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FASHION RECOMMENDATION SYSTEM

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ABSTRACT: A recommender system primary purpose is to provide a series of item suggestions on a topic to its user. Deep learning is used in many fields and solved difficult and complex problems with large volumes of data. Deep learning can also be used in referral systems. Today, online shopping systems are looking for a method that can recommend items according to the user preference and interest in order to increase their sales. Clothing sales systems offer a set of recommendation based on the needs and interests of the users. Now-a-days, nearly all of the tasks are being done online. People prefer to use online which is why we propose a content-based clothing recommender system using deep neural network. In content based systems, product features are required for prediction of unobserved items ratings. In our proposed system by using a deep neural network, the cloth category is obtained and the need to manually extract the product features is eliminated by producing the required features with a large and useful volume. The advantage of this system is that it uses the same network to specify gender as a feature in making suggestions then shows the results to the user. Different machine learning algorithms are tested and analysed with and without considering demographic information such as gender. The experimental results show that the loss of our proposed system is lower than the other related systems and solves the cold start problem for new items. Our proposed system also recommends novel, relevant and unexpected items.

KEYWORDS: Clothing, Recommender System, Deep learning, Demographic, Feature Extraction, Cold start, Content, Coronavirus

I. INTRODUCTION

1.1 BACKGROUND

In the online internet era, the idea of Recommendation technology was initially introduced in the mid-90s. Proposed CRESA that combined visual features, textual attributes and visual attention of the user to build the clothes profile and generate recommendations. Utilized fashion magazines photographs to generate recommendations. Multiple features from the images were extracted to learn the contents like fabric, collar, sleeves, etc., to produce recommendations. In order to meet the diverse needs of different users, an intelligent Fashion recommender system is studied based on the principles of fashion and aesthetics. To generate garment recommendations, customer ratings and clothing were utilized in The history of clothes and accessories, weather conditions were considered in to generate recommendations.

1.2 MOTIVATION

The main aim of the project is to recommend the most appropriate clothes for a given occasion based on the clothes existing in the user's wardrobe to relieve the user of the burden of making decisions about what clothing to

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wear.
The aim of a recommender system is to estimate the utility of a set of objects belonging to a given domain, starting from the information available about users and objects.
The purpose of recommenders is often summarized as "help the users find relevant items", and the predominant operationalization of this goal has been to focus on the ability to numerically estimate the users' preferences for unseen items or to provide users with item lists ranked in accordance to the estimated.

1.3 PROBLEM STATEMENT

- To find or give best recommendations or similar options with respect to customer's choices.
- The objective of recommender systems is to provide recommendations based on recorded information on the users' preferences.
- These systems use information filtering techniques to process information and provide the user with potentially more relevant items.

II. LITERATUREREVIEW

The use of recommendation systems is growing daily since it enables customers to efficiently browse through a large number of products online and choose the ones that best suit their needs. Customers prefer to buy new products that match old ones in terms of colour or design. Automated recommendation engines uncover a wide range of patterns that interest clients more quickly.[1]
Recommendation systems have attracted the attention of researchers, and different types of recommendation systems can be used to make decisions about what to watch or buy. Different recommendation systems have been presented in the literature related to movie, video, music, fashion and clothing. [2]
Collaborative filtering is a new way to model the interaction between users and products and captures collaboration between users' behaviour and reviews on products. Traditional recommendation systems rely on textual and numerical information such as product descriptions and user profiles, while deep learning methods try to extract features from images and videos.[3]
In their study, they combined a multi label CNN with the support vector machine proposed a recommendation system by including the use of aesthetic features in addition to visual features. [4]
They indicated that the aesthetic features were extracted by a pertained neural network. An outfit recommendation system is proposed based on long-short term memory (LSTM) network in [5].
They aimed to learn the model of producing a global compatible outfit from existing outfit images and text descriptions [6] proposed a comparative deep learning model that learns image and users' preferences jointly.
Recommendation systems generally tend to use the information of products previously purchased or rated by consumers to make appropriate recommendations [7].
One is the system that all features are considered, and the second system consults the features without gender and color features of the clothing. An experiment has been conducted to show the effectiveness of our recommendation system, which is based on the idea of using semantic parsing from released source code [8].

