

Laptop Price Prediction using Machine Learning

*An End-to-End Machine Learning Project Developed During
My Data Science Internship at Unified Mentor Pvt. Ltd.*

Intern

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Duration

6-Month Data Science Internship

Organization

Unified Mentor Pvt. Ltd.

Objective

To build and deploy a machine learning model capable of predicting laptop prices in Euros based on hardware specifications.



Problem Statement & Objective

Problem Statement

The laptop market has a wide price variation depending on configurations such as CPU, GPU, RAM, and display. Predicting prices manually is complex due to multiple interdependent features.

Objective

- To analyze laptop specifications and build a **predictive model** that estimates price accurately.
- To deploy a **user-friendly web interface** for real-time price prediction.

Key Challenge: Handling categorical diversity and ensuring the model generalizes across unseen laptop configurations.

Methodology & Workflow

Step-by-Step Workflow:

01

Data Collection

Gathered a real-world dataset with detailed laptop attributes.

02

Data Cleaning & Preprocessing

Handled null values, standardized units (GHz, GB), and removed inconsistencies.

03

Feature Engineering

Extracted new features: CPU_company, GPU_company, Touchscreen, RetinaDisplay, etc. Selected key predictors: ['Product', 'CPU_model', 'GPU_model', 'Ram', 'CPU_freq', 'PrimaryStorage', 'TypeName']

04

Encoding & Scaling

Used **Target Encoding** for categorical variables (category → mean price). Applied **RobustScaler** to handle outliers effectively.

05

Model Training & Evaluation

Trained a **Logistic Regression** model. Evaluated using **MAE**, **RMSE**, **R² score**.

Model Deployment & Results

Model Deployment

- Developed an interactive **Streamlit web application**.
- Users can input specifications (CPU, GPU, RAM, etc.) and get **instant price predictions**.
- Integrated preprocessing (encoding + scaling) at the backend for seamless performance.

Results

- Achieved consistent predictive accuracy on test data.
- Successfully handled unseen categories using dynamic encoding maps.
- Clean, intuitive UI ensures usability for both technical and general users.

Tech Stack

 Python | Pandas | NumPy | Scikit-learn | Streamlit | Joblib

Key Learnings & Acknowledgement

Key Learnings

- *End-to-End ML Pipelines*
Hands-on exposure from raw data to deployment.
- *Real-World Problem Solving*
Experience in resolving feature mismatch errors during real-world deployment.
- *Feature Engineering Mastery*
Deep understanding of feature encoding, scaling, and model interpretability.
- *MLOps & Web Development*
Built strong foundations in Streamlit app development and MLOps concepts.

Acknowledgement

I would like to express my heartfelt gratitude to **Unified Mentor Pvt. Ltd.** for providing this incredible internship opportunity. Their mentorship, guidance, and resources played a crucial role in helping me implement and deploy this project successfully.

Closing Thought

"Turning data into insights – and insights into real-world solutions."