

Literature Survey - Fashion Recommendation System

1. Fashion Recommendation Systems, Models and Methods: A Review

Author - Samit Chakraborty ., et al.

In recent years, the textile and fashion industries have witnessed an enormous amount of growth in fast fashion. On e-commerce platforms, where numerous choices are available, an efficient recommendation system is required to sort, order, and efficiently convey relevant product content or information to users. Image-based fashion recommendation systems (FRSs) have attracted a huge amount of attention from fast fashion retailers as they provide a personalised shopping experience to consumers. With technological advancements, this branch of artificial intelligence exhibits a tremendous amount of potential in image processing, parsing, classification, and segmentation. Despite its huge potential, the number of academic articles on this topic is limited. The available studies do not provide a rigorous review of fashion recommendation systems and the corresponding filtering techniques. To the best of the authors' knowledge, this is the first scholarly article to review the state-of-the-art fashion recommendation systems and the corresponding filtering techniques. In addition, this review also explores various potential models that could be implemented to develop fashion recommendation systems in the future. This paper will help researchers, academics, and practitioners who are interested in machine learning, computer vision, and fashion retailing to understand the characteristics of the different fashion recommendation systems.

2. A Review on Outfit Fashion Recommendation System

Author - Bhagyshree Pravin Bhure ., et al.

With the quick rise in living standards, people's shopping passion grew, and their desire for clothing grew as well. A growing number of people are interested in fashion these days. However, when confronted with a large number of garments, consumers are forced to try them on multiple times, which takes time and energy. As a result of the suggested Fashion Recommendation System, a variety of online fashion businesses and web applications allow buyers to view collages of stylish items that look nice together. Clients and sellers benefit from such recommendations. On the one hand, customers can make smarter shopping decisions and discover new articles of clothes that complement one another. Complex outfit recommendations, on the other hand, assist vendors in selling more products, which has an impact on their business. FashionNet is made up of two parts: a feature network for extracting features and a matching network for calculating compatibility. A deep convolutional network is used to achieve the former. For the latter, a multi-layer completely connected network topology is used. For FashionNet, you must create and compare three different architectures. To achieve individualised recommendations, a two-stage training technique was created.

3. Design and implementation of clothing fashion style recommendation system using deep learning

Author - Muhammad KHALID ., et al.

In recent years, with the huge amount of information and users of the internet service, it is hard to know quickly and accurately what the user wants. This phenomenon leads to an extremely low utilisation of information, also known as the information overload problem. Traditionally, keywords are used to retrieve images, but such methods require a lot of annotations on the image data, which will lead to serious problems such as inconsistent, inaccurate, and incomplete descriptions, and a huge amount of work. To solve this problem, Content Based Information Retrieval (CBIR) has gradually become a research hotspot. CBIR retrieves picture objects based entirely on the content. The content of an image needs to be represented by features that represent its uniqueness. Basically, any picture object can be represented by its specific shapes, colours, and textures. These visual characteristics of the image are used as input conditions for the query system, and as a result the system will recommend nearest images and data sets. This research designs and implements a two-stage deep learning-based model that recommends a clothing fashion style. This model can use a deep learning approach to extract various attributes from images with clothes to learn the user's clothing style and preferences. These attributes are provided to the correspondence model to retrieve

the contiguous related images for recommendation. Based on data-driven, this thesis uses convolutional neural networks as a visual extractor of image objects. This experimental model shows and achieves better results than the ones of the previous schemes.

4. Advanced Fashion Recommendation System for Different Body Types using Deep Learning Models

Author - Seema Wazarkar ., et al.

The fashion industry is rapidly expanding and playing a critical role in driving global economies. Due to this ever-growing industry, application of computer science is rising rapidly to solve different problems in this industry. Many e-commerce sites around the world allow their customers to purchase clothing items over the internet predominantly using recommender systems for shoppers based on the customer's purchase history, similar buying patterns of other shoppers, items in the wishlists and latest trends. These recommendation models lack personalization based on the user's body demographics. Since fashion is a way, one chooses to express themselves, it is important that each piece is carefully selected to suit the buyer. In this paper, an improved recommendation system is developed using a deep learning model for customers with different body shapes/types. It helps users to select clothing items based on their body shape. Proposed system is evaluated with respect to multiple deep learning models as well as traditional machine learning approaches. Xception model out performed by achieving 94% accuracy and a loss of 0.02%.

