SMART FASHION RECOMMENDER APPLICATION

A PROJECT REPORT

Submitted by

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ABSTRACT

In recent years, 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 utilization 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, colors, and textures. These visual characteristics of the image are used as input conditions for the query system, and a result the system will recommended nearest images and data set. This research designs and implements two-stage deep learning-based model that recommends a clothing fashion style. This model can use 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 network as a visual extractor of image objects.

Keywords: Cloth Recommendation, Convolutional Neural Network, Similarity Measure.

Introduction

During the last years, online shopping has been growing. In 2013, the total turnover for ecommerce in Europe expanded with 17% in contrast to the 12 months before and huge organizations can have hundreds and hundreds of products or even more from which we can select on websites. Both the customer and the business enterprise desire the client to easily discover applicable products or items both throughout search and when they are searching, and this is where recommender systems come into the picture. The greater part (62%) of US buyers with Web access presently shop on-line, to some degree, at least a month, and 1% say they do not buy from internet, as indicated by a current report byWalker Sands. From all the clients looking for items on the web, 63% of them buy garments (Burke, 2002), these being, quite possibly, the most purchased items. Theinformation uncover that women are more likely to buy on-line, with 87% of ladies doing this, contrasted with 52% of men. Studies on clothing are in a growing development in general as a result of the tremendous market related to dress. In China, the serviceable market crushed 20 billion US dollars in 2016. Picture recovery can be depicted as the errand of looking out for pics in a picture data set. This is present not an astute thought, in light of everything. It has been explored on account of the way that the 1970s joined informational collection associations with PC vision, looking into the issue as indicatedthrough two uncommon perspectives, the first being text-based and the second one being visual-based. From the outset, the developments have been made only through information annotations that have been saved in a database to work the retrieval step, however, when the dimension of the image collections started to amplify the effort required to label them used to be as soon as unsustainable, to solve this issue, during the 1990s, content-based photograph retrieval was proposed. Starting now many searched for lines have seemed the use of one or the different isolated or combining them. Recommendation systems make recommendations based on the information they are provided with and in the manner in which they are programmed. Going into details, most of the evaluation applied is independent coming up with a brand-new recommendation algorithm, system, or model. However, different researchers use already existing work as researchers use an already existing current piece of work to come up with a new diagram or to truly improve the current one. The present analysis model focuses on the use of a current algorithmic program and, consequently, the use of a new research concept comes up with a recommender system. Existing researchand fashions have given us some inspirations of how to design fashion recommendation systems. Nevertheless, they also involve some common drawbacks. Therefore, in this study, our aim to suggest a new method to assist personal choice making through supplying images and get suggestions based on provided contents.

The contribution of the research are follows:

- To design and implement a web-based clothing fashion style recommender system based on deep learning;
- A scheme for improving a person’s clothing style by removing the features he/she doesn’t like.
- These attributes served to a similar model to retrieve similarimages as recommendations.
- Combined with more common content-based recommendationsystems, our model can help to extend robustness and performance.

Literature survey

Fashion Recommendation Systems:

Fast fashion has grown significantly over the past few years, which has had a significant impact on the textile and fashion industries. An effective recommendation system is needed in ecommerce platforms where there are many options available to sort, order, and effectively communicate to user's pertinent product content or information. Fast fashion retailers have paid a lot of attention to image-based fashion recommendation systems (FRSs), which offer customers a customized purchasing experience. There aren't many academic studies on this subject, despite its enormous potential. The studies that are now accessible do not conduct a thorough analysis of fashion recommendation systems and the accompanying filtering methods. This review also looks at many potential models that might be used to create future fashion suggestion systems.

Your Closet App Magic Closet:

This system aims to retrieve clothes from online stores that are matching to the input clothes and mythology. These clothes must be ft to a particular occasion. In this system, the user takes a photo of them specifying if they want to use the top or bottom clothes along with the occasion, they want to use it for. The system will search for clothing that matches the user query and satisfies the criterion of wearing aesthetically and wearing properly.

Which Clothes to wear confidently?

