جامعة عبد المالك السعدي
Université Abdelmalek Essaâdi

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E-COM PRODUCT CLASSIFACTION

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Problem Statement

In today's fast-paced e-commerce world, platforms receive hundreds of new products every day — clothes, gadgets, accessories, and more. But as the catalog grows, a common yet critical question arises:

How can these products be efficiently organized so that customers instantly find what they're looking for?

Manual classification? *Too slow and costly.*

Ignoring the issue? *It leads to frustrated customers and lost sales.*

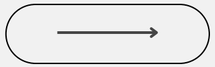
Faced with this challenge, a team of Deep Learning launched the **E-com Product Classification** project — with the goal of building a smart, automated system capable of classifying products with high precision

shopify

- But how do you turn an ambitious idea into a concrete solution?

- What obstacles might the team face in building a robust classification model while staying on schedule and meeting project requirements?

So That’s what we’ll explore in this presentation.



What was our process for building and delivering the E-com Product Classification system?

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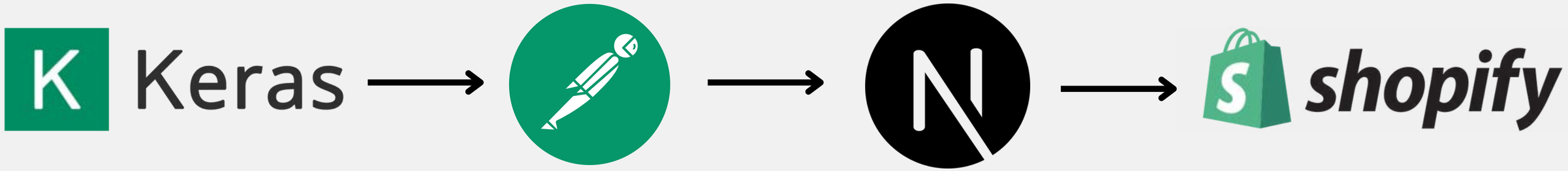


Clear Steps Toward Execution:

Step 1: Define the problem precisely

→ What exactly needs to be classified? What are the product categories? How are the data labeled?

Step 2: Collect and prepare data

→ we faced a major challenge: the dataset was massive — too heavy for our initial GPU setup. But we didn’t stop there. We adapted, optimized our data pipelines, and in the end, successfully managed to train our models despite limited resources.

Step 3: Choose the right model architecture

→ We selected EfficientNetB0, a powerful convolutional neural network architecture.

Clear Steps Toward Execution:

