FashionNet Classifier

Automated Fashion Apparel Classification for E-commerce

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Introduction: A Smarter Approach to Fashion Cataloging

Manually sorting thousands of new clothing items is no longer sustainable for modern online retailers.

Our project uses AI to classify apparel from an image instantly—turning a major operational challenge into a competitive advantage.

Agenda

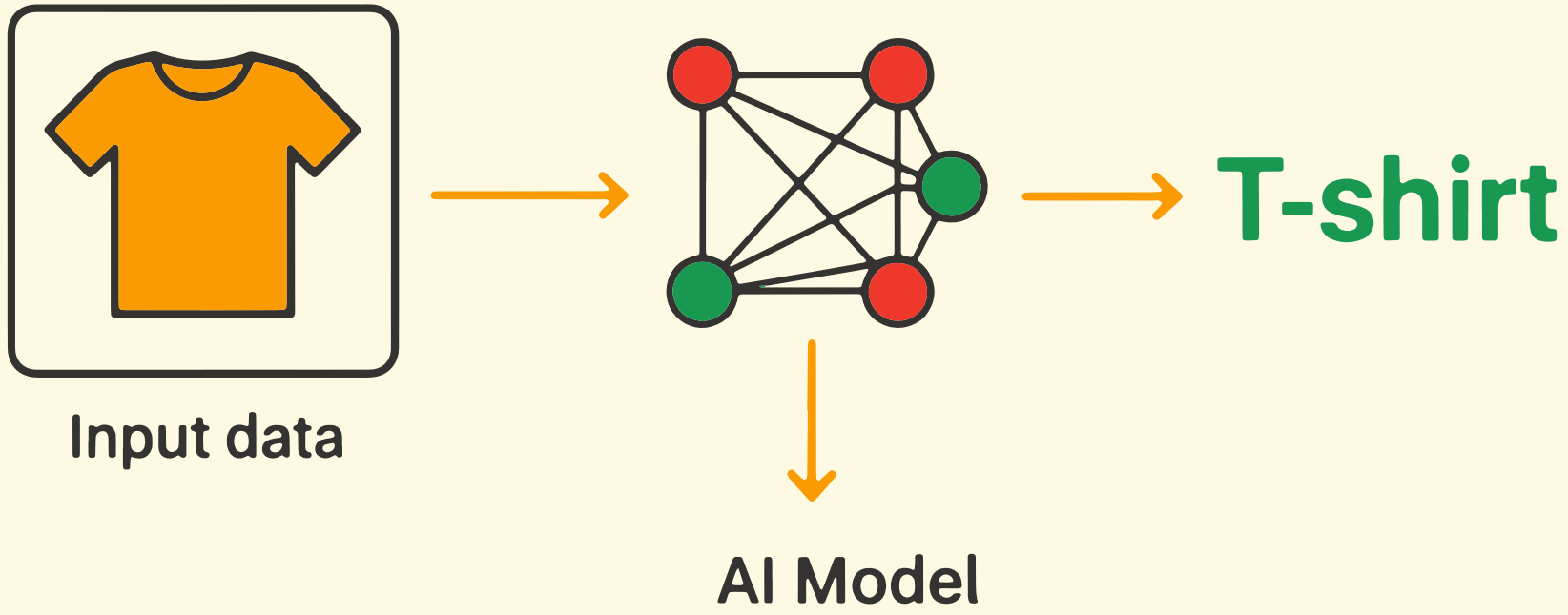
- The Core Challenge
- Our Automated Solution
- Project Objectives
- Methodology & Technology
- Project Timeline
- Potential Challenges
- Literature Review & Benchmarks
- Expected Results

5 The Challenge: The Manual Process

Massive Inventories: Thousands of new products are added daily.
Slow & Costly: Manual categorization is time-consuming and expensive.
Error-Prone: Inevitable mistakes lead to poor data quality.
Poor User Experience: Inaccurate tagging frustrates customers and hurts sales.

6 Our Automated Solution

- **Automated Classification: Use Computer Vision and Deep Learning to categorize apparel automatically.**
- **Key Benefits:**
  - **Boost operational efficiency.**
  - **Improve customer search and discovery.**
  - **Create a scalable cataloging system.**



7 Project Objectives

Develop: Build and train a Convolutional Neural Network (CNN)

Achieve: Attain high classification accuracy on the Fashion-MNIST dataset

Analyze: Use a confusion matrix to understand model performance

Deliver: Create a well-documented proof-of-concept for real-world useg

8 Dataset

The Fashion-MNIST dataset, released in 2017, is a collection of images from the fashion and apparel domain, sourced from the e-commerce site Zalando. It contains a total of 70,000 images, which are split into a 60,000-image training set and a 10,000-image test set, designed for use in machine learning tasks.

Dataset Name	Domain	Source	Size	Year
Fashion-MNIST	Fashion / Apparel	Zalando's website	70,000 images (60k training, 10k test)	2017

9 Referential Study

Reference	Year	Data	Preprocessing	Model	Result
(Mukhamediev, 2024)	2024	Fashion-MNIST	1. Normalization: Scaling pixel values. 2. Dimensionality Transformation: Reshaping data for the CNN input. 3. Data Augmentation: Applying random rotation, height/width shifts, and zoom.	CNN-3-128: A Convolutional Neural Network with three convolutional layers.	Accuracy: 99.65%
(S, R, S, & M, 2022)	2022	Fashion-MNIST	Feature extraction to create feature vectors from images; Dropout for regularization.	Convolutional Neural Networks (CNNs). The paper highlights the "cnn-dropout-3" model from a cited study as being the most effective.	CNNs achieve higher accuracy than traditional models.
(Xiao, 2017)	2017	Fashion-MNIST	Images were trimmed, resized, sharpened, centered, negated, and grayscaled.	No new model; benchmarked standard classifiers (e.g., Random Forest, SVC).	Test Accuracy. Showed Fashion-MNIST is a more challenging benchmark than the original MNIST.

10 Methodology & Technology

Data Exploration

•Understand and visualize the dataset.

Preprocessing

•Normalize and reshape images for the model.

Model Design

•Architect the layers of our CNN.

Training

•Train the model on 60,000 images.

Evaluation.

•Test performance on 10,000 unseen images.

Analysis

•Generate a confusion matrix for deeper insights.

- **Technology Stack**

- **Python**
- **Jupyter**
- **TensorFlow/Keras**
- **NumPy**
- **Matplotlib**

11 Project Timeline (4 Weeks)

Week 1: Foundation & Data

- Finalize scope, set up environment, and preprocess data.

Week 2: Baseline Model

- Build and train the initial CNN architecture.

Week 3: Optimization & Analysis

- Tune hyperparameters and analyze performance with a confusion matrix.

Week 4: Finalization

- Document the code and prepare the final presentation.

Potential Challenges & Solutions

Challenge: Overfitting

Solution: Use Dropout layers and monitor validation curves.

Solution: Start with best practices and adjust systematically.

Challenge: Hyperparameter Tuning

Solution: Use the confusion matrix to pinpoint and address weaknesses.

Challenge: Class Confusion (e.g., Shirt vs. T-shirt)

16 Expected Results & Deliverables

- **A Trained Model: A functional CNN that classifies fashion images.**
- **High Performance: Target test accuracy of over 92%.**
- **Actionable Insights: A confusion matrix detailing model strengths and weaknesses.**
- **Reproducible Work: A clean, commented Jupyter Notebook for full transparency.**

Thank you