5. Outfit Selection Recommendation System using Classification Techniques

Author - N. Srinivasa Gupta ., et al.

Recommendation of outfit helps the people in taking the right decision while purchasing and also increases the sales. The analysis of the accuracy of the classified dataset using various data mining techniques and algorithms is the key concept of this paper. The accuracy when the algorithms are applied on the balanced dataset, imbalanced dataset, dataset with attribute reduction and without attribute reduction is compared. To perform the attribute reduction, we are using cfsSubsetEval, consistencySubsetEval and chisquaredAttributeEval. The algorithms that are used to classify the dataset are Random Forest, Naive Bayes, zeroR, Multilayer Perceptron, RBF Network and AdaboostM1. The main challenge is that the virtual dataset is imbalanced through which we got poor results with less accuracy. This dataset is balanced using SMOTE analysis to obtain higher accuracies and also attribute reduction is performed to compare the accuracies obtained. In comparison with the existing method, the maximum accuracy rate produced by the Poonkuzhali Sugumaran and Vinodh Kumar Sukumaran [1] was 98% using hybrid classifier ID3 and AdaBoost algorithms. In the proposed method, the dataset, when balanced by SMOTE analysis and classified by Random Forest algorithm, results in 99.86% of accuracy in recommending the outfit.

6. Content Based Apparel Recommendation System for Fashion Industry

Author - Illa Pavan Kumar ., et al.

E-commerce systems that encourage online shopping ,have major issues to deal with catalogue based online shopping. As there is a lack of customized services, the users may face difficulties to find discrimination over different types of retailers available on electronic product catalogs, they may also be confused with complex navigations that redirect to other pages based on their selection. This drawback can be overwhelmed by following suggestions on categories that they have chosen or from the products that they have already

Multiple online marketing companies around world-wide ,have been practising the naive method for apparel marketing websites. This paper aims to simulate this recommendation system on real world data set taken from the marketing giant, Amazon's Product Advertising API, in a policy compliant manner by following the procedure in three steps :Analysing the data to select the pivot for the recommendation system, Data preprocessing to remove invalid sections and to implement and find appropriate choices among the techniques like Bag of

Words(BoW) and TF-IDF for better recommendations. The recommendation technology for apparel industry, as an emerging technology, has attracted wide attention of scholars. It is a well known fact that the apparel recommendation depends on operations which were performed manually. To help the customers in selecting the apparels with their own customization, the sales person could do with to a good recommendations to the customer so as to increase the satisfaction rate in customers about the products, and make the customer to be enthusiastic in purchasing the products, to understand the sentimental analysis of the customers during shopping and finally to increase the product of sales.

7) Chatbot design approaches for fashion E-commerce: an interdisciplinary review

Author - A. R. D. B. Landim ., et al.

Chatbots can bring innovation in online assistance and communication with customers. Due to the growth of e-commerce, fashion brands have been adopting chatbots to provide personalised consumer experiences. Research in the area of chatbots for fashion e-commerce has addressed technological advancements and consumer behaviour, but little has been done on analysing chatbot features through a holistic point of view. The aim of this paper is to offer an interdisciplinary review through a comprehensive categorisation of recent studies on the theme and inform future research in the area. To achieve that, a theme-based literature review was carried out through the analysis of specialised research. The collected work was categorised addressing both computational and non-computational perspectives. The findings show that Deep Learning, recommendation systems, audio recognition and integration of chatbots with other fashion applications are a few design opportunities to be applied in both research and practice. When it comes to designing and adopting chatbots within the consumer journey, Pantano and Pizzi inform that: retailers might want to choose already designed chatbot platforms or to design their own; from a technological point of view, conversational agents are

designed to mimic natural language; however, analytical skills to learn from consumer data are still required; and, social media (e.g. instant messengers such as Face- book Messenger) and voice-based AI (utilising audio recognition) such as Siri and Alexa, are the most used platforms.