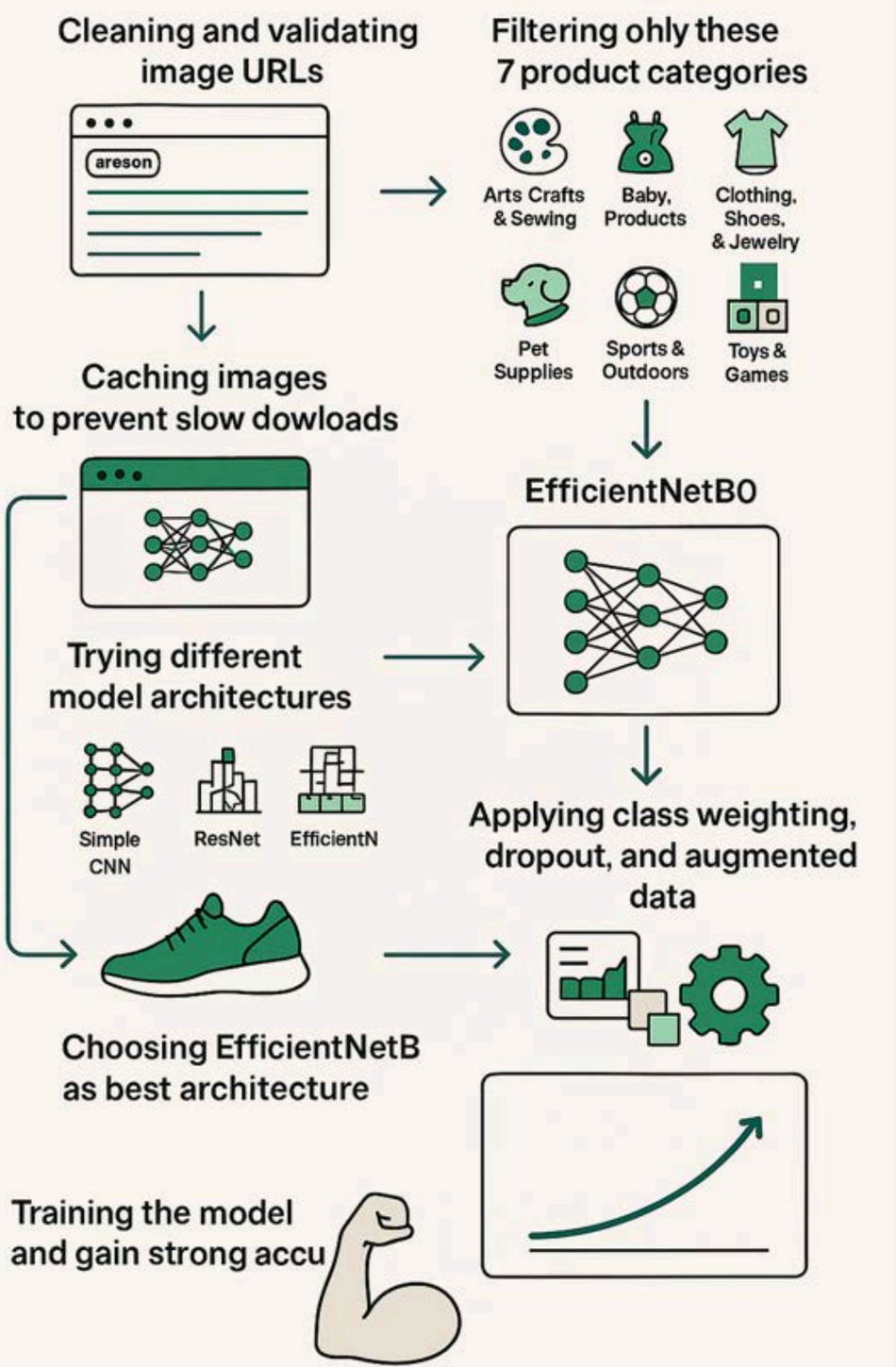
Step 4 : User-Centric Interface Design

Step 5 : Integrate with the platform

→ Deploy the model on the e-commerce platform to classify new products in real-time.

Step 6 : Testing & Refinement

→ After training, we tested the model on a validation and test set to evaluate its performance


Cleaning and validating image URLs
areson
Filtering ohly these 7 product categories
Arts Crafts & Sewing
Baby, Products
Clothing, Shoes, & Jewelry
Pet Supplies
Sports & Outdoors
Toys & Games
Caching images to prevent slow dowloads
EfficientNetB0
Trying different model architectures
Simple CNN
ResNet
EfficientN
Applying class weighting, dropout, and augmented data
Choosing EfficientNetB as best architecture
Training the model and gain strong accu

Why is automatic product classification essential for an online store?

Advantages of our Application

Improved customer experience

Customers find products faster and more easily

Operational efficienc

Saves time and reduces costs compared to manual classification

Increased sales

Efficient product organization drives higher sales and decreases the rate of abandoned shopping carts.

What are the areas where our app still needs improvement?

Disadvantages of our Application

Despite the many benefits of our automatic product classification app, like any technology solution, it comes with some challenges that we continue to work on. Identifying these areas helps us improve the system and deliver even better results for any online store.

01

Handling ambiguous products

Some items can fit multiple categories, which sometimes causes misclassification.

