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COSMETIC SUGGESTION BASED ON SKIN CONDITION

Suchethana H C [1], Himashree D[2], Keerthana Bhatt S R[3], Ranjitha G B[4], Smruthi S[5]

Suchethana H C Professor, Department of ISE JNN College of Engineering,

Himashree D, Keerthana Bhatt S R, Ranjitha G B, Smruthi S Department of ISE JNN College of Engineering.

Abstract - These days, beauty and cosmetology are exceptionally basic to a person's look. People get to a collection of things through online shopping and e-commerce websites. It is very challenging to choose the right cosmetic for human skin. Given that each person contains a specific type of skin, choosing right cosmetics that suit the person may be annoying. The composition depends on skin type, which can be dry, oily, or normal. Due to the significant crash that makeup have on a person's looks, the client must to choose the finest cosmetics for themselves based on person components . Identification of product that does not include any harms or allergies for the clients is very important. Thus the point of this application is to highlight the current applications of AI and machine learning in beautification and cosmetology by thorough examination of skin condition and prescribe personalized cosmetics based on the type of skin and buy secure things for the skin utilizing the Convolutional Neural Network (CNN). The objective is to achieve tall precision and recognize the skin type precisely.

Keywords: Cosmetic, Skin type, Machine learning, Convolutional Neural Network.

1.INTRODUCTION

In recent years, the beauty and cosmetic items has experienced quick expansion that has resulted in increased client numbers as well as what is publicized. As a result of improvement in both clients and cosmetic items, choosing the foremost fabulous remedial cosmetic is troublesome. It is fundamental to choose the fitting remedial cosmetic for each individual based on person skin type, since correct cosmetic have a basic vital role in one's appearance [1]. The skin type of a person is affected by qualities, in addition there would be any other exterior components like climate, genetics and can modify skin condition.

Based on the different skin characteristics, skin has been isolated based on their type broadly as normal, oily, dry. It is of most remarkable significance for a person to know their skin type a few time as of late selecting a skin care plan. It is fundamental to know which kind of item would be reasonable for an individual, and hence, one need to be careful of their skin type [5]. As plenty of skin care things being available these days in the publicize, people tend to go for the predominant things instead of going for a thing which is best suited to their skin type. In expansion the side impacts of utilizing a cosmetic which isn't suited to ones skin can lead to serious skin issues[6]. As a result of this tremendous extension of beauty industry and buyers, choosing the right cosmetic gets to be continuously basic. Since excellence skin care items play such a noteworthy portion in person appearance, choosing the right things for one's skin type is crucial as everyone's skin surface is differing[8].

Facial skin care is crucial for various reasons. Contributing in high-quality cosmetics may overhaul ones skin's current and future brilliance. There are various issues when it comes to selecting a skin care item for a specific type of skin. This issue can be lit up by recognizing unmistakable skin types. The system analyses the captured picture of human face, recognizes significant skin types, and compares them to the dataset to find the closest match. Based on this closeness, system recommends the best remedial brand. Thus it is possible to give personalized recommendations through the utilize of AI and machine learning methodologies. Thus this system utilizes convolutional neural network (CNN) algorithm for providing an effective solution . CNN contains a convolution layer and pooling capacities that recognize it from other sorts of feedforward neural frameworks[9]. Since it can collect both around the world and adjacent characteristics, its capability and accuracy are incredibly extended. In conclusion, by offering personalized cosmetic recommendations based on individual facial features, the system contributes to a more tailored and satisfying cosmetic experience for customers. The subsequent sections includes literature survey and proposed work and conclusion.

2. LITERATURE SURVEY

A. Kavitha, Rathiya R, Rajkumar T , Abinaya S, Britney Sandra M, Rajasri M [1] stated that the application is used to highlight the current and creating applications of manufactured insights and machine learning in beautification and cosmetology by computerized investigation of skin condition and propose superior items based on the skin type and carefully check the skin tone and purchase safe items for

their skin utilizing the Convolutional Neural Network (CNN) calculation to carry out the workflow of the method.

Muskan Chaurasia, Neha Pathak, Meetu Rani, Muskan Verma, Nandini Gauhri [2] stated that the objective of this method is to create a structure for prescribing skincare items based on the user's skin sort and the cosmetics of the item. To know the a product's chemical cosmetics and find items with comparable constituent compositions, content-based filter is used. On the off chance that a client doesn't know what a product is or hasn't find they like, they may moreover enter their wanted magnificence affect rather than a item title utilizing this approach. As a title state itself the strategy is utilized to recommend the corrective product on the premise of fixings present in it.

Rubasri S, Hemavathi S, K. Jayasakthi, Sangeerani devi .A, K .Latha, N. Gopinath [3] stated that nowadays, makeup have a huge affect on how people see. It can be challenging to choose the most excellent skincare product. Individuals can select the perfect product for their skin type utilizing the prescient way it offers. The significance of selecting the leading beauty care products develops as the number of merchandise and shoppers rises. A person's see (skin quality) is enormously affected by makeup, in this way customers must select the perfect beauty care products for them depending on their unique qualities. Finding beauty care products that work for their skin type can be challenging since everybody contains a unique skin type. The composition will shift depending on whether the skin is dry, oily or normal. Thus, selecting the suitable makeup gets to be pivotal as the number of things and customers rises.

