Mining of Complete Fashion Attire with Multiple Choices Using Deep Learning

Sonali Kadam, Simran Kawale ,Priyanka Ghotgalkar, Neha Hajare, Kirti Harke

Abstract :

The fashion industry has evolved in many fields and its growing and making a huge market in garment companies and e-commerce entities. The challenging task for IT industry in fashion is to model a predictive system with the domain of data mining. Our paper deal with such a system which will result in composing fashion outfits. The core of the proposed automatic composition system is to score fashion outfit candidates based on the appearances and meta-data. Our approach will first implement an end-to-end system of encoding visual features using a deep convolution network for complicated visual contents of a fashion image because it is impossible to label or even list all possible attributes for every clothing image. Secondly, we propose a multi-modal deep learning framework for rich contexts of fashion outfit. We propose a system which will recommend with review comments and which product should purchase and the system will display a rating of the product.

IndexTerms **- Component, formatting, style, styling, insert.**

I. INTRODUCTION

Fashion domain requires a sound knowledge of the recent trends and ability to expertise in outfit combination. In this project, an "outfit" refers to a set of clothes worn together, typically for certain desired styles. To find a good outfit composition, it is very important to follow the appropriate dressing codes and also be creative in balancing the contrast in colors and styles. For instance, generally people do not pair a fancy dress with a casual backpack, however, once the shoes were in the outfit, it completes the look of a nice and trendy outfit. Many types of research have been done on clothes retrieval and recommendation, but none of them considers the problem of fashion outfit composition. This is partially due to the difficulties of modeling outfit composition. On one hand, a fashion concept is often subtle and subjective, and it is nontrivial to get consensus from ordinary labelers if they are not fashion experts. On the other hand, there may be a large number of attributes for describing fashion, for which it is very difficult to obtain exhaustive labels for training. Thus, most of the existing work is restricted to the simple scenario of retrieving similar clothes or choosing individual clothes for a given event. Our project proposes a data-driven approach to train a model that can automatically compose a suitable fashion outfit. With the help of the internet, it has been facilitated to bring awareness to people about the upcoming trends. Many websites like Polyvore, Pinterest and YouTube have tremendously spread fashion trends and tips by online sharing of data over mobile or various social media sites. Such online communities can be very big. By actively interacting with the websites, the users express their opinions on which fashion outfits are good and which are not so well composed. By aggregating the wisdom of the crowds, we obtain user engagement scores (popularity), for the fashion outfits, which are used to train a classifier to score new fashion outfit candidates. The full automatic composition system is built upon the scorer by iteratively evaluating all possible outfit candidates.

Keywords
Clothes, Convolutional Neural Network, Recommendation

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Related Work

1. Hi, Magic Closet, Tell Me What to Wear

Description: This paper proposes the magic closet system which automatically recommends the most suitable clothing by considering the wearing properly and wearing aesthetically principles. Limited by the current performance of human detector, some clothing in the user's clothing photo album may be misdirected.

2. Learning Visual Clothing Style with Heterogeneous Dyadic Co-occurrences Description: This paper presented a new learning framework that can recover a style space for clothing items from co-occurrence information as well as category labels The algorithm used in this paper was old and not feasible as compared to our approach.

3. Where to Buy It: Matching Street Clothing Photos in Online Shops

Description: This paper, define a new task, Exact Street to Shop, where our goal is to match a real-world example of a garment item to the same item in an online shop. This algorithm already had the predefined style stored in their databases.

4. Street-to-Shop: Cross-Scenario Clothing Retrieval via Parts Alignment and Auxiliary Set

Description: a clothing parsing method based on fashion image retrieval. In which system combines global parse models, nearest-neighbor parse models, and transferred parse predictions. This paper did not consider the mixed fashion tradition like our does.

5. Retrieving similar styles to parse clothing

Description: a clothing parsing method based on fashion image retrieval. In which system combines global parse models, nearest-neighbor parse models, and transferred parse predictions. This paper did not consider the mixed fashion tradition like our does.

Motivation:

Fashion has evolved day by day from the past few decades and has gained a considerable amount of attention. With the influence of fashion magazines and fashion industries going online, clothing fashions are attracting more and more attention. There is a need to study and make a system which will make it easy for a commoner to get the fashion sense without wasting their time on researching new style.

Mathematical Model

Input: Train data images of 50 outfit combinations.
S = {I, F, O}
Where, S = Proposed system.
I = Input of system (Product images).
F = Functions of the system.
O = Output of the system (Final outfit).
F = {f_1, f_2, f_3}
- f_1= Convolutional layer.
- f_2= Pooling layer.

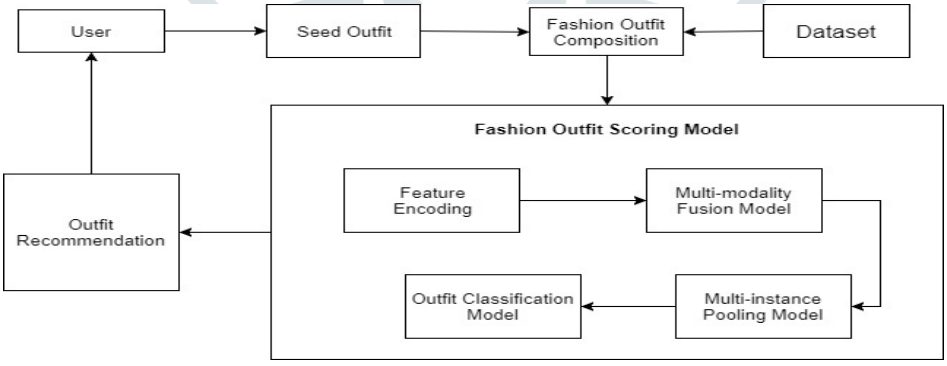
f_3= Fully-connected layer.

The proposed system uses Convolutional Neural Network (CNN) for predicting the complete outfit. The image undergoes Convolutional layer, pooling layer and fully connected layer for performing image processing steps and then does classification to give the required output.

Output:
Complete outfit with the products having their reviews and ratings given by the users.

System Architecture:

Figure shows the detailed flow of Fashion Outfit Composition. A user needs to select one product and an internal process will get started which will run a deep learning process for the outfit for recommending the best products among them. These recommendations will be shown on the next page. Convolutional Neural Network (CNN) is used for feature extraction and classification of images. The images of 50 outfits are considered as a dataset for this project.



System overview

Convolutional Neural Network (CNN)

Convolutional neural networks are deep artificial neural networks that are used primarily to classify images (e.g. name what they see), cluster them by similarity (photo search), and perform object recognition within scenes. They are algorithms that can identify faces, individuals, street signs, tumors, platypuses and many other aspects of visual data.

Steps in CNN:

1. Convolution Layer- In this layer we apply filter (3*3) on image.
2. Pooling layer- Pooling is an important component of convolutional neural networks for object detection.
3. Fully Connected layer- It is the fully connected layer of neurons at the end of CNN.

A CNN consists of an input and an output layer, as well as multiple hidden layers. The hidden layers of a CNN typically consist of convolutional layers, pooling layers, fully connected layers and normalization layers.

Convolutional layers apply a convolution operation to the input, passing the result to the next layer.

Conclusion:

This paper has proposed a generic composition algorithm based on outfit quality scorer for compositing the fashion outfits, which cope up with the difficulties of matching domain expert knowledge and modeling the diversity in fashion. The outfit quality scorer is an end-to-end trainable system, which achieves promising performance. By finding the combination of multi-modalities and proper pooling of the instance level features, leads to the best performance.

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