02

Needs regular updates

New products and trends appear all the time, so the model needs to be updated often to stay accurate.

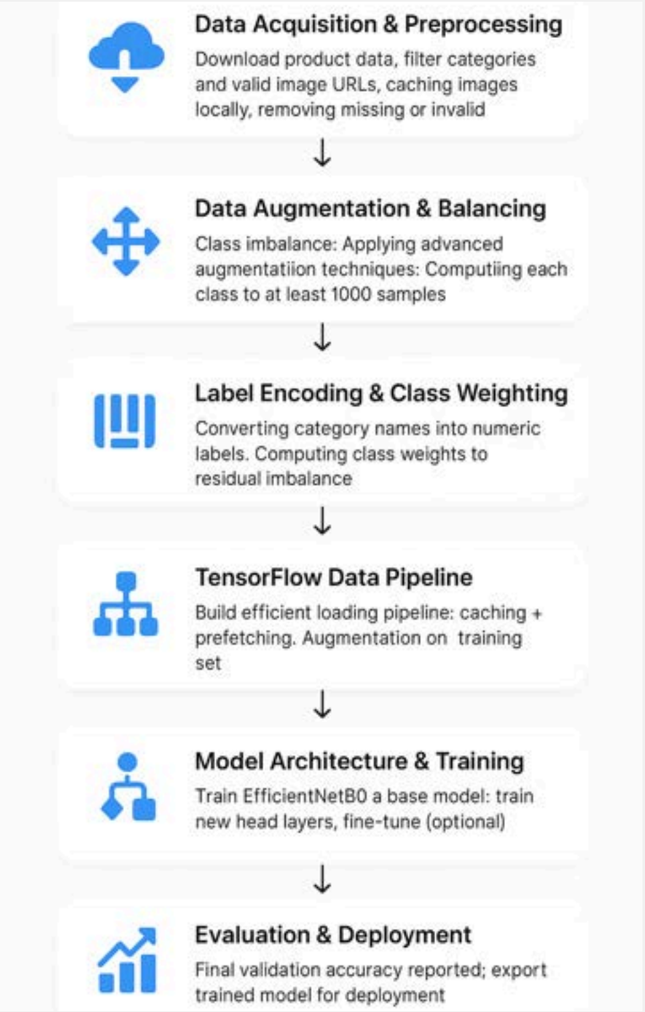
What steps did we follow to prepare our product data for training?

Data Collection & Challenges

- We used the **Fashion Product Images Dataset** available on Hugging Face, which contains a large variety of product images and categories.
While it provided a rich and diverse dataset, we encountered a few technical challenges.

First, downloading and cleaning such a large volume of data was time-consuming and required us to handle issues like broken image links and duplicates.

Second, training deep learning models on this large dataset pushed the limits of our available GPU resources, especially when testing different architectures. Despite these challenges, we optimized the process and successfully trained a robust model using EfficientNetB0.

