FASHION RECOMMENDATION SYSTEM

Presented By

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INTRODUCTION

This project focuses on developing an advanced fashion recommendation system using a convolutional neural network (CNN). The primary objective is to classify fashion images into 142 distinct categories. The CNN architecture, comprising multiple convolutional and pooling layers followed by dense layers, is optimized for feature extraction and classification accuracy.

This system not only categorizes fashion items but also extracts intricate features from these images, potentially useful for various applications including similarity matching in recommendations. Emphasizing practical challenges in machine learning, such as dataset imbalance and feature extraction, this project aims to enhance user experience in online fashion retail, connecting deep learning with real-world e-commerce solutions.

METHODOLOGY

DATA COLLECTION AND PREPROCESSING

The initial stage involved assembling a diverse dataset of fashion images classified into 142 categories.

EXPLORATORY DATA ANALYSIS (EDA)

EDA was pivotal in shaping the direction for the subsequent model development phase.

BASELINE MODEL DEVELOPMENT

CNN model is crucial for understanding basic classification performance and sets the stage for more advanced models and feature extraction in future phases.

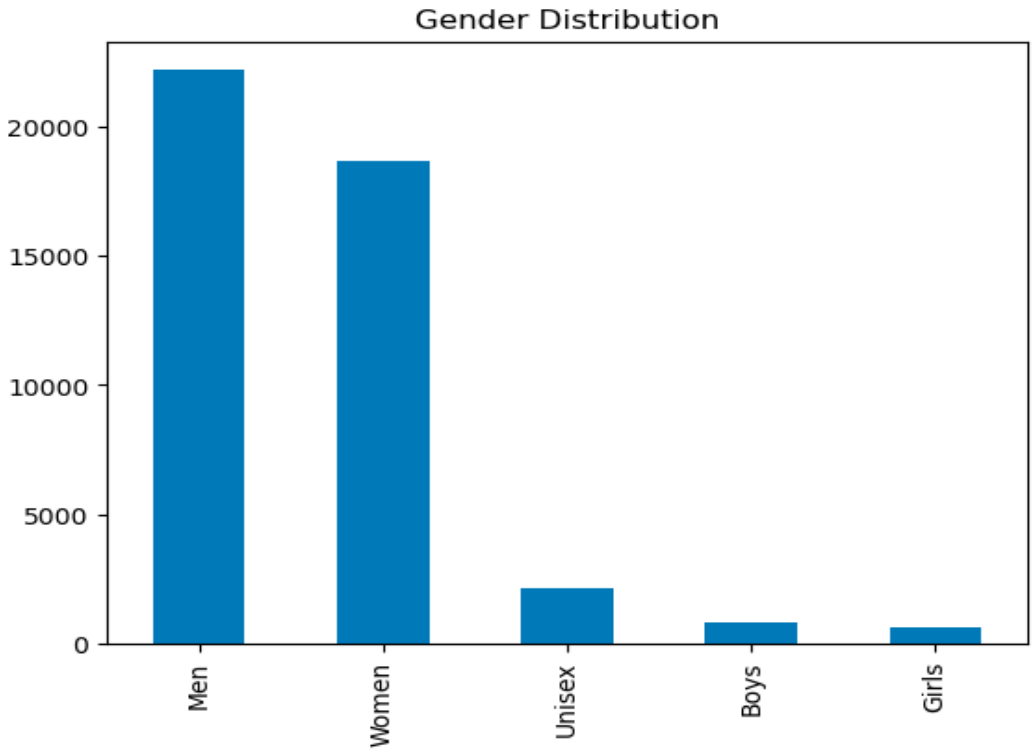
MODEL TRAINING AND VALIDATION

Counteracting dataset imbalance and overfitting, such as data augmentation and early stopping.

