



**INDIUM**

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**From Disorganized Listings  
to Seamless Shopping –  
How Indium’s AI-Powered  
Categorization Boosted  
Conversions**

SUCCESS STORY

# Mismatch Mayhem: The Hidden Barriers to Smarter Shopping

E-commerce aggregators thrive on seamless product discovery, but inconsistent categorization across retailer websites created numerous roadblocks for the client. While individual retailers structured their product categories effectively, the lack of a unified system led to search inconsistencies, affecting user experience and purchase decisions. The client faced numerous challenges, such as:

- 1 The Categorization Chaos:** Retailers defined product categories differently, making grouping identical products under a single classification challenging. It also caused search inefficiencies from the same product showing up in several categories.
- 2 The Search Accuracy Dilemma:** Misclassified products resulted in inaccurate search results, frustrating users and reducing conversion rates. A lack of standardization meant inconsistent search suggestions and filters, leading to poor product discovery.
- 3 The Broken User Experience:** Users couldn't compare products easily due to category mismatches across different retailers. Inconsistent categorization indirectly impacted recommendations and up-selling, leading to lost revenue opportunities.

Traditional rule-based categorization failed to address the scale and complexity of multiple retailer taxonomies. A sophisticated AI-driven approach was required to intelligently classify and map products across different sources.

## Client Overview

The client owns an AI-powered e-commerce aggregator that enhances shopping experiences by enabling seamless product comparison across multiple retailer websites. However, inconsistent product categorization across retailers' websites created challenges in assigning the same product to a unified category, compromising search accuracy and user experience. To solve this problem, they sought a trusted technology partner with advanced AI and machine learning expertise who would ultimately improve search quality, refine recommendations, and deliver a smarter, more seamless shopping experience.



# Strategic Thinking, AI Execution: Indium's AI-Driven Approach for Product Categorization

Product categorization is highly significant for e-commerce websites. Displaying the most popular categories up front speeds up free text searches and improves user experience.

To tackle the challenge of inconsistent product categorization, we implemented a strategic, AI-driven approach that ensured accurate classification and seamless product discovery. The solution was structured into multiple stages, leveraging advanced techniques to enhance efficiency and precision.

## Data Sampling – Ensuring Balanced Representation

To create a well-distributed dataset, a **Random Sampling with a Stratification approach** was employed, ensuring a fair representation of each product category.

## Pre-Processing Phase – Converting Text into Usable Data

Before training, product data was transformed into numerical representations using techniques such as **TF-IDF, N-grams, stop word removal, and stemming/lemmatization** to refine text-based inputs.

## Model Training – Building Intelligent Classification Models

The processed data was trained using **Support Vector Machines (SVM) and Naïve Bayes** models, ensuring robust categorization and high accuracy.

## Parameter Tuning – Optimizing for Maximum Accuracy

Cross-validation and Grid Search (Scikit-Learn) were used to fine-tune model performance and identify the best parameters for improved classification.

## Model Nesting – Structuring for Hierarchical Categorization

A hierarchical approach was applied to classification by developing separate models for different category levels using **Group By formulas, for-loops, and subsetting** techniques.

## Deployment & Production – Enabling Seamless Integration

The final trained model was integrated into the client's system using **JavaScript, Django, and Pickling**, ensuring smooth deployment and real-time categorization.

The solution delivered accurate, scalable, and AI-powered product classification through this structured approach, enhancing search results, recommendations, and overall user experience.

## Precision in Product Categorization, Powering Business Impact at Scale

By leveraging AI-driven approaches, Indium transformed the client's product categorization process, ensuring accuracy, consistency, and seamless product discovery. Our strategic approach not only optimized search relevance but also delivered a measurable business impact at scale.

- ▶ **75% Accuracy – Smarter AI, Sharper Categorization:**  
The AI model achieved great accuracy in predicting categories for new products, ensuring precise classification and improved product discovery.
- ▶ **3% Conversion Boost:** An increase in conversion rates across all product categories contributed to a 20% rise in Gross Merchandise Value (GMV), driving significant business impact.
- ▶ **Better Categorization, Bigger Revenue:** Enhanced product categorization and superior indexing led to better search results, directly improving product discovery and user experience.



## About Indium

Indium is an AI-driven digital engineering company that helps enterprises build, scale, and innovate with cutting-edge technology. We specialize in custom solutions, ensuring every engagement is tailored to business needs with a relentless customer-first approach.

Our expertise spans Generative AI, Product Engineering, Intelligent Automation, Data & AI, Quality Engineering, and Gaming, delivering high-impact solutions that drive real business impact.

With 5,000+ associates globally, we partner with Fortune 500, Global 2000, and leading technology firms across Financial Services, Healthcare, Manufacturing, Retail, and Technology—driving impact in North America, India, the UK, Singapore, Australia, and Japan to keep businesses ahead in an AI-first world.

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