The basic problem the system addresses is from the two given images corresponding to a pair of clothes, we have to determine if the pair of clothes matches or not. While there may be several aesthetics espoused by die rent individuals, it takes a simplistic approach in this problem. An example ofshirts and ties is used. Various machine learning methods are used to classify ifthe clothes are matching or not such as Ridge Regression, Standard Neural Network and Siamese Neural Network.

Personalized Clothing Recommendation Based on Knowledge Graph:

This system attempts to exploit the knowledge graph for providing clothing recommendations to the user keeping the user context in mind. The recommendation is done by calculating the similarity in the clothing ontology similar to users' collection. Skin and Clothes matching seeded by Color SystemSelection: The main aim of the system is to suggest clothes to user based on skin color. The paper first finds out which color scheme is best suited to represent skin colors and then tries to find a way to recommend if clothes and skin color match. An automated system to determine the highest levels of color suitability between skin and clothing was made.

Discerning Advisor:

The system tries to recommend clothes based on skin color of the customer. Using a neural network, first the skin color is detected. Fuzzy logic is used to map a skin color to the skin color of a fashion model, and clothes suited to that model are recommended. Garment Detectives: The garment detection is to detect the presence of clothes in images and somewhat locate their extents, where the localization can be defended from coarse (image) level to fen (pixel) level. A unified system is proposed for detecting and recognizing clothes in customer photos.

Proposed system architecture

The system architecture defines the hardware, software and network environment of the structure. The system will be web-based meaning that the users need to run the URL in order to run the system. The system will run both horizontally and vertically. The architecture used in the system is shown horizontally where the Model View Controller is explained as represented in Figure 1. The high-level part of the system is looked at using the vertical way.

