MAJOR-1 PROJECT

SYNOPSIS

For

Project Title

FASHION OUTFIT RECOMMENDATION SYSTEM

Submitted By

Specialization	SAP ID	Name
AI & ML	500075359	Niharika Agrawal
AI & ML	500076519	Prabhraj Singh
AI & ML	500075307	Pradumn Nathawat

Department of Informatics

School Of Computer Science

UNIVERSITY OF PETROLEUM & ENERGY STUDIES,

DEHRADUN- 248007. Uttarakhand

Mr. Bikram Pratim Bhuyan   Dr. T. P Singh
Project Guide   **Cluster Head**

School of Computer Science
University of Petroleum & Energy Studies, Dehradun

Synopsis Report

Project Title : Fashion Outfit Recommendation System

Abstract

Traditional recommendations for clothes consisted of lexical methods. However, visual-based recommendations have gained popularity over the past few years. This involves processing a multitude of images using different image processing techniques. In order to handle such a vast quantity of images, deep neural networks have been used extensively. With the help of fast Graphics Processing Units, these networks provide results which are extremely accurate, within a small amount of time. However, there are still ways in which recommendations for clothes can be improved. We propose an event-based clothing recommendation system which uses object detection. We train a model to identify nine events/scenarios that a user might attend: White Wedding, Indian Wedding, Conference, Funeral, Red Carpet, Pool Party, Birthday, Graduation and Workout. We train another model to detect clothes out of fifty-three categories of clothes worn at the event.

keywords : Time, Clothing, Recommendation.

1. Introduction

Deciding what clothes to wear for an event can often be a time-consuming task. At times, it is important to find clothes that are well-suited for an event. What we wear could have a good or a bad impression on people. Not wearing appropriate clothes on certain occasions can at times offend some people. For example, at a Christian funeral, wearing black conservative clothes is customary while at a Hindu funeral, wearing white conservative clothes is the norm. At Buddhist funerals, wearing the color red is frowned upon. Hence, the problem of event-based clothing needs to be addressed. These days, most of the people share photos of the events they attend on social media platforms. The information obtained from such images could be leveraged to learn the correlation between events and the categories of clothes worn at the events. By learning this correlation, appropriate clothing recommendations could be made. A recommender system is used to suggest products to customers by using information about the customer, about other customers or about the products and can predict what a customer will prefer.

2. Literature Review

Outfit Recommender System - Nikita Ramesh [1]
They first identified the type of event using object detection. Once they found out about the event in the image/s, they identified the clothes worn at that event. After this, they started finding correlation between the event and clothes worn. Then they ultimately found the most frequently used clothes and recommend similar clothes using a nearest neighbor approach.

Improving Outfit Recommendation with Co-supervision of Fashion Generation [2]
-Yujie Lin, Pengjie Ren, Zhumin Chen, Zhaochun Ren, Jun Ma, Maarten de Rijke
In this paper they tried to address the aesthetic style issue regarding the outfit recommendation system and propose a neural co-supervision learning framework, called the FAshion Recommendation Machine (FARM). FARM improves visual understanding by incorporating the supervision of generation loss, which they hypothesize to be able to better encode aesthetic information.

Outfit Recommendation System Based on Deep Learning - Ying Huang, Tao Huang [3]
Their goal was to use the system not only to judge an outfit if it is good or not but also to recommend good outfit to users when it is given a pool of cloth items. They proposed a model which includes two parts: one is feature extractor based on ResNet-50, and the other is a binary classifier which is to classify the outfits into good and bad ones.

3. Problem Statement
The main problem we are trying to address is that to provide a solution or "recommendation" which give the user an option for what to wear and reduce the stress to think about it.

4. Objectives

- To create a outfit recommendation system with Machine Learning that will work like highly personalized online shopping recommendations.

- The model should be able to scan across all the product images and automatically generate a group of recommended products that are customized to what the user wants to wear.

- The group of recommended products should be generated in real-time to meet the requirements of the pipeline.

- The model should be able to adapt to new products and new users.