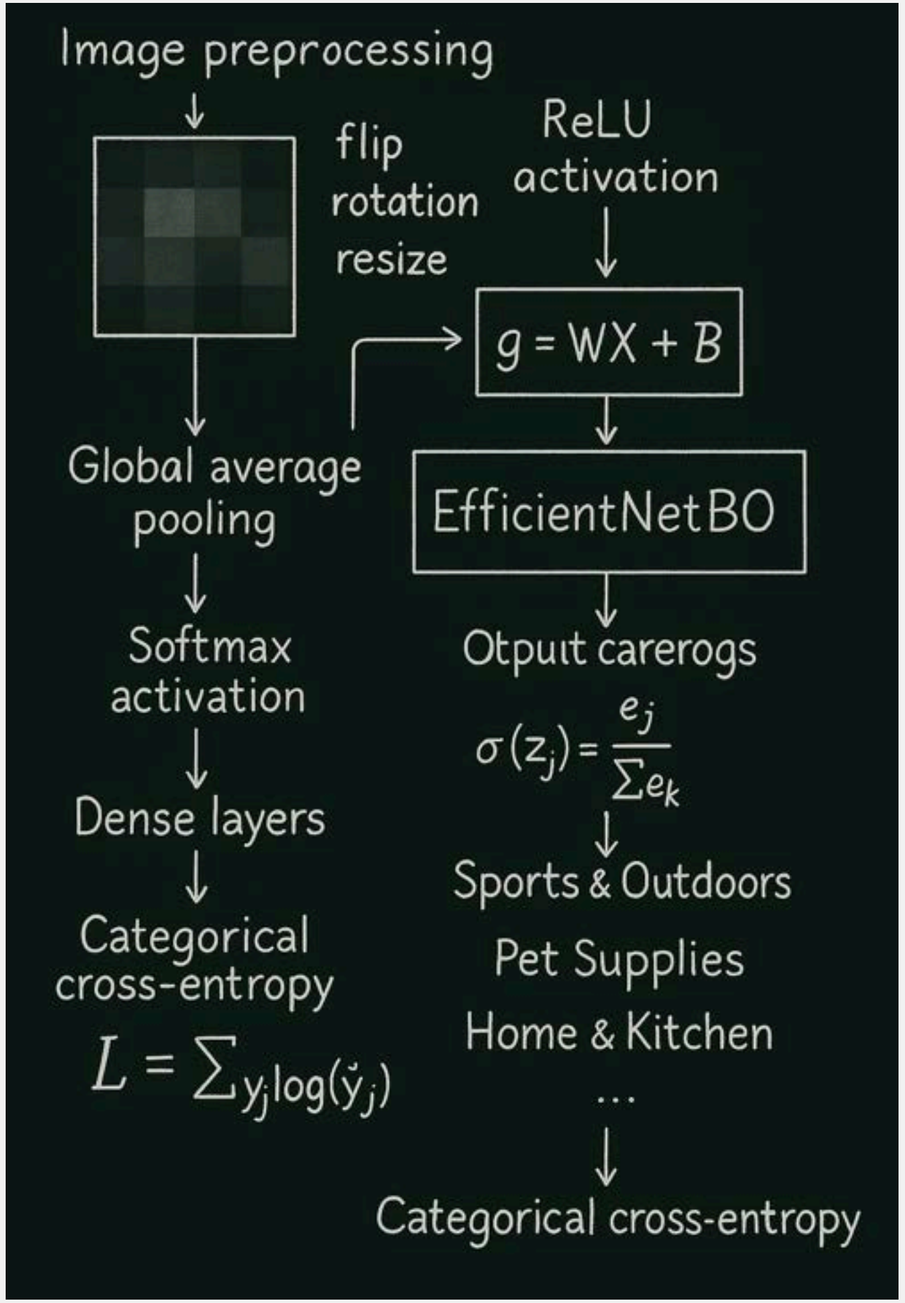


Which deep learning model can handle thousands of product images with speed and accuracy?