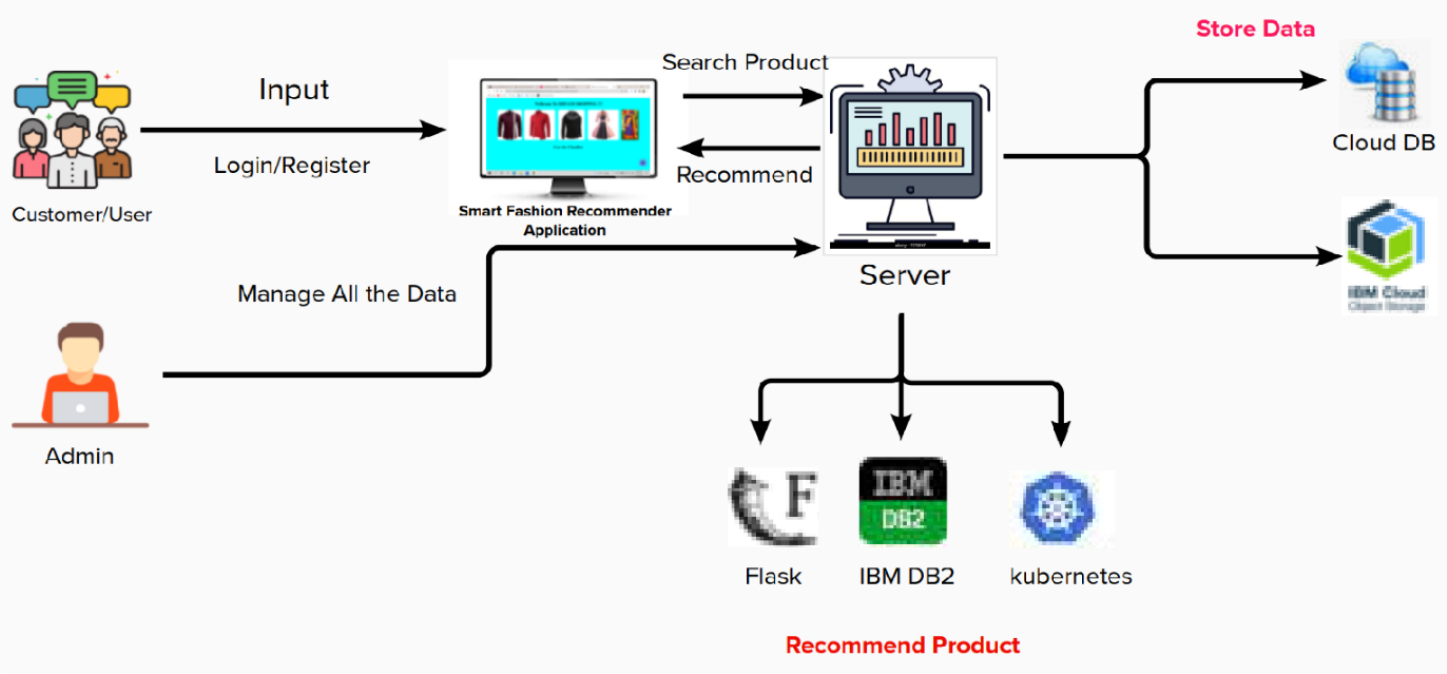

Figure 1. **System architecture**.

The system comprises of the Client tree, which is the front end or View mode, middle term which is the system controller and the backend tree which is the model. The client side is where the users/customers log in in the system, browse for the system interface, provide input query image to the system, and get recommendation according to the input query.
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. The internet works to provide access to the site

with a strong security check, provided by both firewall and password protection policy.

Any unauthorized access is detected and prevented by the firewall.

Data Recommender Makes Recommendations Recommender Algorithm Determines the Similarity between cloths Figure 2. Vertical architecture of the system.It uses the algorithm to go over the input user data and determine similarities betweenusers input data and stored dataset features. Finally, it makes recommendations. By looking at Figure 1 and Figure 2, we realize that the recommender system does not interact directly with the users at any point.

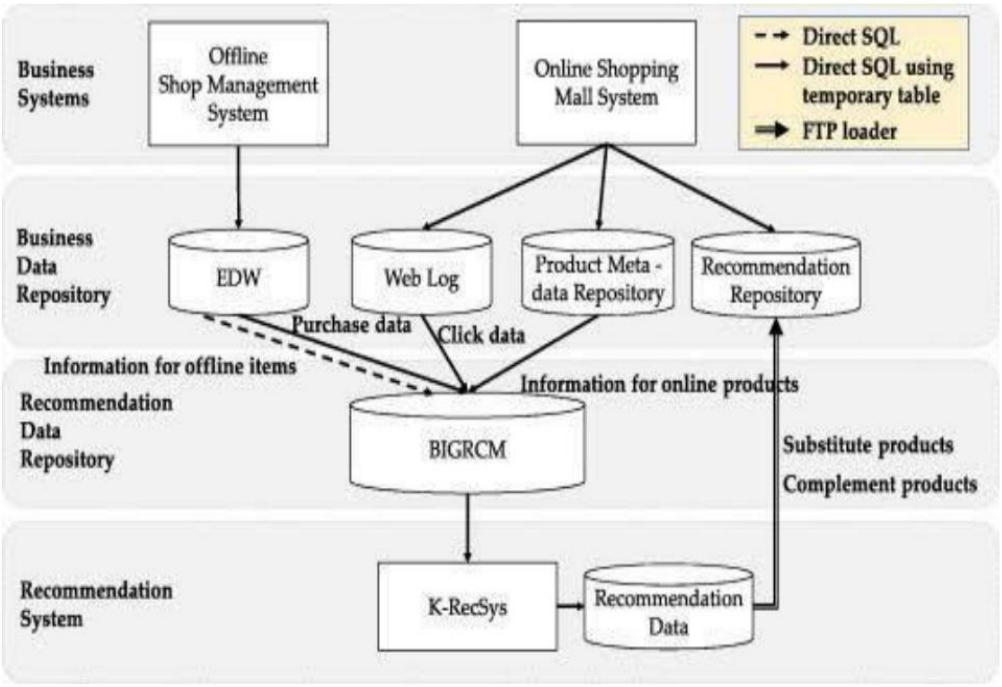

Figure 2

When the repository stores data, the recommender filters the data it needs from the repository using the algorithm. When asignal is sent to the algorithm about what data are needed for filtering, the algorithm computes the similarity. The similarity results are then transferred to the recommender system which in turn sends recommendations to the webserver and finally to the respective user.

