

Submitted to: Sruthimol Miss

SEMINAR ABSTRACT

Submitted by: Preethy Ann Thomas

INMCA S9

Roll Number: 43

Automated Clothing Detection and Classification System

The fashion industry is no stranger to rapid technological advancements, and in recent years, it has witnessed a transformation fuelled by artificial intelligence and computer vision. In this era of e-commerce, fashion recommendation engines, and visual search applications, the need for accurate and efficient methods to analyse clothing and accessories in images has never been more crucial. This abstract explores an innovative solution—a state-of-the-art automated clothing and accessory detection and classification system—that harnesses the power of deep learning to provide a comprehensive and detailed understanding of fashion items.

The Changing Landscape of Fashion Analysis

The digital age has revolutionized the way we interact with fashion. Gone are the days of brick-and-mortar stores being the sole avenue for shopping. Today, consumers increasingly turn to online platforms and mobile apps to explore, discover, and purchase clothing and accessories. This shift has given rise to a multitude of opportunities and challenges in the fashion industry.

One of the fundamental challenges is how to accurately assess and present fashion items to online shoppers. To tackle this challenge, our research team has developed an automated system that combines cutting-edge computer vision and machine learning techniques to recognize and classify clothing and accessories in images. The system's capabilities extend beyond mere identification; it delves into the realms of clothing types, colours, patterns, and accessory detection, offering an in-depth analysis of fashion items.

Our automated clothing and accessory detection and classification system are built upon a series of well-defined methods and technologies. Here's a breakdown of the key components:

1. Data Preparation:

Before embarking on the journey of fashion analysis, the system requires high-quality data. It is designed to accept JSON datasets containing vital information about images, including their dimensions, file paths, and bounding box coordinates. This structured data forms the foundation upon which the system operates.

2. Clothing Detection:

The core of the system's clothing detection module relies on a pre-trained ResNet-50 model, a deep neural network capable of recognizing objects in images. This neural network has been fine-tuned to identify various clothing items present in the images. The recognized clothing types encompass a wide range, from T-shirts and dresses to outerwear, suits, shirts, sweaters, tank tops, and skirts. Each clothing item is tagged and categorized, providing a detailed inventory of the fashion elements in the image.

3. Accessory Detection:

Fashion is not limited to clothing alone. Accessories play a pivotal role in defining a person's style. Therefore, our system goes a step further by identifying accessories such as glasses, sunglasses, dark glasses, ties,

handbags, backpacks, umbrellas, and more. This accessory detection module employs custom-trained classifiers tailored to specific accessory classes, ensuring accuracy in the identification process.

4. Bounding Box and Cropping:

To make the analysis visually accessible, the system draws bounding boxes around detected clothing and accessories within the image. This step not only provides a structured representation of the fashion elements but also enables precise cropping. By focusing on the detected items, the system produces visually appealing and informative results.

5. Colour and Pattern Classification:

Colours and patterns are intrinsic to fashion, shaping its aesthetics and appeal. Our system leverages deep learning models to classify both colour and pattern attributes of clothing items. For colours, it offers distinctions such as black, blue, brown, cyan, grey, green, multi-colour, orange, pink, purple, red, white, and yellow. Patterns, on the other hand, are categorized into floral, graphics, plaid, solid, spotted, and striped. These classifications provide a nuanced understanding of the fashion elements present in the image.

Advancing Fashion Analysis

The results produced by our automated system are a testament to its accuracy and performance. It excels in handling diverse clothing types and accessories commonly encountered in fashion-related applications. The inclusion of custom bounding boxes and labelling ensures that the information is not only accurate but also visually presented on the image, making it user-friendly and practical for a wide range of applications.

The system's ability to process images with multiple clothing items and accessories further enhances its utility. Whether it's providing outfit recommendations, enabling visual searches, or enhancing the online shopping experience, our system stands as a reliable tool in the fashion industry's digital evolution.

Conclusion

In conclusion, our automated clothing and accessory detection and classification system signify a pivotal advancement in the realm of fashion analysis. By seamlessly integrating deep learning and computer vision, it addresses the evolving demands of the fashion industry in the digital age. Its capacity to identify clothing types, colours, patterns, and accessories, all while delivering visually appealing results, positions it as a valuable asset in e-commerce, fashion recommendation systems, and visual search applications.

As fashion continues to evolve, so too will our system, adapting to new trends, styles, and technologies. With the power of automation and artificial intelligence, fashion analysis has taken a giant leap forward, paving the way for more engaging, informative, and immersive fashion experiences for consumers worldwide.