Exploring Laptop Trends Using Data Analysis and Visualization

**Introduction (Paragraph)**

In an increasingly digital world, the demand for laptops has skyrocketed, with consumers seeking a wide range of specifications, features, and price points. Understanding the dynamics of the laptop market is crucial for manufacturers, retailers, and even consumers. This project focuses on analyzing a dataset from Kaggle that includes various specifications of laptops, such as brand, processor, RAM, storage, and pricing. By leveraging data analysis and visualization, this study aims to uncover trends, consumer preferences, and factors that influence pricing. This insight will help better understand the market landscape and guide decision-making for both companies and individuals. The importance of this topic lies in its relevance to the constantly evolving tech industry and how data can drive market strategies.

**Two Reference Papers**

1. “Analyzing Consumer Preferences for Laptop Features Using Conjoint Analysis” - This paper explores how consumers value different laptop features, helping contextualize the data analysis in terms of consumer preferences.

2. “Market Segmentation in the Electronics Industry: A Case Study of the Laptop Market” - This reference offers insights into how the laptop market is segmented, providing a backdrop for further analysis of the dataset.

**Data Introduction**

* File Name: [laptop.csv](https://www.kaggle.com/datasets/pradeepjangirml007/laptop-data-set/data?fbclid=IwY2xjawF2PKFleHRuA2FlbQIxMAABHbEj7j6fSs4vgyoh39sOcHSxcvid504o5QXfhI8_ege7UAxXSJXmKC8coQ_aem_80eqPNNuxB9Fld5vYd7C9w)
* Data Size: The dataset will be analyzed and cleaned as part of the process. I will load and inspect the size, number of columns, and rows in the next step.
* Source: Since the dataset has been provided by you, it is assumed to be curated for a specific purpose (you could add whether this data is collected from sales records, reviews, or industry reports).
* Contents: The dataset likely contains details about laptops such as their specifications, prices, brands, performance ratings, etc. I will load and inspect the dataset to confirm the exact content.

**Plan for Lateral Analysis and Visualization**

1. Data pre-processing:
   1. Data cleaning: removing missing or irrelevant entires, and ensuring all fields are properly labeled and structured.
   2. Normalization: for factors like price or scores by using min-max normalization to bring them into comparable ranges.
   3. Feature extraction: Extract important features such as brand, categories, processor types,...
2. Analysis:
   1. Descriptive statistics: compute the mean, median, mode, and standard deviation for continuous fields like price, scores,...
   2. Correlation analysis: identifying relationships between various features, such as price, brand, or sales volume.
   3. Trend analysis: explore trends in pricing, performance, or brand popularity over time.
3. Data visualization:
   1. Static visualizations:
      1. Bar charts to show the distribution of brands, screen sizes,...
      2. Box plots to display variations in price and performance across different brands.
   2. Interactive visualizations:
      1. Scatter plots with interactive over features to explore relationships between two variables, such as price vs. performance.
      2. Lind graphs to explore trends over time.
      3. Heatmaps for analyzing the correlation between multiple features.

**Two Images from Internet:**

<https://www.t4.ai/industries/laptop-market-share>

<https://www.maximizemarketresearch.com/market-report/global-laptops-market/21050/>

**Group Members’ Duties:**

* Qichen Jin: Sentiment analysis, logistic regression, and plotting.
  + Conduct sentiment analysis on Pennsylvania newspaper articles
  + Create a logistic regression model.
  + Generate regression analysis plot, time-series comparison plot, and others plots.
* Lena Tong: Modeling building, time series analysis, and reliability of results
  + Generate multivariable linear regression and time series analysis.
  + Use time series analysis to look at patterns in economic
  + Interpret model results and assess accuracy of predictions.