8) Towards Fashion Recommendation: An AI System for Clothing Data Retrieval and Analysis

Author - A. Pericles Mitkas ., et al.

Nowadays, the fashion industry is moving towards fast fashion, offering a large selection of garment products in a quicker and cheaper manner. To this end, the fashion designers are required to come up with a wide and diverse amount of fashion products in a short time frame. At the same time, the fashion retailers are oriented towards using technology, in order to design and provide products tailored to their consumers' needs, in sync with the newest fashion trends. In this paper, we propose an artificial intelligence system which operates as a personal assistant to a fashion product designer. The system's architecture and all its components are presented, with emphasis on the data collection and data clustering subsystems. In our use case scenario, datasets of garment products are retrieved from two different sources and are transformed into a specific format by making use of Natural Language Processes. The two datasets are clustered separately using different mixed-type clustering algorithms and comparative results are provided, highlighting the usefulness of the clustering procedure in the clothing product recommendation problem. The fashion clothing industry is moving towards fast fashion, enforcing the retail markets to design products at a quicker pace, while following the fashion trends and their consumer's needs. Thus, artificial intelligence (AI) techniques are introduced to a company's entire supply chain, in order to help the development of innovative methods, solve the problem of balancing supply and demand, increase the customer service quality, aid the designers, and improve overall efficiency. Recently, an increasing number of projects in the fashion industry make use of AI techniques, including projects run by Google and Amazon.

9) Fashion Evaluation Method for Clothing Recommendation Based on Weak Appearance Feature

Author - Yan Zhang ., et al.

In fashion sales, the recommendation technology, as an emerging technology, has attracted wide attention from scholars. As is widely known, the traditional garment recommendation depends on manual operation. To be specific, salesmen need to recommend garments to customers in order to arouse their interest in purchasing. However, it is very difficult for salesmen to understand customers' real thoughts and then recommend the targeted garment as there is no sufficient cohesiveness between customer information and merchants. Therefore, it is essential and meaningful to find a set of objective indicators, instead of subjective opinions, to evaluate the fashion level in the clothing recommendation technology. As the Internet technology continues to develop rapidly, virtual fitting and other clothing intelligent equipment have enjoyed great popularity in the fashion industry. Cordier first applied the 3D graphics technology to create and simulate the virtual store. Subsequently, proposed the interactive 3D virtual fitting room system in which the model's hairstyle and accessories can be changed according to customers' preferences and customers' matching degree can be evaluated to guide people to choose the suitable clothes. Nevertheless, the virtual fitting research products are constantly innovating and developing. In fact, today's systems are mainly used to display garment, and customers can only have a preview of the fitting effect. If the store does not have an efficient recommended method, the search will be tedious and frustrating. Zhang presented an inter-action clothes fitting system that can recognize what human eyes perceive in terms of the clothing similarity through the frontal-view outfit images.

10) **Fashion Meets Bot : What Should the Bot Wear?**

Author - Ziqi Wang ., et al.

Intelligent bots are evolving with the development of artificial intelligence, especially the deep learning method. Many skills like semantic judgement, speech recognition, and text generation have been added, making bots more like real persons. The latest ones, such as Microsoft Xiaolce, Amazon Alexa, and Apple Siri, focus on enhancing general functionalities but still overlook the personality of the bot itself nevertheless, e.g., unchanging name and its virtual appearance. To further personalise the user experience, we desire to make the appearance of intelligent bots more diverse, i.e., appearing capable of autonomously changing its characteristic appearance according to users' contexts like the changing geolocation. In this paper, we design a personalised appearance transformation framework for the next generation intelligent bots. Specifically, Multi-modal crowd-intelligence technology is used for differential analysis of various regions, and generative adversarial network (GAN) is customised to render the bot appearance target domain. We also collect new region-specific data sets from social media platforms, implement a fully-fledged prototype, and demonstrate the effectiveness of our proposed framework.