E-commerce Product Categorization Using ML and Deep Learning

This presentation explores the use of machine learning and deep learning to automate product categorization in e-commerce, a crucial aspect of improving user experience, product discoverability, and search functionality.

2 Contributors

Search Problems with Manual Product Categorization

Manual Tagging Limits Search

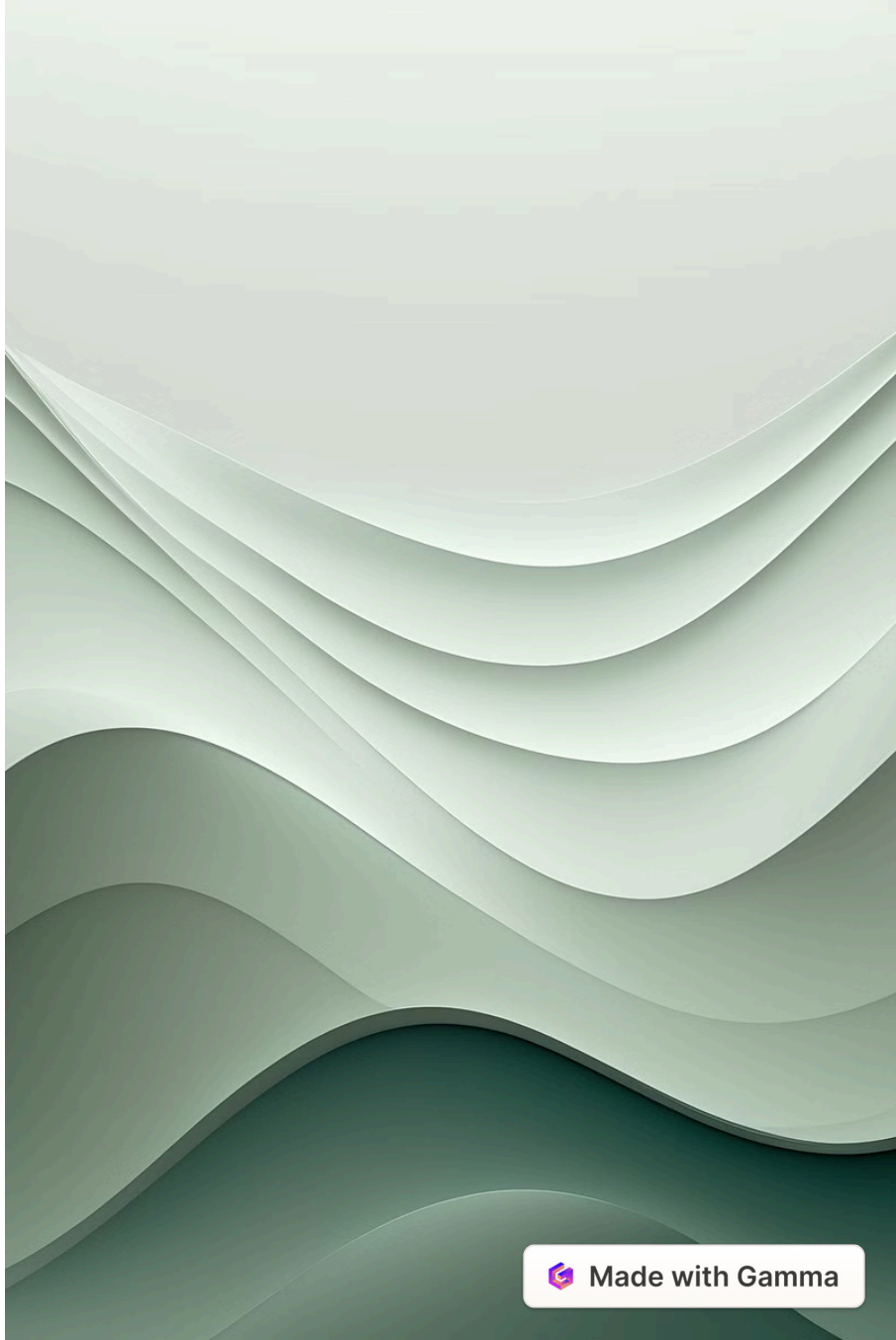
Manual product tagging hurts search. Mistakes in tagging make products hard to find, frustrating customers and losing sales.

