

LAPTOP PRICE PREDICTION SYSTEM

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ABSTRACT

The laptop price prediction tool is a machine learning application that helps users find the best prices for laptops. The tool uses two models, SVR and Linear Regression, to predict laptop prices based on the laptop's specifications. It uses label encoding for pre-processing and the trained model is saved and loaded using pickle. The web-based application is user-friendly, allowing users to input the laptop model and receive a predicted price range. In addition, the tool provides features such as setting alerts for price drops, viewing historical price trends, and comparing prices across multiple retailers. The tool's machine learning models are trained on a large dataset of laptop pricing and product data, making it accurate and up-to-date. The tool is deployed in Streamlit, making it accessible to users. Overall, the laptop price prediction tool simplifies the process of finding the best prices for laptops online and helps users make informed purchasing decisions.

Problem Statement

Laptop prices can vary greatly depending on the brand, model, specifications, and other factors. This can make it difficult for consumers to find the best deals on laptops that meet their needs and budget. Moreover, laptop manufacturers and retailers face the challenge of determining the optimal price point for their products. To address these challenges, a machine learning-based laptop price prediction tool can be developed that accurately predicts the price of laptops based on their features, specifications, and other factors. This tool will not only help consumers find the best deals on laptops but will also help manufacturers and retailers optimize their pricing strategy and stay competitive in the market.

Market/Customer/Business Need Assessment:

Market Assessment:

The laptop market has grown rapidly in recent years due to the increasing demand for laptops for personal and professional use. According to Statista, the global laptop market size was valued at approximately \$109 billion in 2020 and is expected to grow to around \$126 billion by 2027. With such a vast market size, there is a significant need for a tool that can help consumers find the best deals on laptops and manufacturers and retailers to optimize their pricing strategy.

Customer Assessment:

The primary customers of the laptop price prediction tool are individual consumers and businesses looking to purchase laptops. The tool will help them find the best deals on laptops that meet their needs and budget. Additionally, laptop manufacturers and retailers can also benefit from the tool by optimizing their pricing strategy to stay competitive in the market.

Business Need Assessment:

The laptop price prediction tool will provide a unique value proposition to its customers by offering accurate price predictions for laptops based on their features, specifications, and other factors. By using the tool, customers can save time and money by finding the best deals on laptops that meet their needs and budget. Additionally, manufacturers and retailers can use the tool to optimize their pricing strategy and stay competitive in the market.

Overall, the laptop price prediction tool addresses the market need for a solution that helps customers find the best deals on laptops and manufacturers and retailers to stay competitive in the market by optimizing their pricing strategy.

Target Specifications and Characterization:

Target Specifications:

- The tool should be user-friendly and easy to navigate for customers.
- The tool should be able to provide accurate price predictions for laptops based on their features, specifications, and other factors.
- The tool should be able to analyze historical data and current market trends to provide insights into the factors that affect laptop pricing.
- The tool should be able to generate customized reports that provide customers with detailed information on the laptops they are interested in purchasing.
- The tool should be able to provide recommendations to customers on which laptops to purchase based on their needs and budget.

Characterization:

The laptop price prediction tool is designed to help customers find the best deals on laptops by providing them with accurate price predictions based on their desired features and specifications. The tool will use machine learning algorithms to analyse historical data and current market trends to provide insights into the factors that affect laptop pricing.

The tool will be user-friendly and easy to navigate, with a simple and intuitive interface that customers can use to search for laptops and view price predictions. Customers will be able to generate customized reports that provide them with detailed information on the laptops they are interested in purchasing, including specifications, features, and pricing information.

The tool will also provide recommendations to customers on which laptops to purchase based on their needs and budget. Customers will be able to input their desired features and specifications, and the tool will generate a list of laptops that meet their criteria, along with price predictions and recommendations.

Overall, the laptop price prediction tool is designed to provide customers with the information they need to make informed decisions about purchasing laptops,

while also helping manufacturers and retailers optimize their pricing strategy to stay competitive in the market.

External Search:

- International Journal of Computer Science and Mobile Computing. Laptop Price Prediction using Machine Learning.
- https://www.researchgate.net/publication/50946368_Exploratory_data_analysis_in_the_context_of_data_mining_and_resampling.
- https://issuu.com/pricedetailsindia/docs/blog_c
- <https://medium.com/analytics-vidhya/predicting-laptop-prices-using-ml-e60a0315b45a>

Bench marking alternate products:

1. PCPartPicker: This is a popular website that allows users to select computer components and generate a list of compatible parts for building a custom PC. It also provides users with pricing information from various retailers.
2. Laptop Mag: This website provides reviews and rankings of laptops based on factors such as performance, design, and price. It also provides pricing information from various retailers.
3. PriceSpy: This is a price comparison website that allows users to search for products and compare prices from various retailers. It provides pricing information for a wide range of products, including laptops.

4. **Keepa:** This is a browser extension that provides users with historical pricing data for products on Amazon. It can help users to identify trends and make informed purchasing decisions.
5. **CamelCamelCamel:** This is another browser extension that provides users with historical pricing data for products on Amazon. It also allows users to set price alerts for products they are interested in.

