

Fashion Style Analysis and Recommendation Using Machine Learning

Project Proposal



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27 December, 2023

Southern University Bangladesh

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Thesis Proposal

Application for the Approval of B.Sc. Engineering
Thesis/Project

Tentative Title : Fashion Style Analysis and Recommendation Using
Machine Learning

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1. Abstract

Fashion has always been an essential feature of our daily routine. It plays an important role in everyone's life. Today, the impact of deep learning on computer vision applications is increasing every day. Deep learning techniques are applied in many areas like clothing search, automatic product recommendation. The online fashion market continues to grow, and an algorithm capable of identifying clothing can help companies in the apparel industry understand the profile of potential buyers and focus sales on specific niches. As well as tailoring campaigns based on customer tastes and improving user experience. Artificial intelligence capable of understanding, recommending and labeling human clothing is essential, and can be used to improve sales or better understand users. In this paper, a new deep learning model based on Convolutional Neural Network (CNN) is proposed to solve the classification problem. These networks can extract features from images using convolutional layers, unlike traditional machine learning algorithms. In this paper, we used our own generated dataset, where the total number of data was 2000. The dataset contains total 10 categories such as shirt, punjabi, t-shirt, blazer, sweater, saree, salwar kameez, gown, western tops and party wear. All the data we have collected from online like social media, google, facebook, instagram, linkedin. The main goal of this project is that research findings can contribute to developing intelligent fashion style analysis and recommendation systems, improving users' fashion preferences and providing a personalized fashion experience. The topic combines the fields of fashion, style and machine learning to create a system that can analyze fashion images, classifying them into different styles. In this paper I have used the Customize CNN Algorithm, through which we have used the 7 architectures of CNN. The 7 custom CNN methods we used are VGG19, MobileNetV2, MobileNetV3, EfficientNet B0, EfficientNet B3, Inception V3 and DenseNet201.

2. Introduction

The fashion business is a multifaceted sector that encompasses a wide range of activities, from recycling clothing to producing photographs for online shop catalogs. It is particularly involved in sustainable fashion, which involves generating usable items [2]. The fashion business has to gather and evaluate a lot of digital fashion data in order to identify more valued clients in light of the rapidly expanding fashion companies and the rise of e-commerce behemoths. Artificial intelligence began to blossom with several applications and advances in the fashion industry through different situations including identification, synthesis, analysis, and suggestion [3]. The ability for internet consumers to take images of clothing to search for anything is a big assist with clothing image recognition. Image recognition serves as a search engine by giving results without the need for typing. It is possible to frame the definition of clothing image problem as a classification question [4]. In recent years, research on artificial intelligence (AI) technology has advanced significantly due to the quick growth of computer technology. Among these, the study and use of machine learning-based artificial intelligence systems has advanced quickly [5]. Due to rising economic levels, individuals today seek out new fashions to accessorize themselves and are

no more content to wear clothes only to be warm. However, there is no agreed-upon description or categorization scheme for clothing styles, which leads to variations in how various academics classify the same styles [6].

The application of machine learning in production and daily life is growing [5]. Different machine learning techniques may be derived from basic methods for apparel picture recognition [4]. Deep learning techniques are applied to a variety of challenges, including posture estimation, the creation of portrait graphics, the segmentation and recognition of garments in the fashion industry. There is a tendency toward these techniques because, in contrast to conventional machine learning approaches, they are more successful at automated feature extraction and robust discriminating features [2]. However, compared to other common commodities, fashion has far more variance in trends, styles, and designs, making fashion analysis a difficult endeavor. To determine the level of difficulty related to clothes, a great deal of research has been done in the areas of fashion analysis, modeling, recognition, and parsing. All of these studies, which use bounding box prediction to recognize cloth areas, examine significant cues that identify various fabric portions and forecast their characteristics [3].