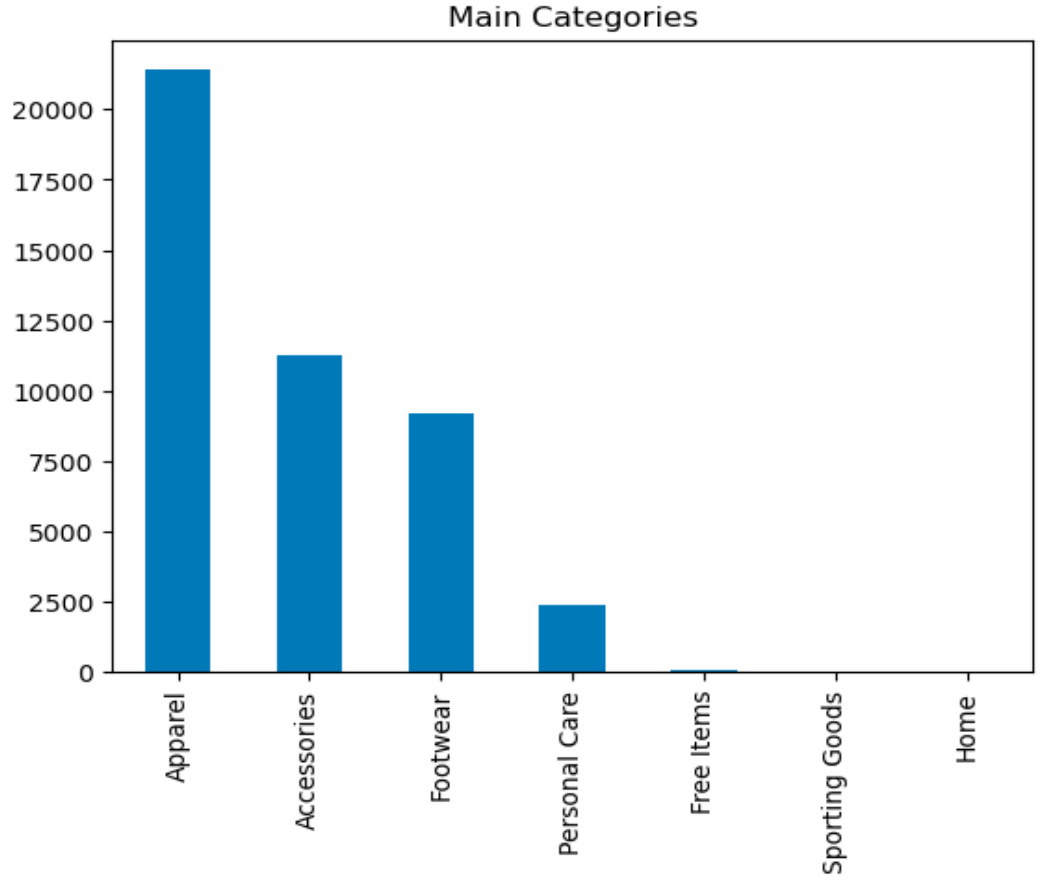
MODEL PERFORMANCE EVALUATION

Post-training, the model's effectiveness was assessed using key metrics like accuracy, precision, recall, and F1-score.