Inaccurate and Slow Searches

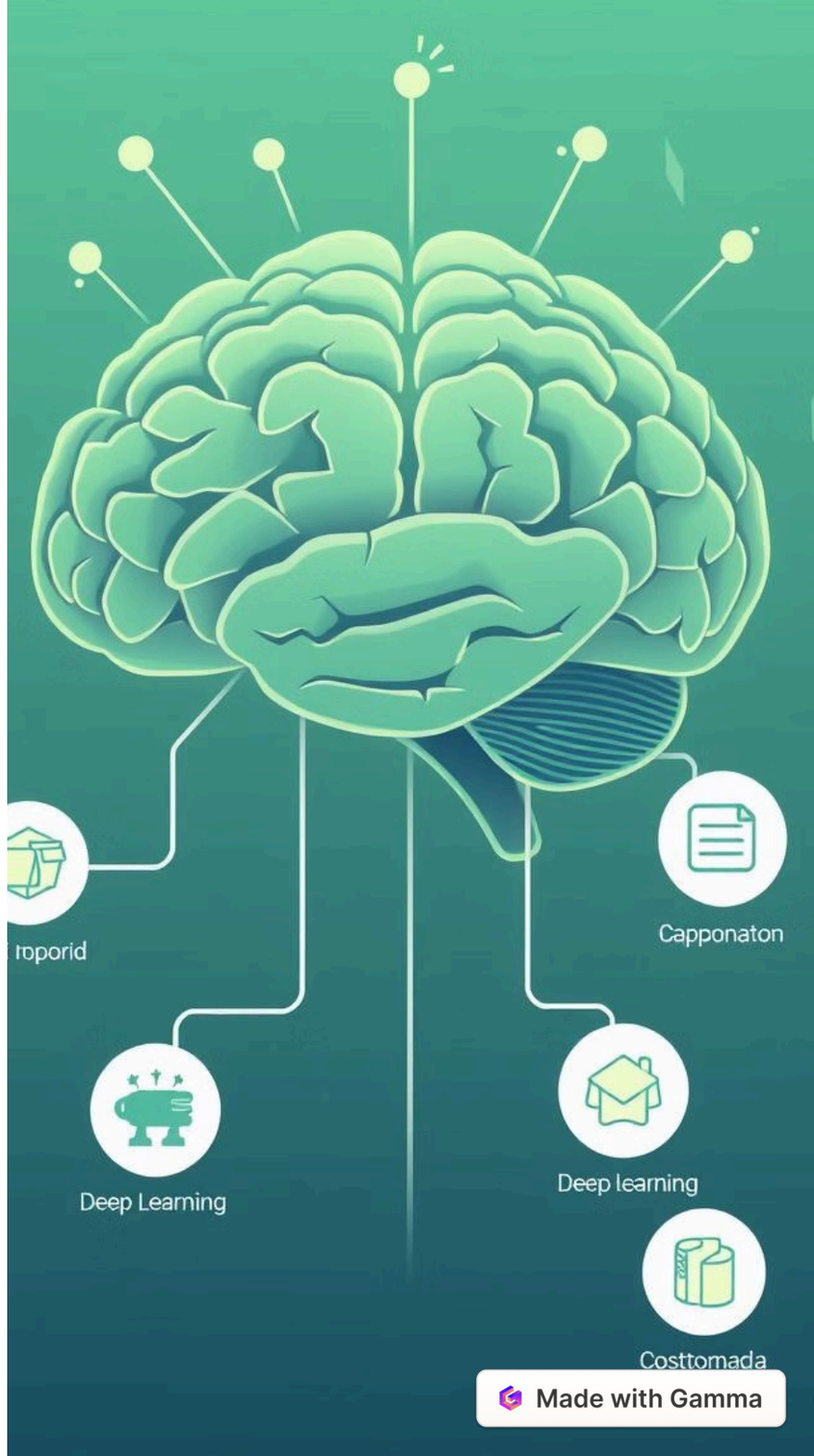
Manual tagging makes searches inaccurate and slow. Updates are slow, making search results outdated and irrelevant.

