

**Project Synopsis**

**Project Name: Laptop Price Trends and Analysis**



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**Project Synopsis: Laptop Price Trends and Analysis**

**1. Title:**

Laptop Price Analysis Using Python

**2. Introduction:**

This project aims to analyze various factors influencing laptop prices. By examining attributes like brand, screen resolution, CPU and GPU specifications, memory capacity, and weight, this study seeks to identify trends in laptop prices and the relationship between these features and cost.

**3. Objectives:**

* To identify the key factors affecting laptop prices.
* To analyze price trends across different brands and laptop types.
* To understand the impact of hardware specifications on laptop pricing.
* To provide insights that can help consumers make informed purchasing decisions.

**4. Scope of Work:**

The analysis covers laptops from various manufacturers and different configurations. Attributes such as screen resolution, CPU type, RAM, GPU, operating system, and weight are examined in relation to price, providing a comprehensive overview of the factors driving laptop costs.

**5. Methodology:**

The project will follow a structured data analysis approach, starting with data cleaning and preprocessing, and Data Transformation followed by exploratory data analysis, feature selection, modeling, and result interpretation.

**6. Exploratory Data Analysis (EDA):**  
EDA will involve summarizing and visualizing the data to understand trends and patterns. Key attributes like screen resolution, CPU, GPU, memory, and weight will be analyzed to explore their relationship with price.

**7. Feature Selection:**  
Relevant features affecting laptop prices, such as brand, screen resolution, CPU frequency, and GPU type, will be identified and selected for modeling. This step ensures that only meaningful features are included in the analysis.

**8. Modeling:**  
Using regression techniques, we will build models to predict laptop prices based on selected features. This will help quantify the contribution of each attribute to the overall cost.

**9. Evaluation and Interpretation:**The model's accuracy will be evaluated using metrics like Mean Absolute Error (MAE) and R-squared. Interpretations will provide insights into which features have the highest influence on laptop prices.

**10. Visualization:**  
Charts and graphs (e.g., bar charts, scatter plots, and heatmaps) will be generated to visualize trends and findings from the analysis, such as price distributions by brand, the effect of CPU frequency on price, and the correlation between memory size and cost.

**11. Reporting:**  
The analysis, results, and insights will be compiled into a comprehensive report, presenting both statistical findings and visual representations to make the data insights accessible and actionable.

**12. Tools and Technologies:**  
The project will utilize:

* **Programming Language:** Python
* **Libraries:** Pandas, NumPy, Matplotlib, Seaborn, Scikit-learn
* **IDE:** Jupyter Notebook or any Python-compatible IDE
* **Data Source:** Provided laptop dataset

**14. Timeline:**  
A timeline will be set for data cleaning, EDA, feature selection, modeling, evaluation, and reporting, with milestones to ensure timely project completion.

**15. Conclusion:**

The project will offer insights into laptop pricing trends, helping consumers and retailers understand which features contribute most to laptop prices. The findings will help guide purchasing decisions and offer a foundation for further research on hardware cost analysis.