The Ideal Model Choice

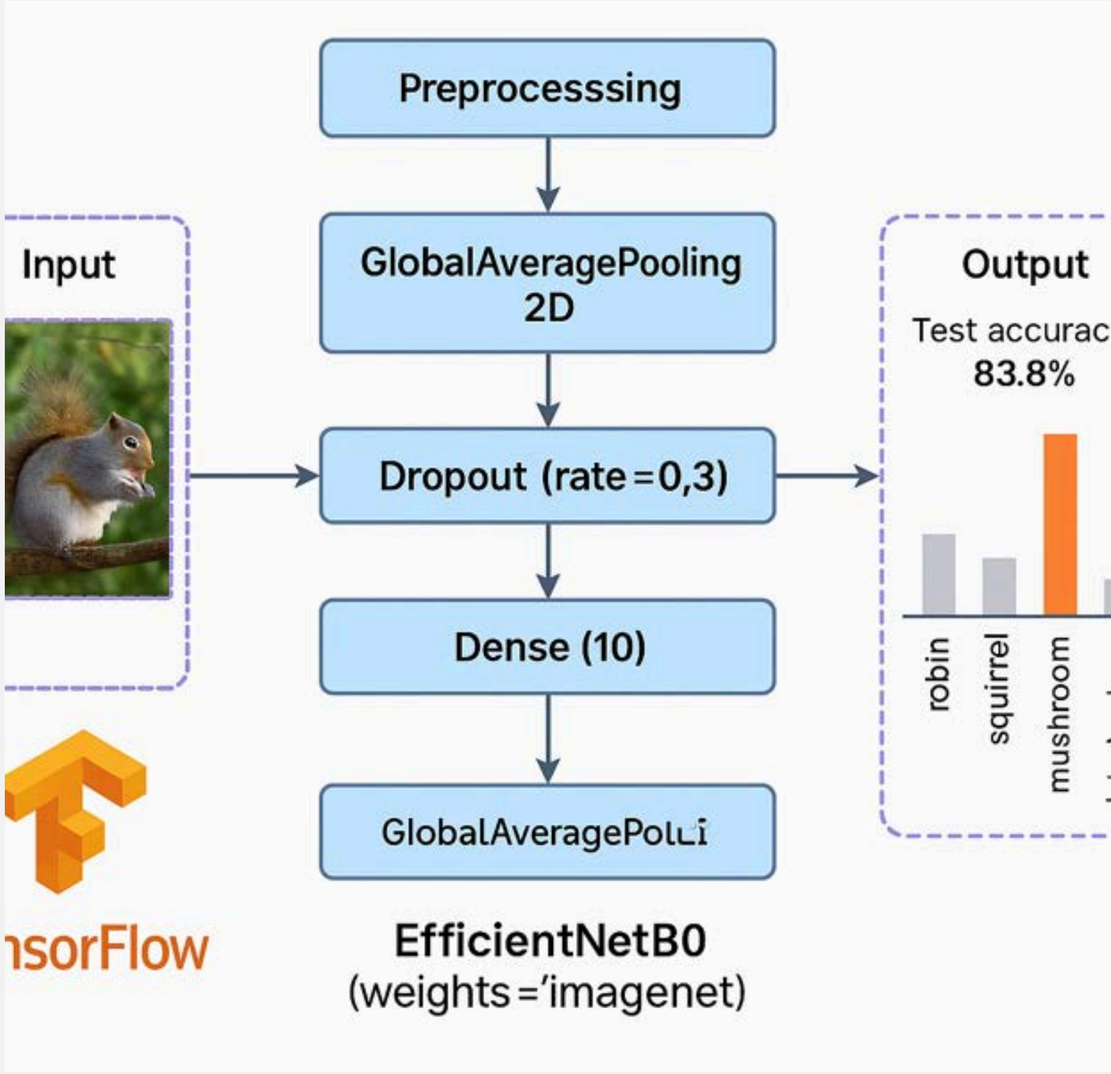
EfficientNetB0 offers a great balance between accuracy and speed. Its optimized design uses fewer resources while maintaining strong performance, making it perfect for classifying many product images quickly and efficiently.

This makes it ideal for real-time classification tasks on large datasets, especially when resources like GPU memory are limited