5. Methodology

The Polyvore dataset includes three JSONs (test, train, and validation) with metadata for **[4]** each outfit.
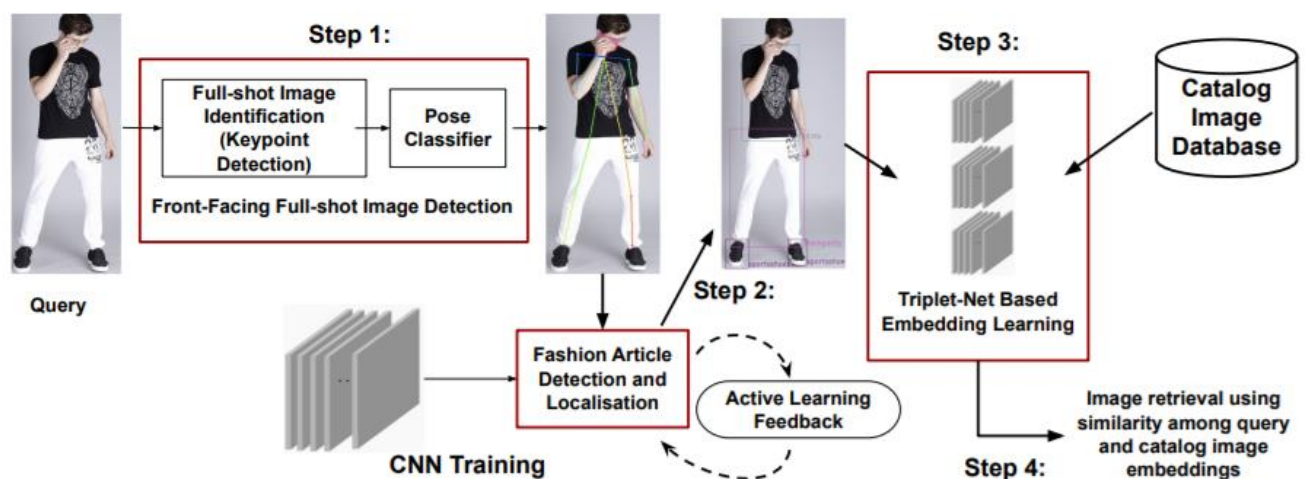
First remove all outfits that weren't relevant to the problem by using the "filter on value" processor.

Most machine learning models can only take numerical inputs, so we need a way to convert our .jpg files to a format that a model can read.When an image is read into Python, it can be represented as either a 2D or 3D matrix, depending on the number of color channels present in the image.When working with image data, just like in any other machine learning problem, the data should be normalized. The models that these images will be fed to will need inputs of universal sizes.

Before training the predictive model, we decided to train a model to reduce the dimensionality of the images to feed into concurrent models.

This has two benefits: The first is that we can work with smaller representations of images, which increases the efficiency. The second benefit is that the concurrent models can learn additional signals from the autoencoder that the original image doesn't contain.

Now that we have the autoencoder model, we can use the encodings to train a predictive model. In order to ensure that the outfits were relatively different from each other, we decided to cluster the outfits using the embeddings and return the top outfit from each cluster.

References

1. https://scholarworks.sjsu.edu/cgi/viewcontent.cgi?article=1611&context=etd_projects
2. https://staff.fnwi.uva.nl/m.derijke/wp-content/papercite-data/pdf/lin-2019-improving.pdf
3. https://www.atlantis-press.com/proceedings/iccia-17/25880175
4. https://github.com/xthan/polyvore-dataset
5. https://towardsdatascience.com/building-a-personalized-real-time-fashion-collection-recommender-22dc90c150cb
6. https://blog.dataiku.com/outfit-recommendation-system

APA Format

Nikita Ramesh, (2018). *Outfit Recommender System.* San José State University

Yujie Lin, Pengjie Ren, Zhumin Chen, Zhaochun Ren, Jun Ma, and Maarten de Rijke. *Improving Outfit Recommendation with Co-supervision of Fashion Generation*. In Proceedings of the 2019 World Wide Web Conference (WWW '19), May 13–17, 2019, San Francisco, CA, USA. ACM, New York, NY, USA.

Ying Huang, Tao Huang (2017). *Outfit Recommendation System Based on Deep Learning*. School of Information Engineering, Wuhan University of Technology, Wuhan 430070, China.

Chakraborty, S.; Hoque, M.S.; Rahman Jeem, N.; Biswas, M.C. Bardhan, D. Lobaton, E. Fashion (2021). *Recommendation Systems, Models and Methods: A Review. Informatics.* Wilson College of Textiles, North Carolina State University, Raleigh, NC 27695, USA.