Style and fashion are significant components of self-expression and identity. The purpose of this thesis is to use machine learning techniques to assess current fashion trends and offer tailored style advice. Various datasets of fashion photos, including apparel items, accessories, and outfit combinations, will be gathered for this project. The main goal of the research is to create deep learning models, such as Convolutional Neural Networks (CNN), that can recognize characteristics in photographs and categorize or extract them based on various fashion trends. In order to understand visual representations of many styles, including streetwear, formal, vintage, and casual, models will be trained on labeled data. Furthermore, the thesis will investigate methods to offer customized fashion suggestions based on individuals, such as collaborative filtering or recommendation algorithms. Past encounters and preferences. Metrics like precision, accuracy, and recall will be used to assess the performance of the generated models, and user surveys or studies will be used to gauge user satisfaction. The findings of this study have the potential to enhance users' fashion preferences and offer a customized fashion experience by enabling the development of intelligent fashion style analysis and recommendation systems. In order to develop a system that can evaluate content fashion photos, categorize them into various styles, and provide tailored fashion suggestions, it integrates the domains of fashion, style, and machine learning. You may further hone in on the subject by adding user-generated fashion data or taking into account other factors like seasonality and the compatibility of clothing pieces. As always, work with your thesis adviser to customize the material to your preferences and the resources that are accessible. This paper mainly uses machine learning and deep learning to make fashion design analysis and recommendations. There are basically 10 categories namely shirt, Punjabi, t-shirt, blazer, sweater, saree, salwar kameez, gown, western tops and party wear. That is, to find out who is wearing what by using computer vision through various algorithms of data science. The main goal of this project is to provide future research with better comparisons between classification methods. Several models have been applied for this, through which we can predict better results.

2. Objective

This paper mainly uses machine learning and deep learning to make fashion design analysis and recommendations. There are basically 10 categories namely shirt, Punjabi, t-shirt, blazer, sweater, saree, salwar kameez, gown, western tops and party wear. That is, to find out who is wearing what by using computer vision through various algorithms of data science. The main goal of this project is to provide future research with better comparisons between classification methods. Several models have been applied for this, through which we can predict better results.

- Leverage machine learning techniques to analyze fashion trends and provide personalized style recommendations.
- Various datasets of fashion images including clothing items, accessories and clothing combinations will be collected.
- Models will be trained on labeled data to learn visual representations of different styles such as casual, formal, streetwear, vintage, etc.
- The thesis will explore techniques such as collaborative filtering or recommendation systems to provide personalized fashion recommendations based on individual preferences and previous interactions.
- Findings from research can contribute to developing intelligent fashion style analysis and recommendation systems, improving users' fashion preferences and providing a personalized fashion experience.
- The subject combines the fields of fashion, style and machine learning to create a system that can analyze fashion images, classify them into different styles.

3. Problem Description

In this paper, a new deep learning model based on Convolutional Neural Network (CNN) is proposed to solve the classification problem. These networks can extract features from images using convolutional layers, unlike traditional machine learning algorithms. In this paper, we used our own generated dataset, where the total number of data was 2000. The dataset contains total 10 categories such as shirt, punjabi, t-shirt, blazer, sweater, saree, salwar kameez, gown, western tops and party wear. All the data we have collected from online like social media, google, facebook, instagram, linkedin. The main goal of this project is that research findings can contribute to developing intelligent fashion style analysis and recommendation systems, improving users' fashion preferences and providing a personalized fashion experience. The topic combines the fields of fashion, style and machine learning to create a system that can analyze fashion images, classifying them into different styles. In this paper I have used the Customize CNN Algorithm, through which we have used the 7 architectures of CNN. The 7 custom CNN methods we used are VGG19, MobileNetV2, MobileNetV3, EfficientNet B0, EfficientNet B3, Inception V3 and DenseNet201.

4. Methodology

Preprocessing Technique:

- i. Grayscale
- ii. Noise Reduction
- iii. Histogram Equalization

CNN Model or Algorithm:

- VGG19
- MobileNetV2
- MobileNetV3
- EfficientNet B0
- EfficientNet B3
- Inception V3
- DenseNet201

5. Expected Outcomes

- Fashion design analysis is done using artificial intelligence through data science.
- Recommendations are made after fashion design analysis.
- This work aims to leverage machine learning techniques to analyze fashion trends and provide personalized style recommendations.
- The results of this research can contribute to developing intelligent fashion style analysis and recommendation systems, improving users' fashion preferences.
- This topic combines the fields of fashion, style, and machine learning to create a system that can analyze fashion images, classify them into different styles.

6. Application Area

I have some practical aspects of this project. The online fashion market continues to grow, and an algorithm capable of identifying clothing can help companies in the apparel industry understand the profile of potential buyers and focus sales on specific niches. Artificial intelligence capable of understanding, recommending and labeling human clothing is essential, and can be used to improve sales or better understand users.

The main goal of this project is that research findings can contribute to the development of intelligent fashion style analysis and recommendation systems, improve users' fashion preferences and provide a personalized fashion experience. The topic combines the fields of fashion, style and

machine learning to create a system that can analyze fashion images by classifying them into different styles.

7. Tools/Technology

- Computer
- Laptop
- Python
- Google Colab

8. Milestones and Activity

	Week/Cycle												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Supervisor & Topic Selection	←→												
Background Reading		←→											
Literature Review				←→									
Research Method Planning								←→					
Proposal												←→	

9. References

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