EfficientNetB0-based CNN Architecture

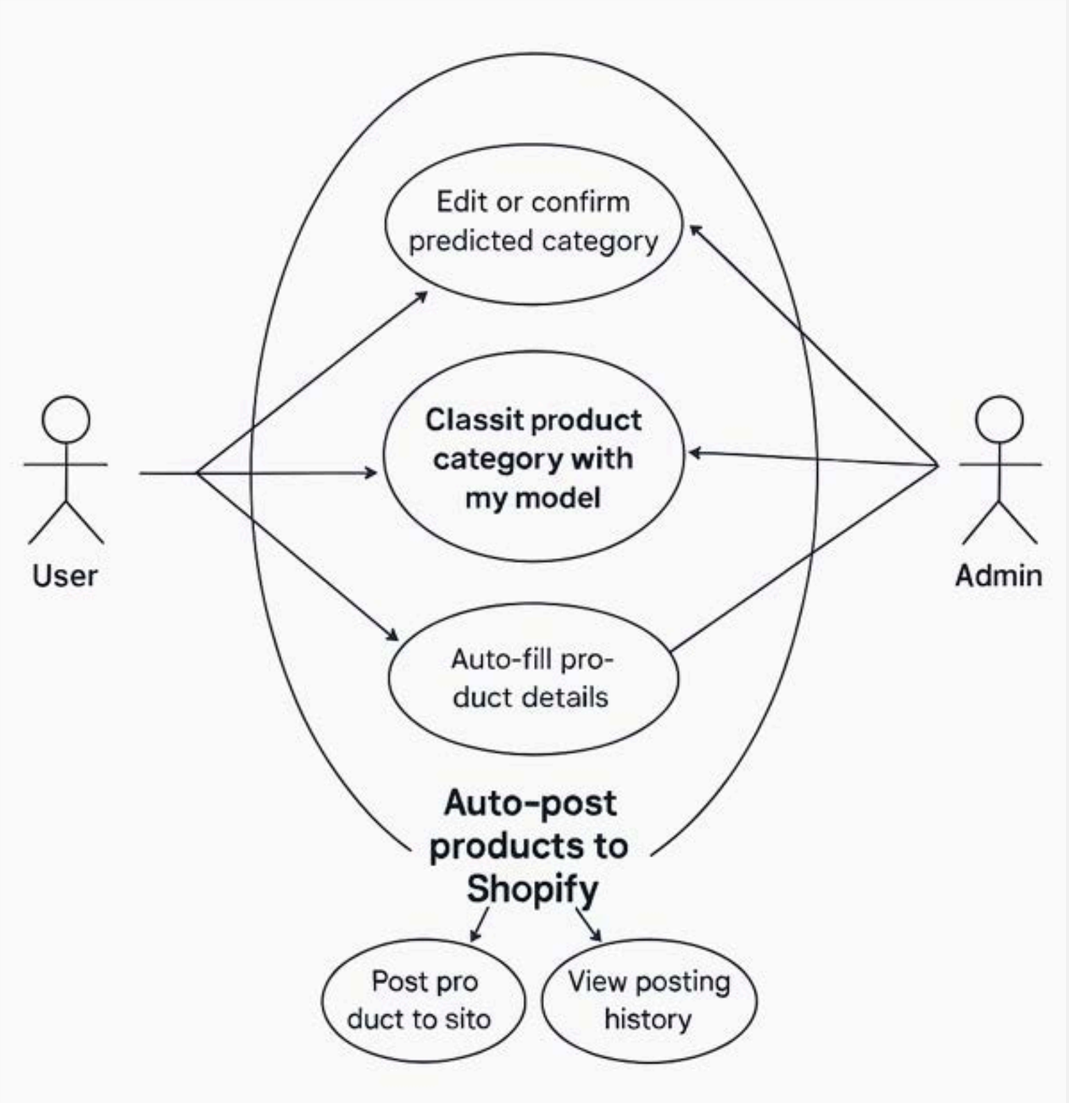
- Pretrained on EfficientNetB0, followed by global pooling, regularization (dropout & batch norm), and a dense ReLU layer for classification.



How can we integrate our model into a real application to automate product launches?

