



# JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

## Image Based Product Recommendation System

Akansha Pendharkar

Department of Computer Engineering

Pratiksha Sawalakhe

Department of Computer Engineering

Prasad Kumar Adhav

Department of Computer Engineering

Saurabh Singh

Department of Computer Engineering

Prof. Rashmi Deshpande

Associate Professor, Dept. of Computer Engineering,

DYPIEMR Department of Computer Engineering, Dr.D.Y. Patil Institute of Engineering Management and Research,

Akurdi, Pune - 4110144

**Abstract**-Online shopping forums are rapidly emerging and their popularity is growing significantly around the world. These forums rely heavily on search engines, which are primarily based on the knowledge base and use the same keywords to find similar products. However, customers want to set up an easy and reliable interaction in inquiring about related products. Offline shoppers face the problem of selecting products from a large number of online products available. The value of these products is growing significantly due to the large number of companies moving to online businesses. The user can assign, select, or click the image, and similar products based on the image will be introduced to the user. The proposed recommendation system is based on content-based image retrieval and is made up of two main categories; Phase 1 and Phase 2. In Phase 1, the proposed method reads the category/type of product. In Phase 2, the proposed recommendation system returns the closely related products and recommends the desired product to the user.

**Keywords:** Recommendation system, Convolutional neural network, machine learning, collaborative Filtering, Content based Filtering.

### I. INTRODUCTION

The E-commerce market is growing rapidly and various online strategies are being used to provide relevant ads and products to the user. These systems rely heavily on search engines, which are still primarily based on the same keywords to find similar products. Modern-day customers want an easy-to-use shopping platform. So this project has a new idea of searching for products in an online shopping system using a

picture-based approach to find the product the customer needs. Our priority is to create an effective and efficient online shopping environment that we consider customer needs a priority.

### II. MOTIVATION

With the rapid development of network technology, the number of digital images is growing at an alarming rate, and people's demand for information is slowly shifting from text to images. However, it is very difficult for users to quickly find their favorite images from a large number of photo libraries. Therefore, these challenges and concerns have raised the demand for recommendation programs to facilitate users simply and comfortably. Almost every E-commerce company today expands its recommendation system. An excellent recommendation system will benefit customers and help the seller by increasing sales and customer satisfaction. Search engines designed for E-commerce are still struggling to find the best program to recommend because most of these services use text-based search. Most of these systems use product text metadata such as attributes, descriptions, and purchase history for different users. Text-based systems and keywords can mislead the low-quality recommendation system and unrelated products that users need.

### III. PROBLEM STATEMENT

Online search engines use information from user profiles (demographic filters), similar neighbors (collaborative filtering), and text description (content-based model) to make recommendations, which easily generate non-essential suggestions for users due to ignorance of user intentions. and the

apparent similarity between the products. A smart search engine for online shopping will be used. Basically, it uses images as its input and tries to understand the information about the products from these images.

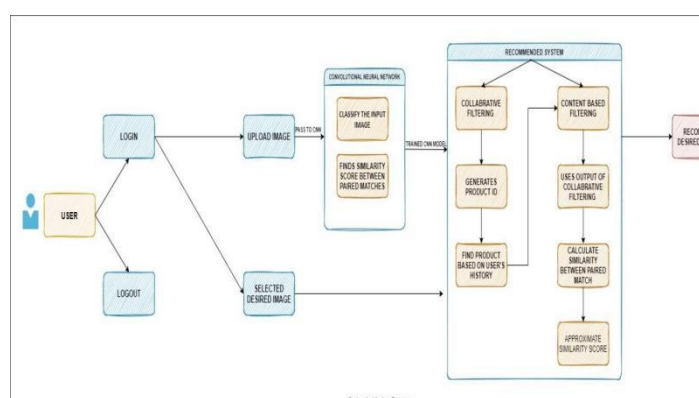
#### IV. EXISTING SYSTEM

Existing recommendation systems use information from users' profiles (demographic filtering). User's profiles (demographic filtering). In Demographic Filtering (DF) technique, the demographic data of a user is used to determine which items may be appropriate for recommendation. Similar neighbor's (collaborative filtering) is an approach that can filter out items that a user might like on the basis of reactions by similar users. Textual description (content-based model) uses item features to recommend other items similar to what the user likes, based on their previous actions or explicit feedback. Therefore, these all existing systems make recommendation more relative and easy to use.