Applicable Patents:

[Patent : Utilizing artificial intelligence to make a prediction about an entity based on user sentiment and transaction history](#)

Applicable Regulations:

- Data privacy laws: Need to comply with data privacy laws such as the General Data Protection Regulation (GDPR) in the European Union or the California Consumer Privacy Act (CCPA) in the United States.
- Consumer protection laws: Examples include the Federal Trade Commission Act (FTC) in the United States and the Consumer Protection Act in the United Kingdom.
- Intellectual property laws: Need to ensure that tool does not infringe on any existing patents or trademarks.
- Anti-discrimination laws: Tool must not be used to discriminate against individuals based on protected characteristics such as race, gender, age, or disability. May need to comply with anti-discrimination laws such as the Americans with Disabilities Act (ADA) in the United States or the Equality Act in the United Kingdom.
- Export controls: May need to comply with export controls laws such as the International Traffic in Arms Regulations (ITAR) in the United States or the Dual-Use Regulation in the European Union.

Applicable Constraints:

Availability of data: The accuracy of predictions will depend on the availability and quality of data. If the data used is incomplete or unreliable, it may affect the performance of your tool.

Computing power: Training machine learning models can be computationally intensive, and may require powerful hardware such as GPUs. If working with limited computing resources, it may affect the complexity and accuracy of model.

Time constraints: The development and testing of machine learning models can be time-consuming, and may have deadlines to meet. May need to balance the need for accuracy with the need to deliver results quickly.

Budget constraints: Building a machine learning tool can be expensive, and may have limited resources to work with. May need to make trade-offs between the cost of computing resources, data acquisition, and hiring staff.

Expertise: Building a machine learning tool requires expertise in data science, software development, and machine learning algorithms. If there we lack the necessary skills, it may be a constraint in the development of my tool.

Business Model:

Freemium model: Offer the basic version of tool for free, but charge for premium features such as more accurate predictions or access to additional data.

Subscription model: Charge users a monthly or annual fee to access tool and its features. This could be a good option while targeting businesses or power users who require frequent access to accurate pricing information.

Commission model: Partner with online retailers or e-commerce platforms and earn a commission on sales made through your tool. This could be a good option and can demonstrate value to retailers.

Data licensing model: Sell access to dataset or predictive model to third-party companies or researchers. This could be a good option if we have developed a unique and valuable dataset or model that is in demand.

Advertising model: Offer the tool for free to users and generate revenue through advertising. This could be a good option if we are able to attract a large user base and can demonstrate value to advertisers.

Concept Generation:

- Identify the problem: Start by identifying the problem I want to solve. In this case, the problem is the difficulty consumers face in finding the best price for laptops online.
- Research existing solutions: Conduct research on existing solutions in the market, such as price comparison websites, online retailers, and product review sites. Look for gaps or opportunities where I can provide additional value to consumers.
- Determined value proposition: Defined unique value proposition and what sets your tool apart from existing solutions. This could be done by use of machine learning algorithms to make more accurate predictions, access to additional data sources, or a more user-friendly interface.
- Define target audience: Identify the specific audience you want to target with your tool, such as budget-conscious shoppers, students, or tech enthusiasts.
- Determine your data sources: Identify the data sources use to make price predictions. This could include data from online retailers, product reviews, or historical pricing information. I just scrapped data from Flickart
- Develop machine learning model: Develop a machine learning model that can analyze the data and make accurate price predictions. This will involve selecting the appropriate algorithms, data preprocessing techniques, and model validation methods.
- Prototype and test: Develop a prototype of tool and test it with potential users. Gather feedback and iterate on the design and functionality of tool.
- Determine your monetization strategy: Decide business model and how will monetize your tool. This could include charging for premium features,

offering a subscription service, or earning commissions on sales made through tool.

Concept Development:

The laptop price prediction tool is a machine learning product that helps consumers find the best prices for laptops online. The tool utilizes machine learning algorithms to analyze data from various sources such as online retailers, product reviews, and historical pricing information to predict the best prices for laptops. Users can input the model or specifications of the laptop they are interested in, and the tool will provide a predicted price range based on the analysis of the data. This information can help users make informed purchasing decisions and save money on their laptop purchases. The tool will also provide additional features such as the ability to set alerts for price drops, view historical price trends, and compare prices across multiple retailers. The user interface will be designed to be user-friendly and intuitive, making it easy for even non-technical users to navigate and utilize the tool effectively.

Ultimately, the laptop price prediction tool aims to provide a valuable service to consumers by simplifying the process of finding the best prices for laptops online and helping them make informed purchasing decisions.

Final Product Prototype:

The final product prototype for the laptop price prediction tool is a web-based application that uses machine learning algorithms to predict the best prices for laptops. The tool's user interface is designed to be user-friendly and intuitive, allowing users to easily input the model or specifications of the laptop they are interested in and receive a predicted price range.

The tool's machine learning model has been trained on a large dataset of laptop pricing and product data, including data from online retailers, product reviews,

and historical pricing information. This allows the tool to provide accurate and up-to-date price predictions.

Overall, the laptop price prediction tool provides a valuable service to consumers by simplifying the process of finding the best prices for laptops online and helping them save money on their purchases.

Conclusion:

In conclusion, the laptop price prediction tool is a valuable machine learning application that helps users find the best prices for laptops. By leveraging the power of machine learning, the tool is able to accurately predict laptop prices based on the laptop's specifications. The tool's features, such as setting price alerts and comparing prices across multiple retailers, make it a valuable resource for anyone in the market for a new laptop. The successful implementation of this project involved careful planning, data pre-processing, model selection, and web application deployment. Through this project, we were able to demonstrate the effectiveness of using machine learning for price prediction in the tech industry. In the future, the tool can be further improved by incorporating additional data sources, enhancing the user interface, and exploring new machine learning models. The laptop price prediction tool is a prime example of the potential of machine learning to improve our everyday lives and make complex tasks simpler and more efficient.