The texture of the clothing is another important factor, as well as its colour, which can be determined by computing its value in HSV colour space. [9]
N. The systems in [10] performed gender identification solely on the user's face image. Gender of the items in their system is already available and they do not perform diagnostic operations.[10]

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III. PROPOSED SYSTEM ARCHITECTURE

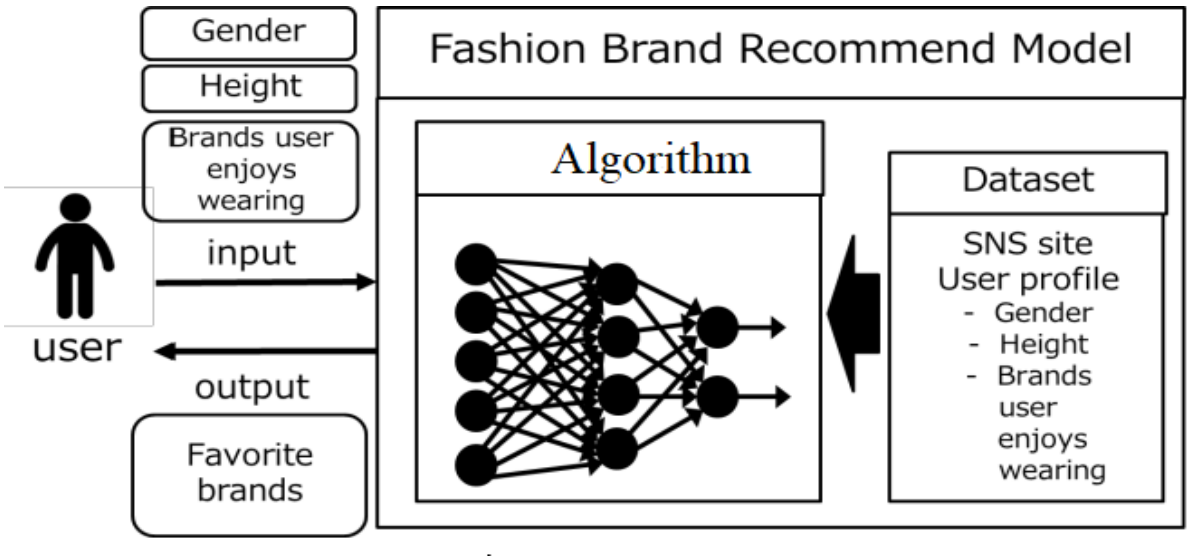

Figure 3.1 Proposed System Architecture

The system architecture defines the hardware, software and network environment of the structure. The system will be Android based application in order to run the system.

3.1 MODULE:

3.1.1 USER REGISTRATION:

User will enter their details in the registration form. User will fill the information like Name, Phone number, Address, Gender, Height, Weight, different clothing brands which user enjoys wearing or favourite brand etc.

3.1.2 PRE PROCESSING:

Using K-NN algorithm the system will find out the similarity between the new case/data and available cases and put the new case into the category that is most similar to the available categories.K-NN algorithm stores all the available data and classifies a new data point based on the similarity. This means when new data appears then it can be easily classified into a well suite category by using K- NN algorithm.

The middle true is responsible for communication between the front end and the back end. It receives user requests and sends them to the back end and in turn accepts responses from the back end and sends them to the user.

3.1.3 ADMIN:

In this module, the admin can view the list of users who all registered. In this the admin can view the user's details such as, user name, email, address, height ,gender, weight, favourite brands and admin authorizes the users.

3.1.4 END USER:

In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password Once Login is successful browse for the system interface, provide input query image to the system, and get recommendation according to the input query.User will do some operations like Add Products, View All Products with reviews, View All Early recommendation.

3.1.5 BACK END:

In this module, after successful preprocessing of data, system will show and recommend the best Fit cloths to the user according to their choices.

The back end which involves the data set and recommender algorithm deals with data storage, user input data storage,

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processing user requests, determining user input similarity, making recommendations and forwarding them to the middle tier which in turn sends them to the respective users.

IV. ALGORITHM

4.1 CNN

CNN algorithm used for the detection of breast cancer to gives the input as a image of breast cancer and detect the output. Neural networks are a set of algorithms. They interpret sensory data through a kind of machine perception, labelling or clustering raw input. The patterns they recognize are numerical, contained in vectors, into which all real-world data, be it images, sound, text or time series, must be translated. Neural networks help us cluster and classify. They help to group unlabeled data.