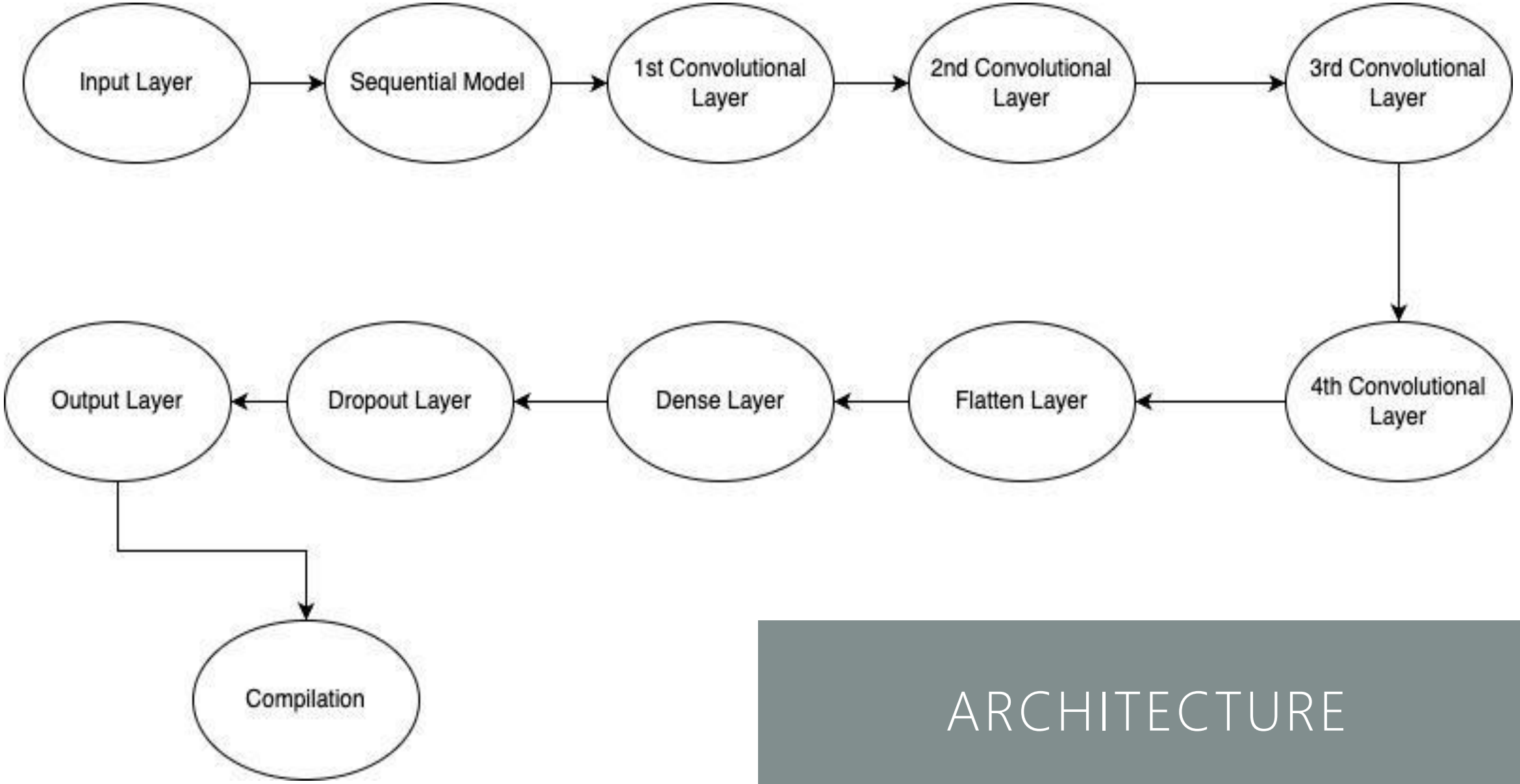
EXPLORATORY DATA ANALYSIS



Distribution of Products by Gender



Distribution of Product Categories



ARCHITECTURE

RESULTS AND INFERENCE

Dataset	Accuracy	Loss
Training	76.08%	0.7561
Validation	78.48%	0.7201
Test	77.49%	0.8265

AREAS OF IMPROVEMENT

Limited data across 142 categories hinders model performance.

Scarcity of data affects model training for diverse categories.

Inadequate data leads to prolonged model training times.

Class	Precision	Recall	F1-Score	Support
Accessory Gift Set	0.00	0.00	0.00	67
Baby Dolls	0.00	0.00	0.00	11
Backpacks	0.02	0.02	0.02	506
Bangle	0.00	0.00	0.00	59
Basketballs	0.00	0.00	0.00	9
Bath Robe	0.00	0.00	0.00	14
Beauty Accessory	0.00	0.00	0.00	2
Belts	0.01	0.01	0.01	569
Blazers	0.00	0.00	0.00	5
Body Lotion	0.00	0.00	0.00	4
Body Wash and Scrub	0.00	0.00	0.00	0
Boxers	0.00	0.00	0.00	36
Bra	0.01	0.02	0.01	333
Bracelet	0.00	0.00	0.00	46
...	...	...	...	...
[Other Classes]	...	...	...	...
...	...	...	...	...
Wristbands	0.00	0.00	0.00	4
Overall Accuracy	**0.05**	**0.05**	**0.05**	**31026**

HOW WE GET THERE

Increasing Training Samples

Collecting additional product data.

Employing data augmentation techniques to synthetically generate new training samples.

Ensuring a balanced representation of user interactions for diverse recommendation scenarios.

Utilizing Better GPU Architecture / Cloud

Choosing GPUs with higher computational capabilities for model training.

Considering using cloud platforms (e.g., AWS, Google Cloud, or Azure) to access scalable GPU resources.

Optimizing data loading and processing pipelines for efficient GPU utilization.

Incorporating Pre-trained Models

Selecting a pre-trained model to the recommendation system. (e.g., RESNET).

Integrating the pre-trained model as a feature extractor or incorporate it into a hybrid recommendation system.

TEAM INVOLVEMENT AND CONTRIBUTION

Team Member	Tasks
Aditya Krishnan	Build CNN custom model architecture, training on local GPU, Performance Improvement
Bharat Kathuria	Data Extraction, cleaning and working on pre trained model for comparison.
Pinal Gajjar	Working on UI, Exploratory Data Analysis and Collecting additional product data.
Aditya Singh	Generating Recommendations and Collecting additional product data.

Q & A

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THANK YOU

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