

A Novel Virtual Cosmetics Recommender System Based On Pre-Trained Computer Vision Models

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Abstract

Computer vision is a field of artificial intelligence that enables computers to see, observe and understand. Computer vision trains machines to virtually see with cameras, data and algorithms in less time. Artificial Intelligence algorithms enable a computer to teach itself about the context of visual data and help in how to look at an image and see its features. With the increased computational power offered by deep learning systems, there is noticeable progress toward the point where a computer will be able to recognize and react to everything it sees.

In this thesis, we will propose a system that recommends the best cosmetic product based on the users faces. A virtual user interface has been built to provide the most appropriate solutions during virtual beauty shopping. Skin defects or any dermatologic infection disease leads to an incorrect recommendation. Therefore, skin disease classification system has been implemented as a supporting stage, it diagnoses 11 several kinds of skin diseases, and promising results have been achieved using multi Convolutional Neural Network neural network (CNN) models.

Experimental results proves that Inception ResNetV2 consistently outperforms other transfer learning (TL) models. The Inception ResNetV2 model with Adam Optimizer and epoch=50 produced the best validation accuracy of (96.93 %).

On the other hand Emotion Analysis (EA) has been studied deeply to come up with a cosmetics recommender system that considers user's emotions. The main aim was to map the relationship between occasions and cosmetics types. Deep Learning has been used to classify facial emotions to support in recommending the best facial cosmetics. A deep neural network that has been trained to categorize emotions may perform better with the aid of transfer learning. 9 different types of feelings have been classified as we propose a supporting system to the virtual cosmetic recommender system. The experiments performed well and successfully exhibited their ability to recognize emotions, the best-obtained F1Score was 0.63, while for the validation data, and The ResNet50 F1-Score was 0.7.

In the proposed work, we employed recent and most powerful Artificial intelligent (AI) techniques to intelligently build a recommender system that helps users to choose the best compatible cosmetics product based on the face features, current emotions, and possible skin diseases. Finally, a mobile application has been implemented to facilitate the user interface.

Keywords: Artificial Intelligence, Intelligent Systems, Computer Vision, Convolutional Neural Networks, Computer-aided diagnosis, Deep Learning, Emotion Analysis, Transfer Learning.

