

REPORT



LAPTOP PRICE PREDICTOR

USING MACHINE LEARNING

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Github Repository:
<https://github.com/saiful-islam-rupom/laptop-price-predictor.git>

Introduction

This project aims to help consumers determine if a laptop is fairly priced by predicting its cost based on technical specifications. It involves building a regression model using real-world data on laptop configurations and prices. The final model is deployed in a Streamlit web application, allowing users to input specs and get an instant price prediction. The app also includes dynamic currency conversion for international users.

Objective

The primary objectives of this project are:

- To develop a machine learning model that predicts the price of a laptop based on its specifications.
- To engineer useful features from raw data to improve prediction accuracy.
- To design a simple, interactive, and user-friendly web interface for price prediction.
- To deploy the model publicly using Streamlit Cloud for ease of access.
- To offer dynamic currency conversion (INR \rightarrow USD, EUR, BDT) with editable exchange rates.

Dataset Overview

- Source: Online
- Size: 1,300+ records
- Key Features Used (After cleaning & preprocessing the data):
 - Brand
 - Type (Notebook, Gaming, Ultrabook, etc.)
 - Screen Size (inches)
 - Screen Resolution
 - IPS Panel (Yes/No)
 - CPU
 - Ram
 - SSD
 - HDD
 - GPU
 - Touchscreen (Yes/No)
 - OS
 - Weight
 - Price (Target Variable, in INR)

Tools and Technologies Used

Category	Tools / Libraries
Programming Language	Python
Data Analysis	Pandas, NumPy
Visualization	Matplotlib, Seaborn
Machine Learning	Scikit-learn (Random Forest Regressor)
Web Application	Streamlit
Model Serialization	Pickle
Deployment	Streamlit Community Cloud

Project Workflow

This project follows a complete end-to-end machine learning pipeline:

1.Data Collection

- Real-world laptop specifications and prices were collected from online sources.

2.Data Preprocessing

- Handling missing values
- Feature engineering
- Encoding categorical variables

3.Model Building

- Algorithm used:
RandomForestRegressor
- Trained on 85% of the dataset
- Evaluated using MAE and R^2 score on test data

4. Model Serialization

- Final pipeline (preprocessing + model) saved using pickle as pipe.pkl
- Supporting data (e.g., dropdown options) saved as df.pkl

5. Web App Development

- Built using Streamlit for fast deployment and easy UI
- Inputs collected using dropdowns, sliders, checkboxes
- Currency conversion with editable exchange rates (INR → USD, EUR, BDT)

6. Deployment

- App deployed for free using Streamlit Community Cloud
- Publicly accessible via shareable URL

Model Performance

Metric	Score
R^2 Score	0.8918
MAE	0.1551

Web Application Features

- Different interactive inputs.
- Dynamic currency conversion: INR to USD, EUR, BDT
- Option to edit exchange rates directly from the UI
- Instant predicted price display based on user inputs

App Snapshots

Laptop Price Predictor

Developed by [Saiful Islam Rupom](#)

Predicts the price of a laptop based on its specifications.

Brand

Asus



Laptop Type

Ultrabook



Screen Size (Inches)

14.00



Screen Resolution

1920x1080



IPS Panel

Yes



CPU

Intel Core i7



RAM (GB)

8



SSD (GB)

512



HDD (GB)

0



GPU

Intel



Touchscreen

No



Operating System

Windows



Weight (Kg)

1.40



Select Currency

USD



Set Exchange Rates (per 1 INR) if you want or just ignore.

USD Rate

0.0120



EUR Rate

0.0110



BDT Rate

1.29



Predict Laptop Price

The predicted price of this configuration is 843.92 USD

Exchange Rates Used:

- 1 INR = 0.0120 USD
- 1 INR = 0.0110 EUR
- 1 INR = 1.29 BDT

Live App: [Click to Try the App](#)

Limitations and Assumptions

- The model is only as good as the dataset; rare configurations may be underrepresented.
- Price estimation assumes all laptops are new and does not consider discounts or second-hand conditions.
- Exchange rates are manually editable but not fetched live from an API.

Future Enhancements

- Add live exchange rate integration using a currency API
- Show price distribution or comparison graph for selected specs
- Add data visualization dashboard (e.g., brand-wise price trends)
- Enable user uploads to batch-predict multiple laptops
- Enhance UI with theme customization and responsiveness

Conclusion

This project successfully demonstrates how machine learning can be applied to build practical applications that solve real-world problems. The laptop price predictor leverages the power of regression models to estimate prices from technical specifications, offering users a convenient tool for research and comparison. The interactive Streamlit interface and free public deployment make this project accessible to a broad audience.

Acknowledgements

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