Poor E-commerce Performance

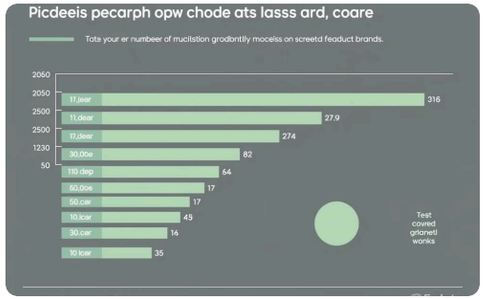
Bad search results mean unhappy customers, fewer sales, and less loyalty. We need a better system for product discovery.



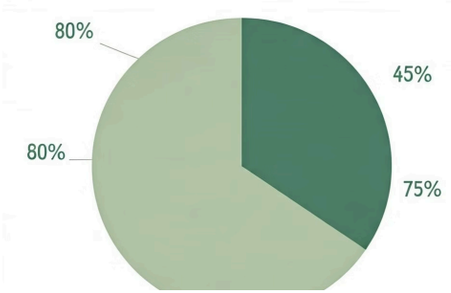
1. Embark on the data journey by loading the dataset
2. Uncover hidden gems through exploratory data analysis for valuable business insights
3. Craft a data masterpiece using NLTK for preprocessing and feature engineering
4. Translate words into numerical representations using techniques like TF-IDF or word2Vec
5. Divide and conquer with train-test split using stratified sampling
6. Train and unleash the power of various machine learning and deep learning models
7. Fine-tune for perfection using hyperparameter tuning
8. Crystal ball time - get our predictions
9. May the best model win - compare and crown the top performer



Key Insights

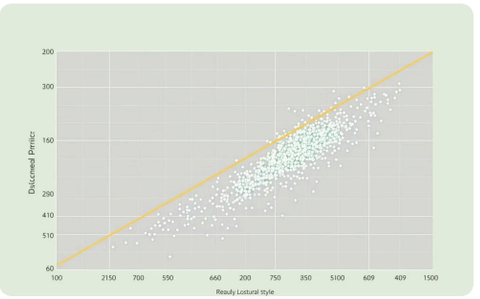


leading brands showcasing a wide range of products on the platform.



