, storage, and display features. This project focuses on analyzing laptop price data and building a machine learning model to predict laptop prices based on their specifications. The dataset used contains various laptop features collected in a structured CSV format. Data preprocessing, exploratory data analysis, and machine learning techniques were applied to understand price trends and improve prediction accuracy. A regression-based model was developed and evaluated using appropriate performance metrics. This project demonstrates practical skills in data analysis, data visualization, and machine learning using Python.

## **1. INTRODUCTION**

In recent years, laptops have become an essential tool for education, business, and personal use. The wide range of available laptop configurations makes price estimation challenging for customers and sellers.

The purpose of this project is to analyze laptop price data and build a predictive model that estimates laptop prices based on hardware specifications. Machine learning techniques are used to identify key factors that influence laptop pricing.

## **2. OBJECTIVES**

- To analyze laptop price data using Python
- To perform data preprocessing and feature engineering
- To visualize relationships between laptop specifications and price
- To build a machine learning model for price prediction
- To evaluate model performance

## **3. DATASET DESCRIPTION**

The dataset used in this project is "laptop\_prices.csv". It contains detailed information about laptops and their prices.

Attributes include:

- Brand
- Processor
- RAM
- Storage
- Operating System
- Screen Size
- Price

The dataset was cleaned and prepared before applying machine learning algorithms.

#### **4. TOOLS AND TECHNOLOGIES USED**

- Programming Language: Python
- Libraries: Pandas, NumPy, Matplotlib, Seaborn, Scikit-learn
- Development Environment: Jupyter Notebook
- Data Format: CSV

#### **5. METHODOLOGY**

The project follows these steps:

1. Data Collection from CSV file
2. Data Cleaning and Preprocessing
3. Exploratory Data Analysis (EDA)
4. Feature Selection and Encoding
5. Model Building using Machine Learning
6. Model Evaluation and Prediction

#### **6. MACHINE LEARNING MODEL**

A regression-based machine learning model was used to predict laptop prices. The dataset was split into training and testing sets. The model was trained using historical data and evaluated using accuracy metrics such as R-squared and Mean Absolute Error. The model showed satisfactory performance in predicting laptop prices.

#### **7. RESULTS AND ANALYSIS**

The analysis revealed that laptop specifications such as RAM, processor type, and storage have a significant impact on price. Visualizations helped identify pricing trends and relationships between features. The machine learning model successfully predicted laptop prices with reasonable accuracy, demonstrating the effectiveness of data-driven pricing analysis.

## **8. CONCLUSION**

This project successfully analyzed laptop price data and developed a machine learning model to predict prices based on specifications. The results highlight the importance of hardware

features in determining laptop prices.

The project enhanced practical knowledge of data analysis, machine learning, and Python programming.

## **9. FUTURE SCOPE**

- Use larger and more diverse datasets
- Apply advanced machine learning algorithms
- Deploy the model as a web application
- Include real-time price prediction features

## **10. REFERENCES**

- Python Documentation
- Scikit-learn Documentation
- Kaggle Datasets