**Web scraper for product price comparison**

CAPSTONE PROJECT REPORT

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**Abstract**

This report presents a comprehensive capstone project focused on the integration of Requirements Engineering and Software Architecture. The project aims to demonstrate how effective requirements gathering and analysis can inform architectural design decisions, leading to the development of a robust software system that meets user needs. A mixed-methods approach was employed, incorporating literature reviews, case studies, and surveys to explore best practices in aligning requirements with architectural frameworks. The findings highlight the critical role of requirements engineering in shaping software architecture and provide actionable recommendations for practitioners.

**1.Introduction**

In the era of e-commerce, online shoppers are faced with countless options for purchasing the same product at varying prices across different platforms. While this abundance of choice is beneficial, it also creates the challenge of identifying the best price. Manually comparing prices is time-consuming and prone to human error.

This capstone project seeks to address this issue by developing a web scraper that automates price comparison. By extracting product details and pricing data from various websites, the system provides a consolidated view of available options, enabling users to make informed decisions efficiently. This project not only demonstrates the practical application of web scraping technology but also underscores its potential in enhancing consumer convenience and cost-effectiveness.

**2. Objectives**

* **Automate Data Collection**: Extract product prices and details from multiple e-commerce websites.
* **Data Normalization**: Ensure consistency in the data structure across platforms.
* **Price Comparison**: Provide users with a clear and concise comparison of product prices.
* **User Interface**: Develop a simple and intuitive interface for users to search for products.
* **Accuracy and Timeliness**: Ensure real-time updates and accurate data retrieval.

## 3.**Methodology**

* + **Requirement Analysis**: Identify key e-commerce platforms and user needs.
  + **Technology Selection**: Use Python with libraries like Beautiful Soup and Scrapy for web scraping and Pandas for data processing.
  + **Web Scraping**: Implement scripts to scrape data such as product name, price, ratings, and availability.
  + **Data Storage**: Store scraped data in a database for efficient retrieval and analysis.
  + **Integration and Processing**: Normalize and integrate data from different sources for comparison.
  + **Frontend Development**: Design a user-friendly interface using tools like HTML, CSS, and JavaScript.
  + **Testing**: Conduct functional and performance tests to ensure accuracy and reliability.

**4. Integration of Data**

* **Data Cleaning**: Remove duplicates and handle missing data.
* **Data Structuring**: Convert data into a standardized format (e.g., JSON).
* **Database Management**: Store and retrieve data efficiently using an SQL or NoSQL database.
* **APIs**: Utilize APIs of e-commerce platforms (if available) for more robust data integration.

**5. Prototype Development**

1. **Web Scraper Prototype**:
   * Develop a prototype capable of scraping a limited number of websites.
   * Test functionality to ensure successful extraction of key data points.
2. **Comparison Engine**:
   * Implement algorithms to compare prices and highlight the best deals.
3. **User Interface**:
   * Create a search bar where users can enter product names.
   * Display results in a tabular format with price, website, and additional details.

**6. Evaluation**

* **Accuracy**: Test the scraper's ability to fetch correct data.
* **Performance**: Measure response times and ensure scalability.
* **User Feedback**: Conduct usability testing with potential users to refine the interface and features.
* **Reliability**: Ensure the system performs well under varying network conditions.

**7. Results:**

The final product is a fully functional web scraper capable of retrieving and comparing product prices from multiple e-commerce platforms. It delivers accurate, real-time data in a user-friendly interface, enabling users to make well-informed purchasing decisions efficiently.

**8. Conclusion**

This project demonstrates the potential of automation in addressing real-world problems, such as price comparison for online shopping. By combining web scraping, data integration, and intuitive design, the system effectively reduces the effort required for manual price checks. Future work could involve expanding the platform to include more websites, integrating advanced analytics, and supporting additional features like price trend tracking.

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