Dataset and classification

In this project, we worked with the Deep Fashion dataset, which is gathered from researchers from the Chinese Hong Kong University. It has over one million diverse trend pics and wealthy annotations with additional dataabout landmarks, categories, pairs etc. The dataset consists of 5 distinct typesof predicting subsets that are tailor-made towards their tasks. Figure 3. Fashion dataset One subset, known as Attribute Prediction, can be used for apparel category and attribute prediction. From almost 290,000 photos of50 apparel categories and 1,000 apparel attributes, we randomly picked 18k images from different categories and then we classified them for training and testing. The distribution of labels is presented in Figure

a. Design of deep learning module

There are many classification algorithms or classifiers in use today. The most notably and the most implemented classifiers and feature extractor are implemented to solve a problem of cloth / fashion recommendation Design process. there are weight vectors, are fully connected output layers that actually perform classification and are the CNN without the last layer. They are used as a feature extractor

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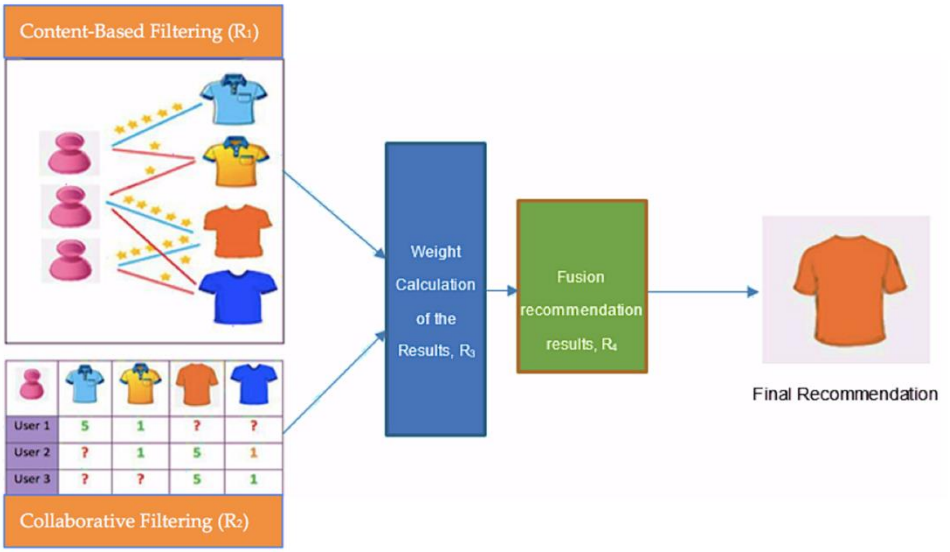

The core network of our model as shown in Figure 4. who presented a convolutonal neural network in the paper “Very Deep Convolutonal Networks for Large-Scale Image Recogniton”, at the University of Oxford.”. Then model is checked for top-5 accuracy on ImageNet.

Results

This secton focuses on evaluatng our system and deciding the stage which it is able to fulfl the purpose for which it was created the performance of the system is analysed in detail through several tests, from small scale to large scale. Firstly, the unit tests are done at the lower stages and then we proceed to the whole test system.

Administration

Step 1: def similarity (feature_data, inp_ feature_data):

Step 2: nun_samp=inp_feature_data. size

Step 3: print (unm_samp) Sim_score = [] for i in range (1 en (feature_data)): score=0

Step 4: show_sample (data_images[i])

Step 5: print (feature_data[i]) score _m = inp_feature_data - feature_data[i]

Step 6: print (Soore_ m) score= nun_samp-np. Count_nonzero (score_m) sim_score [i]=score

Step 7: print (score) sim Score

Step 8: end

We can see that our model can capture the best matching style by including the length, shape, colour, fabric and patern of the cloths, as illustrated in three query images examples. In the frst example, the model captures deep features including the blouse category, fabric, repeated foral patern and the regular ft style. As seen, the fve recommended images display diferent clothes. The second example shows that the model captures the wool fabrics, the contrast colour sttches and the turtleneck. The third example shows that the model can capture the coton fabrics and the printed leters. The recommendatons can be seen in Figure.

