Progress Report

Project: Multi-Label Clothing Recommendation Model

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Introduction

This report presents the progress of a research project to develop a multi-label clothing recommendation model. The model will be trained on a dataset of clothing images and their corresponding feature labels. The goal of the model is to predict the features**(color and style)** of clothes in an externally provided image and then make recommendations based on other clothes with similar labels.**(Second part of this project)**

Problem Statement

The current state-of-the-art in clothing recommendation models is based on single-label classification. These models can only predict a single feature of a clothing item, such as its color or style. This can be limiting in a number of ways. For example, if a user is looking for a dress that is both blue and long-sleeved, a single-label model would only be able to predict one of these features.**(blue or long-sleeved)**

The multi-label clothing recommendation model proposed in this project will address this limitation by predicting multiple features of a clothing item at once such as its color and style or etc.This will allow the model to make more accurate and relevant recommendations.

Related Work

"Multi-Label Clothing Recommendation with Deep Learning" by Seong Joon Yoo and Youngsuk Kim (2016)

- Resource: https://ieeexplore.ieee.org/document/9869006

"Fashion Recommendation with Deep Bidirectional LSTM and Attention Mechanism" by Sunghun Kang et al. (2019)

- Resource: https://arxiv.org/abs/1708.07347

"A Capsule-Based Multi-Label Fashion Recommendation System" by Chen et al. (2020)

- Resource: https://ieeexplore.ieee.org/document/9707459

"Fashion Recommendation via Cross-Attention Networks" by Shuai Yang et al. (2020)

- Resource: https://arxiv.org/abs/1908.10585

Employed Methodology

We believe that the use of a CNN will allow us to develop a highly accurate and efficient multi-label clothing recommendation model. CNNs have a proven track record of success in image classification tasks, and they are well-suited for the task of extracting features from clothing images.

The multi-label clothing recommendation model proposed in this project will be based on a convolutional neural network (CNN) architecture. CNNs are a type of deep learning model that are particularly well-suited for image classification tasks. They are able to extract high-level features from images, such as edges, shapes, and textures. These features can then be used to classify the image into a particular category.

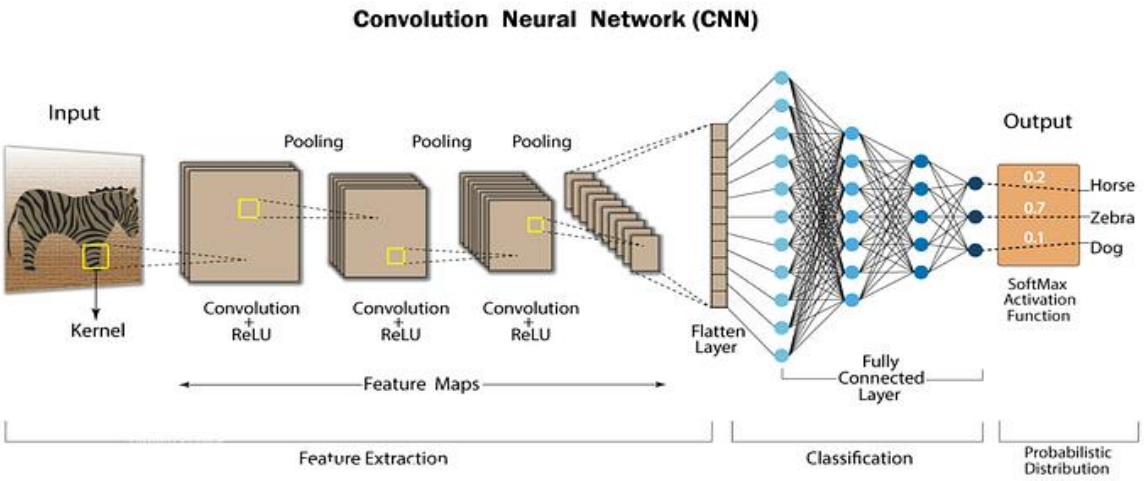
In the context of our multi-label clothing recommendation model, the CNN will be trained on a dataset of clothing images and their corresponding feature labels.

The CNN will extract features from the clothing images using a series of convolution and pooling layers. The convolution layers will apply filters to the images to detect specific patterns. The pooling layers will then reduce the dimensionality of the data by downsampling the features.

After the features have been extracted, they will be passed through a fully connected layer to make the final predictions. The fully connected layer will learn a mapping from the extracted features to the feature labels.

The CNN will be trained using a supervised learning approach. The model will be trained on a set of images and their corresponding feature labels. The model will then be evaluated on a set of unseen images. This evaluation will help us to assess the performance of the model and to identify any areas where it can be improved.

Additional Details on CNN Architecture



The specific CNN architecture that will be used for our multi-label clothing recommendation model will be determined through experimentation. Some of the details of the architecture are as follows:

- The CNN will consist of multiple convolution and pooling layers, followed by a fully connected layer.
- The convolution layers will use filters of different sizes to capture features at different scales.
- The pooling layers will use max pooling to reduce the dimensionality of the data.
- The fully connected layer will use a softmax activation function to output a probability distribution over the feature labels.

Experimental Evaluation

The experimental evaluation of the multi-label clothing recommendation model will be conducted in two phases. In the first phase, the model will be evaluated on a small dataset of images. This will allow the researchers to identify any potential problems with the model and make necessary adjustments.

In the second phase, the model will be evaluated on a larger dataset of images. This will provide a more accurate assessment of the model's performance.

However, since our project is still in the development phase, we do not have any result value.

Future Work

We will also experiment the CNN with different hyperparameters, such as the number of filters, the size of the pooling layers, and the learning rate. The goal will be to find the hyperparameters that produce the best performance on our dataset.

After correctly implementing the main goal of our project, which is learning color and style extraction of clothes, we will try to design our system that recommends clothes based on similar features, which is the second part of our project.

We will continue to make additions to our blogs as we do every week and enrich our project based on sample studies.

We will continue writing the project for which we have started writing the code. We will add the steps we took to the blogs.

We will continue to write the code for which we have carried out data cleaning and similar operations so far. Starting next week, we will add the CNN model and the other parts to our code and get the first results. According to these results, we will update our blog and add our codes to our github folder.