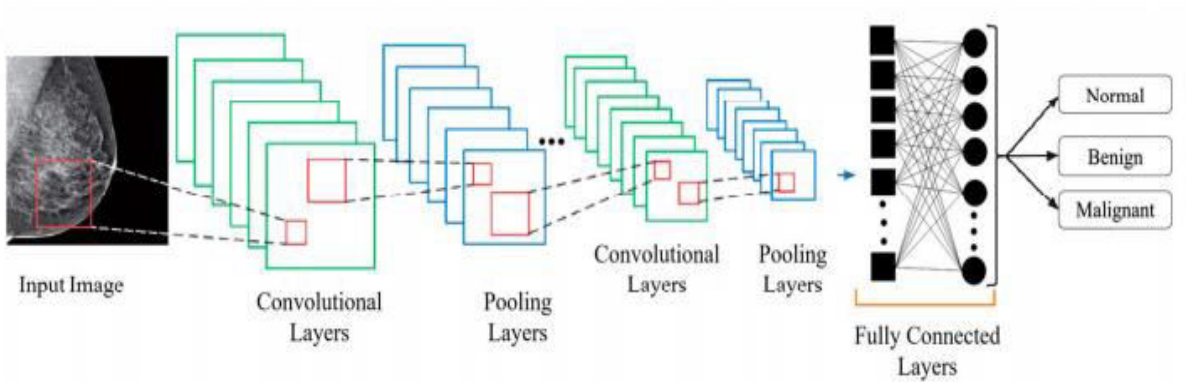

Fig 4.1: CNN Algorithm Steps

4.2 CNN Layers:

Convolutional Layer: It applies 14 5x5 filters (extracting 5x5-pixel sub-regions), Pooling Layer: This will perform max pooling with a 2x2 filter and stride of 2 (which specifies that pooled regions do not overlap). Convolutional Layer: It applies 36 5x5 filters, with ReLU activation functionPooling Layer: Again, performs max Pooling with a 2x2 filters and stride of 2. 1,764 neurons**,** with the dropout regularization rate of 0.4 (where the probability of 0.4 that any given element will be dropped in training) Dense Layer (Logits Layer): There are ten neurons, one for each digit target class (0-9).

4.3 Important modules to use in creating a CNN:

Conv2d (). Construct a two-dimensional convolutional layer with the number of filters, filter kernel size, padding, and activation function like arguments max_pooling2d (). Construct a two-dimensional pooling layer using the max-pooling algorithm. Dense (). Construct a dense layer with the hidden layers and units.

V. CONCLUSION

Recommendation systems have the potential to explore new opportunities for retailers by enabling them to provide customized recommendations to consumers based on information retrieved from the Internet. They help consumers to instantly find the products and services that closely match with their choices. Moreover, different stat-of-the-art algorithms have been developed to recommend products based on users' interactions with their social groups. Therefore, research on embedding social media images within fashion recommendation systems has gained huge popularity in recent times. This paper presented a review of the fashion recommendation systems, algorithmic models and filtering techniques based on the academic articles related to this topic. The technical aspects, strengths and weaknesses of the filtering techniques have been discussed elaborately, which will help future researchers gain an in-depth understanding of fashion recommender systems. However, the proposed prototypes should be tested in commercial applications to understand their feasibility and accuracy in the retail market, because inaccurate recommendations can produce a negative impact on a customer. Moreover, future research should concentrate on including time series analysis and accurate categorization of product images based on the variation in color, trend and clothing style in order to develop an effective recommendation system. The proposed model will follow brand-specific

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personalization campaigns and hence it will ensure highly curated and tailored offerings for users. Hence, this research will be highly beneficial for researchers interested in using augmented and virtual reality features to develop recommendation systems.

VI. FUTURE SCOPE

A lot remains be done for research about Recommender Systems in the Fashion domain, both in the process of addressing the limitations highlighted in previous section and trying to advance performances in tasks that are better correlated with actual use case scenarios. From the machine learning point of view, some of the possible continuation of this work could be the investigation of the features importance and impact the process of outfit composition, the explanation of what clothing features are more correlated in a fashionable outfit, the exploration of different type of visual inputs, such as full-body images, through techniques of visual object segmentation. Moreover, from a more recommender-related side, it would be relevant to join the information about outfit compatibility and completion and those related to users profiles and histories in typical e-commerce setting, and try to create models able to recommend items using the probability of completing an outfit given the his user's past purchases.

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