As shown in Figure, our model can capture the style with high accuracy, meaning that our system achieves its purpose. It can be noted that our system can perform for all the involved categories like pattern, style, fabric etc. The highest similarity score shows that the input images and the recommended ones are similar.

Recommendations to the query images outside the dataset:

It's natural to ask if the model you made works with images which are not part of the dataset. We randomly downloaded three online images illustratng expensive clothes. As shown in Figure 8, the model is stll able to capture the style, patern and fabrics of the clothes and recommend similar ones.

The model is checked for diferent categories like patern, style, fabric. The highest score show that the image is more similar to the input query. So, our model obtains high similarity score for diferent categories.

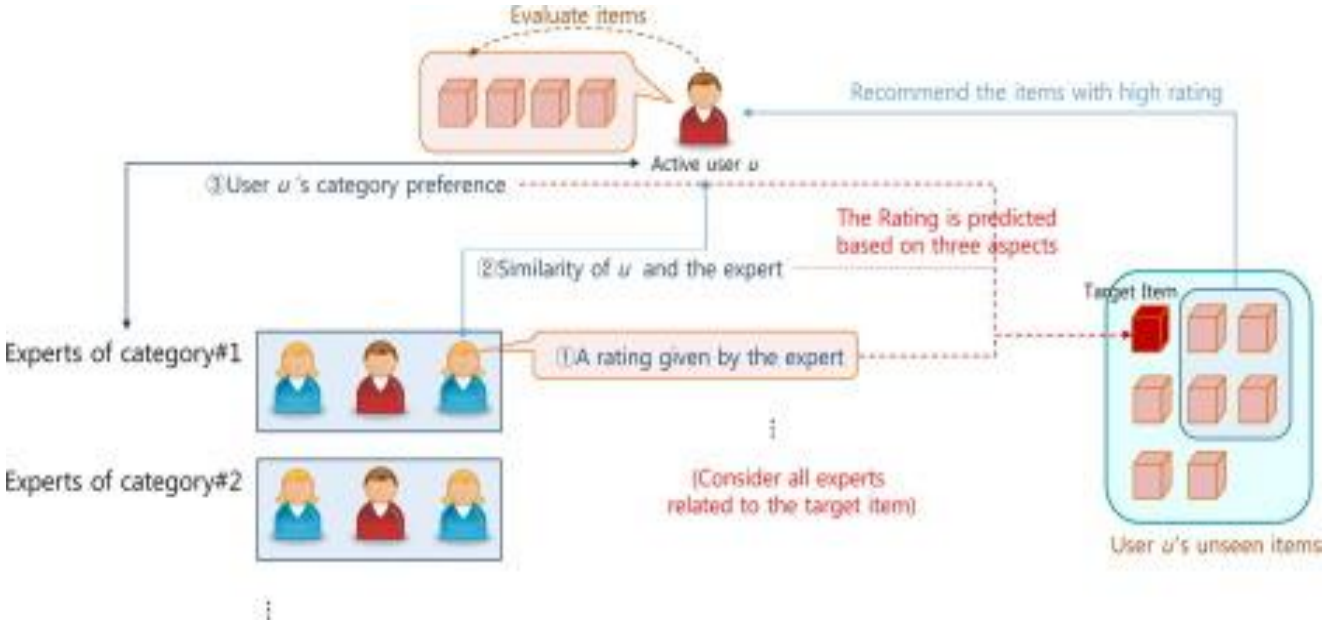

Figure: Outside recommendaton dataset

System result and accuracy:

Finally, this subsecton evaluates the system and shows the testng results and the accuracy of our model. Afer adding the model on top of the convolutonal base, freezing the weights of all layers except of the top ones, and training the model for 5 epochs, the following accuracy was obtained, as shown in Figure.