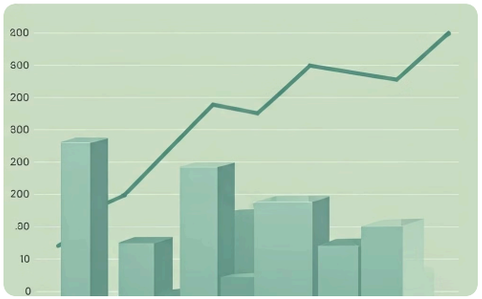
percentage breakdown

based on product category

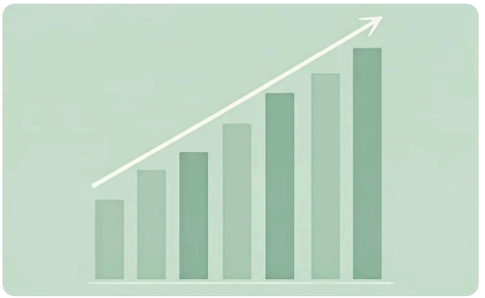


greater discounts with every increase in retail price

ratings on different product categories



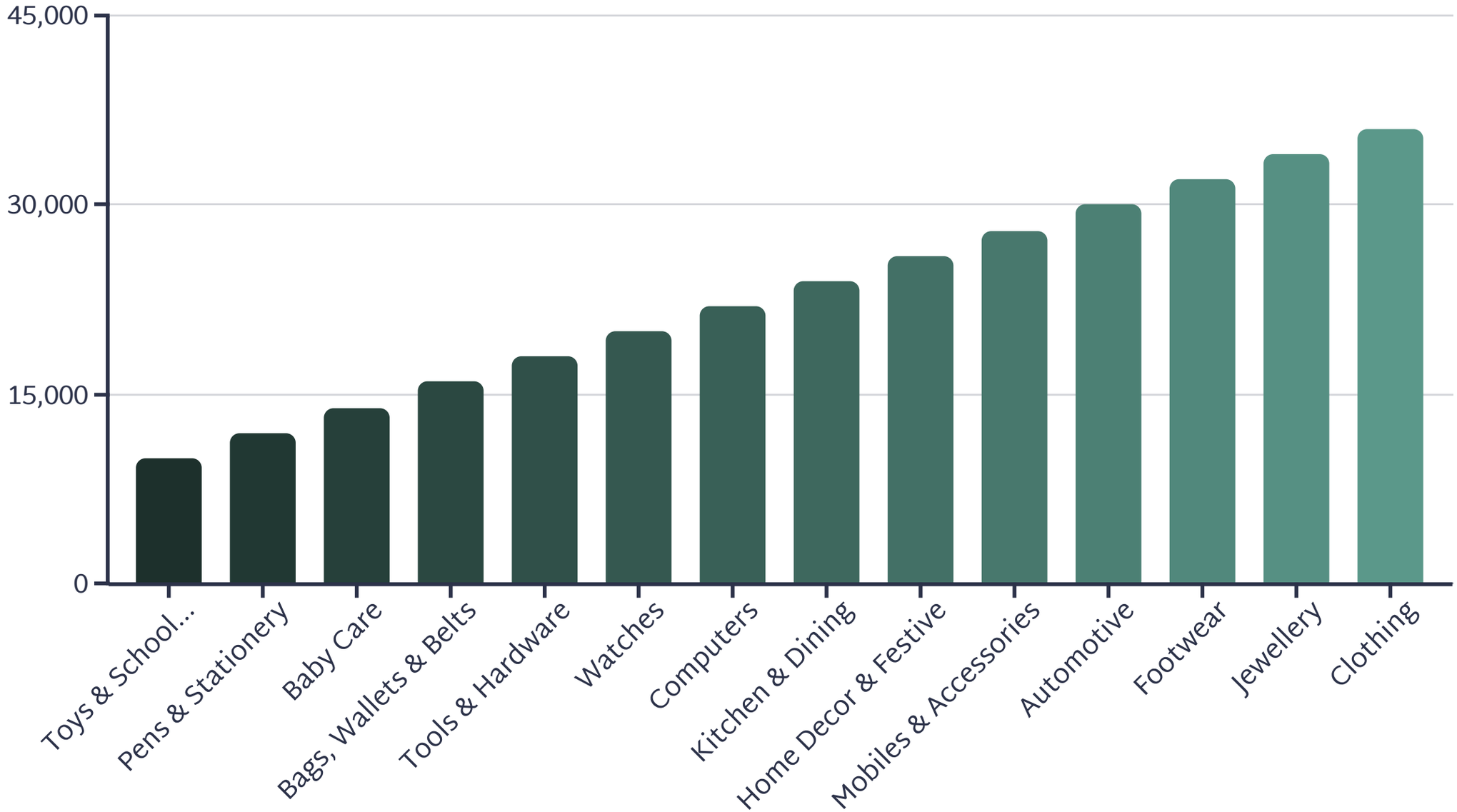
highest average and discounted price on product category



top-selling category

based on ratings

Frequency counts of the product category



Methodology

1

Data Collection

Gathering product data from various sources, including e-commerce platforms, product catalogs, and external databases.

2

Data Preprocessing

Cleaning, transforming, and preparing data for model training, including text normalization, feature extraction, and image resizing.

3

Model Selection

Choosing appropriate ML or deep learning algorithms, considering factors such as data size, complexity, and desired performance.

4

Model Training

Training the chosen model using the prepared data, optimizing hyperparameters to achieve high accuracy and performance.

5

Model Evaluation

Assessing the trained model's performance using relevant metrics, such as precision, recall, and F1-score.

6

Model Deployment

Integrating the trained model into the e-commerce platform for real-time product categorization and recommendation systems.