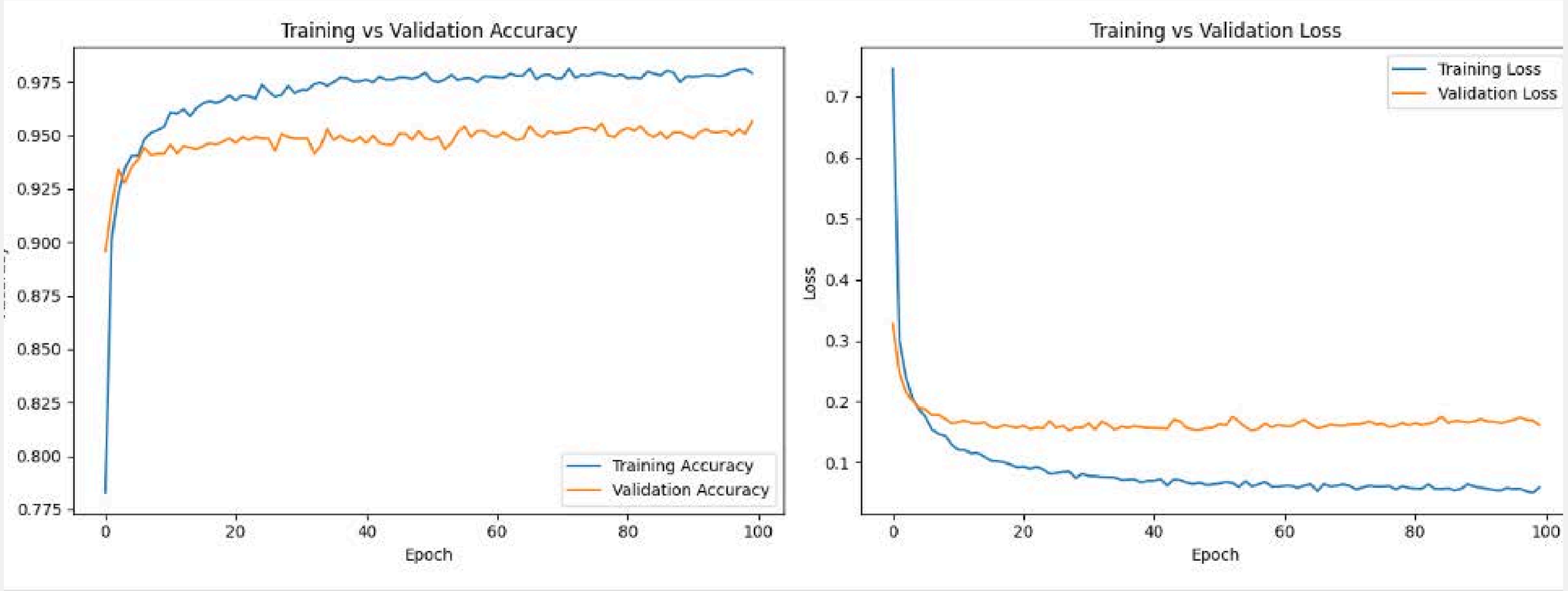
Automatic classification and publication on Shopify

- A smart pipeline where the **model** predicts, the **user** validates, and the **product** is released effortlessly.



Did EfficientNetB0 deliver accurate and reliable product classification results?

Our Model’s Performance

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...
Epoch 99/100
175/175 ━━━━━━━━━━━━━━━━━━━━ 19s 97ms/step - accuracy: 0.9764 - loss: 0.0579 - val_accuracy: 0.9507 - val_loss: 0.1690
Epoch 100/100
175/175 ━━━━━━━━━━━━━━━━━━━━ 23s 110ms/step - accuracy: 0.9812 - loss: 0.0608 - val_accuracy: 0.9564 - val_loss: 0.1619
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CONCLUSION

In this project, we tackled the complex challenge of automatic product classification using deep learning. By choosing EfficientNetB0 and a well-structured data pipeline, we achieved strong performance in categorizing a diverse and a huge dataset.

Despite initial technical obstacles such as GPU limitations and data handling, our agile approach allowed us to adapt quickly and deliver a scalable, efficient solution.

This system not only improves user experience but also supports better product organization and business growth in e-commerce platforms.

Thank you for your Attention !