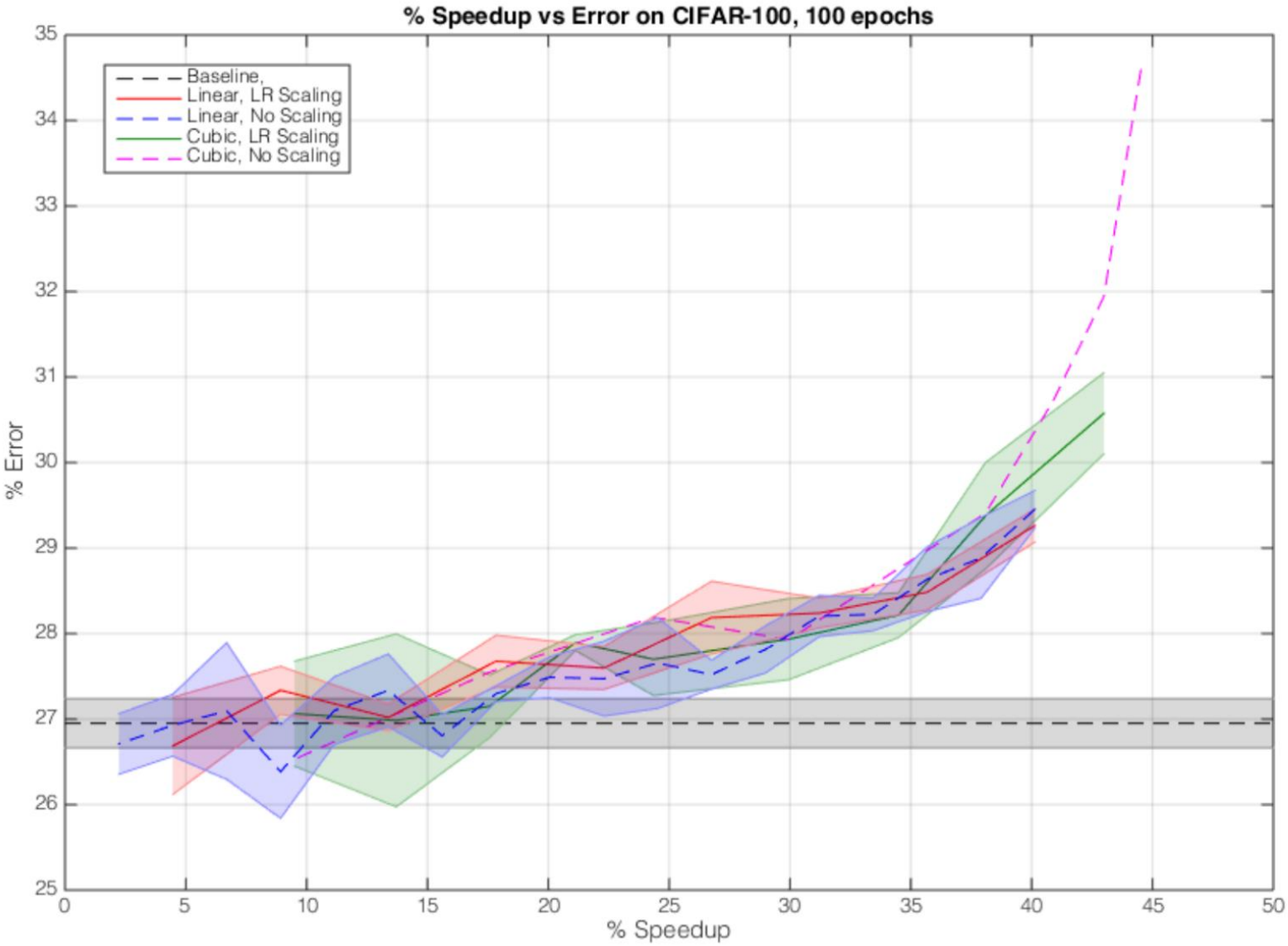

Figure 9. Model accuracy after freezing the layers for 5 epochs

after calculating the mean accuracy for 5 epochs, the obtained results are as follows:

Validaton: accuracy = 0.836000; loss = 0.489109

This part of the sentence “Afer calculatng the mean accuracy for 5 epochs” is mentoned also below, afer Figure 10, and these values mentoned for accuracy and

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 productsbased on users' interactions with their social groups. Therefore, research on embedding social media images within fashion recommendation systems has gainedhuge popularity in recent times.