

Web scraping project on Flipkart [Wall Art]

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Web Scraping

Automating Wall Art Product Analysis



Problem Statement

Why automate wall-art analytics on Flipkart?

- **Current analytical bottlenecks** : Extracting price, discount, rating, and inventory signals by hand demands excessive human hours and is prone to inconsistencies.
- **Scope of automated extraction** : The scraper will target the first five pagination windows—approximately one hundred distinct SKUs—capturing the full spectrum of listings presented to end-users.

Key Objectives :

- Automate data collection from multiple product pages
- Analyze pricing and discount patterns
- Identify brand dominance and rating trends
- Assess stock availability patterns

Core Libraries for Data Collection

Web Scraping Libraries

NumPy



Used for numerical operations like mean, standard deviation, and quartile analysis.

Pandas



Used to store scraped data into DataFrames and perform data cleaning and analysis.

Requests



Used to send HTTP requests and fetch HTML content from Flipkart web pages.

BeautifulSoup



Used to parse HTML and extract product details such as title, price, rating, and availability.

Visualization & Analysis Tools

Libraries Used



Matplotlib

Visualizes data like scatter plots and price distributions.

Provides advanced visual analysis and trend understanding.



Seaborn



Regular Expressions

Extracts discount percentages and keywords from text.

Execution environment for scraping, analysis, and visualization.



Jupyter Notebook

Data Collection Pipeline

- **URL Identification**
 - Identify Flipkart wall art category URLs and construct pagination parameters for systematic page traversal.
- **HTTP Requests**
 - Send GET requests to each product listing page using the Requests library with appropriate headers.
- **HTML Parsing**
 - Parse retrieved HTML content using BeautifulSoup to navigate the DOM structure efficiently.
- **Data Extraction**
 - Extract product attributes: brand names, current prices, original prices, customer ratings, and stock availability.

Data Processing & Analysis Workflow

- **Data Storage**

Store extracted product information in Python lists, then convert to a structured Pandas DataFrame for systematic analysis.

- **Missing Value Handling**

Identify incomplete records and assign NaN values where product attributes like ratings or prices are unavailable.

- **Data Cleaning**

Remove currency symbols (₹), commas, and other formatting characters from price columns to enable numerical operations.

- **Statistical Analysis**

Calculate descriptive statistics, perform correlation analysis, and create visualizations to extract actionable insights from the dataset.

Technical Obstacles in Execution

Data Structure Challenges	Technical Constraints
Inconsistent HTML: Product listing structures varied significantly across different items, requiring flexible parsing logic.	Request Blocking: Risk of IP blocking and CAPTCHA challenges when making rapid successive requests to Flipkart servers.
Missing Attributes: Many products lacked complete information—ratings, original prices, or delivery dates were frequently absent.	Brand Inconsistency: Brand names appeared in various formats and spellings across different product listings.
Mixed Listings: Sponsored products appeared alongside organic results, complicating pure market analysis.	Incomplete Discounts: Discount percentages weren't available for all products, limiting promotional analysis.
Hidden Elements: Stock availability and delivery dates weren't consistently visible in the HTML structure.	Pagination Issues: Accessing pages beyond certain thresholds became unreliable, with inconsistent response structures.

Market Insights & Strategic Findings

- The wall art market is dominated by low-cost products, with most items priced under ₹500 and only a few premium-priced outliers.
- All products in the analyzed category are currently in stock, resulting in 0% unavailability and indicating strong inventory management.
- The WALLSTOXX brand does not offer discounts on any of its products, indicating a consistent full-price strategy.
- The scatter plot shows no strong relationship between discount percentage and customer ratings, indicating that product quality matters more than price reductions.
- The top 10 wall art brands all maintain high average ratings above 4, with ADVIK leading, indicating strong customer satisfaction and close market competition.

- Customer sentiment is overwhelmingly positive, with most products receiving 4–5 star ratings and very few negative reviews.
- Average delivery delay is around 2 days in Mumbai, highlighting generally reliable delivery with room for minor improvements.
- Premium products show significantly higher customer loyalty than entry-level products, as reflected by higher average ratings.
- Consistent brands dominate:
Brands like PVL, Ajay, SHRI, saf appear multiple times.
- Heavy discounts drive top ratings :
 1. Discounts mostly between 56% – 90%
 2. Several top-rated products have >80% off

The background of the card features a vibrant, abstract design composed of swirling patterns in shades of blue, teal, and yellow. The yellow elements appear as small, scattered dots and larger, more concentrated clusters, giving the impression of a starry sky or a microscopic view of a biological sample. The overall effect is dynamic and modern.

THANK YOU!