Challenges Faced

Class Imbalance

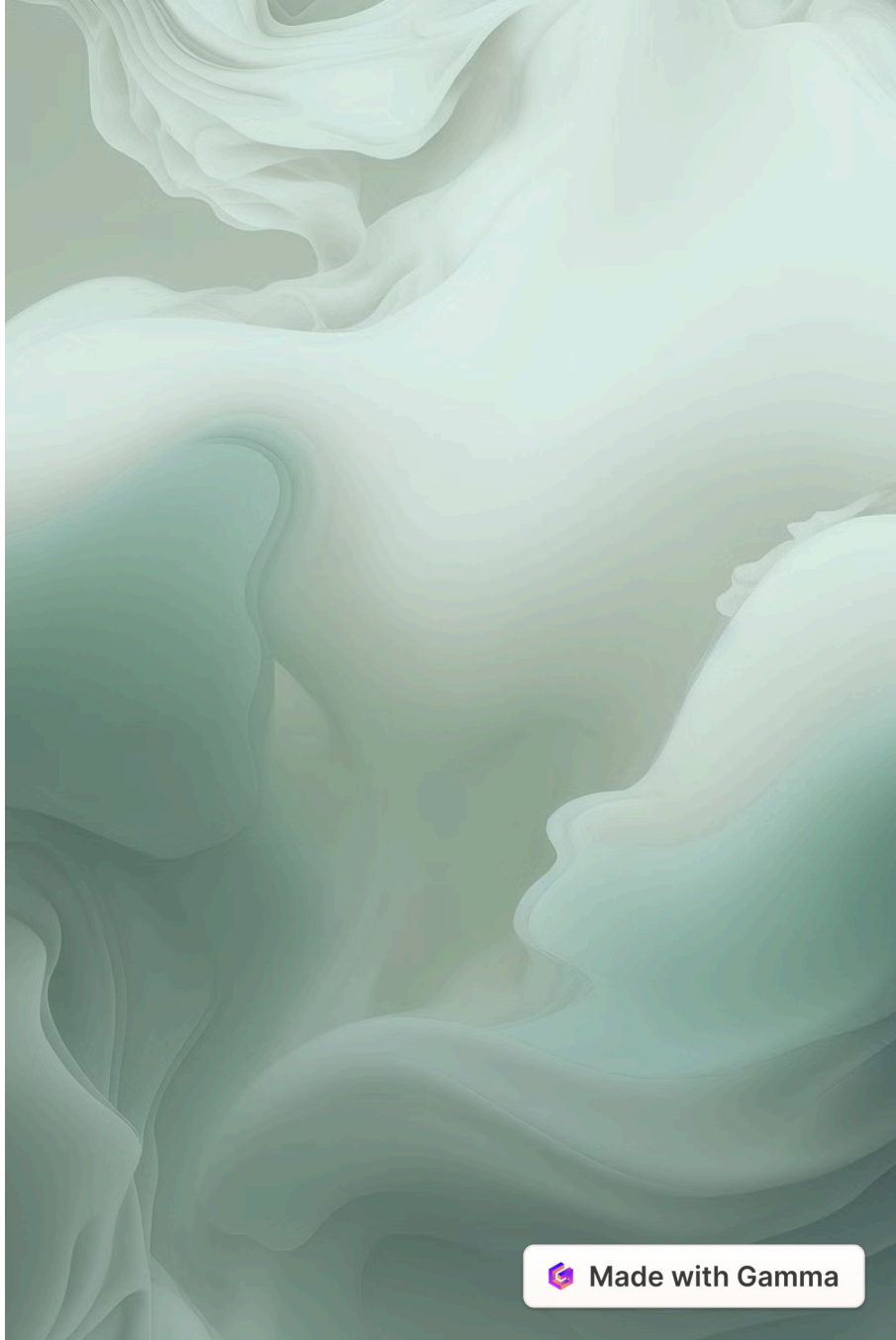
Addressing the issue of uneven representation of product categories in the dataset.

Text Feature Conversion

Converting textual product descriptions into numerical features using word embedding techniques.

Hierarchical Categorization

Effectively handling the complex, multi-level structure of product categories.



Model Selection and Training

Model	Training Result (%)	Test Result (%)
Random Classifier	99.99	96.06
Sequential	97.65	98.08

Evaluation Metrics and Final Results

Golden model with Maximum test accuracy is the sequential model deep learning

98.08%

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Business Impacts

Improved User Experience

Enhanced product discoverability and navigation lead to a more satisfying online shopping experience.

Enhanced Search Functionality

More accurate search results improve customer satisfaction and conversion rates.

Increased Revenue

Improved user experience and search functionality drive sales growth and increased revenue.

Best Practices and Future Trends in E-commerce Product Categorization

1

Data Quality

Ensure accurate and consistent product data for optimal model performance.

2

Continuous Improvement

Regularly monitor and refine categorization models to adapt to changing product trends and market dynamics.

3

Personalized Categorization

Tailoring categorization systems to individual customer preferences and browsing history.

4

Multi-lingual Support

Developing models capable of handling product information in multiple languages.