I Test Assignment

1 Task Overview

The outfit generation task using Generative Adversarial Networks (GANs) involves creating new and realistic clothing ensembles, including various elements like tops, bottoms, shoes, accessories, and more. GANs are a class of machine learning models used for generating synthetic data that resembles real data. They consist of two main components: the generator and the discriminator.

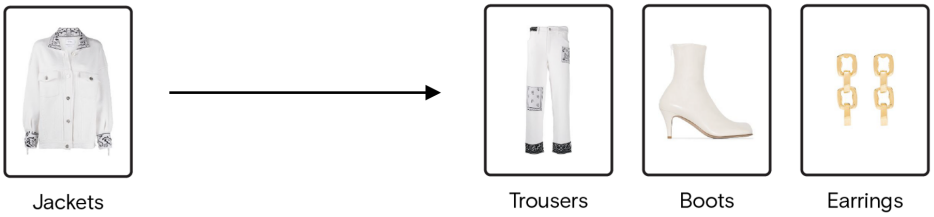

Figure 1: Caption

2 Objective

The objective of this Deep Learning project will be to develop a Generative Adversarial Network (GAN) model to accomplish the outfit generation task in the fashion domain. The primary objective is to generate a set of three images: bottoms (trousers/skirt), shoes, and accessories, given an input image of a top (shirt/t-shirt).

3 Dataset

You are provided with a dataset consisting of fashion outfit descriptions and images.
Polyvore oufits: `https://drive.google.com/file/d/13-J4fAPZahauaGycw3j_YvbAHO7tOTW5/view`

4 Data Preprocessing

Load the provided dataset and split it into training, validation, and test sets. Preprocess the data to convert the outfit descriptions into numerical representations suitable for deep learning models.

5 Model Architecture

Design a GAN model architecture that takes the input the images of the tops and generates the missing item.
The model could also be a GAN-derived model, like conditional GANs or others.

6 Hints

You can:

- organize the dataset to fit the training needs;
- if necessary, use techniques to augment the dataset;
- reduce the images to a reasonable size.

7 Training and Evaluation

Train the GAN model on the training set using suitable loss functions and optimization techniques. Monitor the training process by evaluating the model's performance on the validation set. Use appropriate evaluation metrics. Fine-tune the model hyperparameters to improve its performance on the validation set. Finally, evaluate the trained model on the test set and report its performance metrics.

8 Model Analysis

Perform an analysis of the model's performance. Identify any challenges or limitations faced by the model in generating the missing items. Provide recommendations for further improvements or modifications to enhance the model's accuracy and efficiency.

9 Deliverables

- A well-commented Python code implementation of the model for the outfit generation task in the fashion domain.
- A report documenting the detailed approach taken to solve the problem, including data preprocessing, model architecture, training, and evaluation results.
- Analysis and discussion of the model's performance, challenges faced, and recommendations for improvement.
- A presentation that will be discussed at the time of the Oral Exam.

Notes

You are encouraged to utilize existing deep learning libraries such as TensorFlow or PyTorch for implementing the model. Make sure to properly document your code and provide clear explanations in the report to demonstrate your understanding of the concepts and techniques used.