#### V. PROPOSED SYSTEM

Our approach is to provide a smart engine for online websites in-order to have better user experience. There are 2 different scenarios possible in our approach. In the first scenario, the user can upload any image which has some products. The image is then passed to a Convolutional Neural Network (CNN) to scan the input image and to identify the distinct products in the image. The CNN then identifies the product and this product is passed as an input to the Recommendation System. The recommendation system now uses this product ID and recommends the suitable products using the content Based Filtering. The products which have the same content as that of the given input image are recommended. This is where our solution is different from other e-commerce websites recommendation system. In the second scenario, the user is presented with a list of products based on the previous history. This is done using the identification of the positive data based on the previous history. An image of the product clicked by the user or added to wish-list shows that the user is interested in the product. These are the potential positive data for that user in the system. Once the positive data is identified, the recommendation system would use the collaborative filtering to better recommend the related products to the user. A mixture of Content based and Collaborative filtering will be used to have a better recommendation system.

#### VI. SYSTEM ARCHITECTURE



#### Modules:

- Pre-processing:** The aim of pre-processing is an improvement of the image data that suppresses unwilling distortions or enhances some image features important for further processing, although geometric transformations of images (e.g., re-sizing, scaling, dimension) are classified among pre-processing methods here since similar techniques are used.
- Feature extraction:** CNN is a neural network that extracts input image features and another neural network classifies the image features. The input image is used by the feature extraction network. The extracted feature signals are utilized by the neural network for classification.
- Classification:** Convolutional neural network is equipped with an input layer, an output layer, and hidden layers, all of which help process and classify images. The hidden layers comprise convolutional layers, ReLU layers, pooling layers, and fully connected layers, all of which play a crucial role.

**Recommendation system:** Collaborative Filtering Item-Item Similarity: In this approach, products are recommended based on the similarity of the products. Products that are similar to the previous product purchased or liked, will be recommended to the user. Collaborative Filtering User-User Similarity:

#### VII. ALGORITHM

##### CNN Algorithm

Convolutional Neural Networks (CNN) are used for image classification and recognition because of its high accuracy. CNN is a powerful algorithm for image processing. These algorithms are currently the best algorithms we have for the automated processing of images. Many companies use these algorithms to do things like identifying the objects in an image. Images contain data of RGB combination. Matplotlib can be used to import an image into memory from a file. The computer doesn't see an image, all it sees is an array of numbers. Colour images are stored in 3-dimensional arrays. The first two dimensions correspond to the height and width of the image (the number of pixels). The last dimension corresponds to the red, green, and blue colours present in each pixel.

#### VIII. DESIGN IMPLEMENTATION

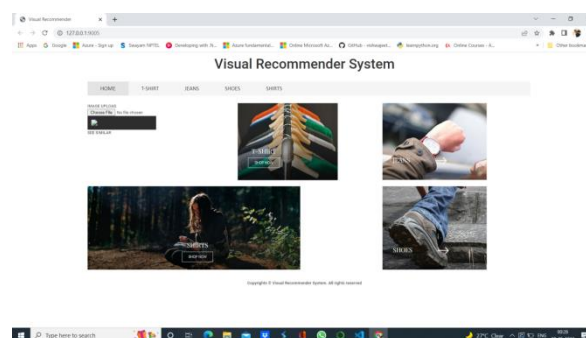


Fig 1. Homepage of Recommendation system.

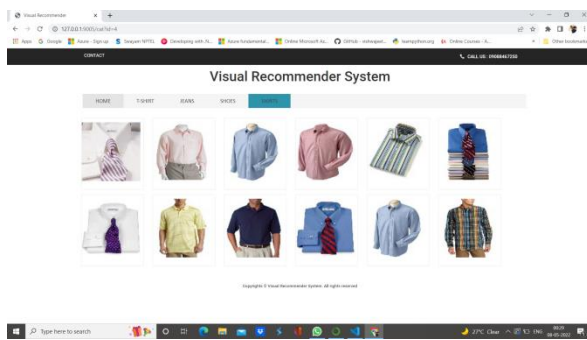


Fig 2. Shirt Category Dashboard

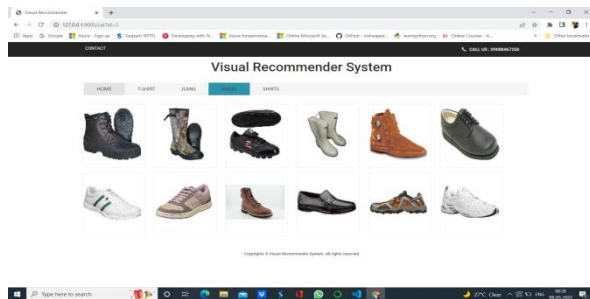


Fig 3. Shoes Category Dashboard

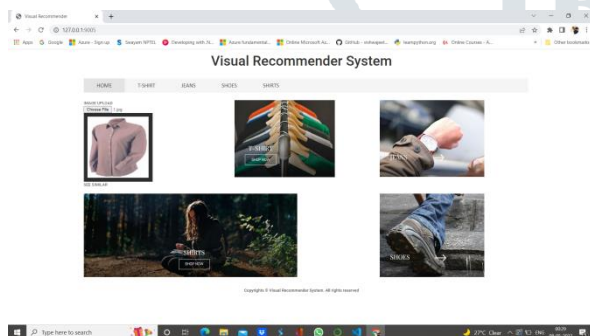


Fig 4. Choose desired Image (product) to purchase.

## XI. REFERENCES

- [1] Farhan Ullah, Bofeng Zhang and Rehman Ullah Khan, "Image-Based Service Recommendation System: A JPEG-Coefficient RFs Approach", Digital Object Identifier 10.1109/ACCESS.2019.2962315, 25 December 2019.
- [2] Luyang Chen, Fan Yang, Heqing Yang, "Image-based Product Recommendation System with Convolutional Neural Network", Stanford University 450 Serra Mall, Stanford, CA, 2017.
- [3] Akshit Tayade<sup>1</sup>, Vidhi Sejpal<sup>2</sup>, Ankit Khivasara<sup>3</sup>, "Deep Learning Based Product Recommendation

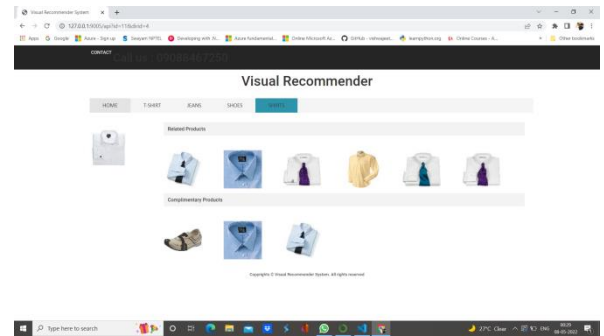


Fig 5. Recommendation system recommends desired product to the user.

## IX. CONCLUSION

This smart search system recommends similar product based on the input given by the user in the form an image. The proposed recommendation system retrieves closely matched similar products and recommends desired product to the user. Recommending products to users based on collective opinions.

## X. FUTURE SCOPE

There is over-fitting issue in our model, which can be one of the things to do in future work. As shown in the Dataset and Features section, though we have a huge data set, due to the limitation on time and machine memory, we used limited images to train our model. In the future, we can try to train our model on a larger amount of data using batches. This can potentially increase the accuracy of the model.

System and its Applications", International Research Journal of Engineering and Technology (IRJET), Volume: 08 Issue: 04 | Apr 2021.

[4] Hessel Tuinhof, Clemens Pirker, and Markus Haltmeier, "Image Based Fashion Product Recommendation with Deep Learning", July 17, 2018.

[5] Khanabhorn Kawattikul, "product recommendation using image and text processing", Department of Information System, Faculty of Social Technology, Rajamangala University of Technology Tawan-ok, Chanthaburi, Thailand, 2018.