Akshya J , Vinit Mehra , M.Sundarrajan , Pattapu Teja Sri , Mani Deepak Choudhry[4] stated that the term "proposal framework for facial skin care" suggest to an computer aided technique that gives customers encouragement on which facial skin care items to utilize based on their particular skin type. Product suggestion analyze client information employing a assortment of strategies, counting collaborative filter, content-based filter, and machine learning calculations. In order to make an personalized skincare recommendation, the creators recommend a cross breed approach that include a few existing strategies. The user's skin type brings out seriousness are all inputs into the calculation, which at that point yields a proposal for the foremost appropriate item.

Kavyashree N, Rama Satish K V, Prasanna Rajaram Rasal , Dr. Rahul Jalindar Jadhav, Dr. M. Saidireddy, K G Kharade [5] stated that nowadays, makeup have a huge affect on how individuals see. Clients can get to a extend of items

through various website. It employments deep learning innovation to streamline the complex methods within the IT industry for beauty care products and magnificence care. With the extension of items and buyers, selecting the right makeup gets to be very important. As a result, it may well be challenging for the common open to keep up a sound schedule and select the suitable items for their skin sort.

Samrat Ray ,Abinaya M, Dr. A. Kakoli Rao, Surendra Kumar Shukla ,Shubhi Gupta, Poonam[6] stated that these days, makeup play a critical part in individual appearance. Choosing the most excellent skin care item is getting to be progressively complicated. As a result, a prescient approach is created that gives a clear understanding of which item is best for a certain skin type. An AI calculation is utilized to unravel this issue since it works well with endless sum of unstructured information and produces promising results. After recognizing the skin type, the appropriate product for those skin type is suggested. As a result, best composition of restorative items are proposed for appropriate skin type.

Samia A. Abu-Shanab ,Shadi AlZu'bi ,Amjad Zraiqat[7] stated that the cosmetic industry has been rapid development over the a long time. The proposed framework points to improve decision making and give an intelligently client interface for corrective brand classification. Clients can utilize a portable application to capture their pictures and get personalized corrective proposals.

R. Abishek, T.S. R. Ajeyan, N. Aravinth, M. Gokul, Dhiyanesh B[8] stated that these days, corrective items are very important to a person's see. Clients get to a variety of items through online shopping and e-commerce websites. It is exceedingly challenging to select the perfect item for human skin. As such, this think about proposed a novel framework to precisely decide appropriate item based on the skin type. The composition depends on skin type, which can be dry, oily or ordinary and corresponding cosmetics are recommended.

Arya Kothari, Dipam Shah, Taksh Soni, Sudhir Dhage[10] stated that the skin range is utilized in a wide extend of ponders like dermatology, biometric acknowledgment, restorative investigate and infection discovery. The current strategies to recognize the corrective skin type are time expending and mistake inclined. The applications of Convolutional Neural Organize for skin type classification have been considered. The skin type of a individual is influenced by qualities, in spite of the fact that it can too be decided by other outside variables and can alter with time. It is of most extreme significance for a individual to know their skin type for selecting a skin care schedule. With modern skin care items being brought out exceptionally regularly, it is basic to know which kind of item would be fitting for an person, and so, one ought to be mindful of their skin sort.

Hsiao-hui Li, Yuan-Hsun Liaoī , Yen-nun Huang, Po-Jen Cheng[11] stated that this paper will center on the application of machine learning and deep learning calculation advancement on human confront and skin insights suggestion

stage. That employments YOLOv4's novel question acknowledgment calculation to identify key highlights in confront pictures, and captured sub-images of locales of intrigued (ROI) as input data for multi-label models. The forecast comes about of machine learning can give appropriate upkeep information and item suggestions for clients to prescribe the reasonable skin care items.

3. SKIN TYPE DETERMINATION

A person's skin care regimen involves various stages. There are diverse methods and regimens that ought to be utilized for different skin type. This area instructs how to distinguish the skin type how to require care of it, and what items to remain absent from deciding one's skin type. This consider takes into consideration four distinctive skin types: normal skin, oily skin, dry skin. Sensitive skin isn't taken into consideration since it is inclined to sensitivities and skin issues as well as other therapeutic variables such nourishment, chemicals, tidy, and family history. Skin type is decided by reactions, ailments, and indications . In any case, other components like work out, the environment, and resting designs might moreover have an affect on skin type.

The fundamental cause of dry skin is the cold climatic condition and drying out where the dryness cause bothering in skin. The application give the items like moisturizer and gels that cause hydration and creams for the skin condition like extraordinary dry or least dry. It can treat a assortment of skin issues for dry skin, counting snugness, redness, unpleasantness, and tingling.

Oily skin people for the most part get tan and dark whereas coming out in sun and get hot fire amid the winter. This causes inconvenience to people for the most part by causing skin break out and clogged pores. The Application gives the benefit of choosing the items like creams and sunscreens .Oily skin is characterized by an increment in surface lipids. The skin ordinarily shows up shiny and thick, and pores are as often as possible broadened. It basically influences youngsters and youthful people and as often as possible produces blemishes like zits. Hormones, stretch, and stickiness all have an affect.

Normal is a term widely used to refer to well-balanced skin. This skin is not either dry nor as oily. It has standard surface, no defects and a clean, delicate appearance, and does not require uncommon care. Thus any kind of cosmetics can be used for normal skin without causing any skin issues.

4. METHODOLOGY

Cosmetic Suggestion is a method of suggesting suitable products for the applicants' skin condition by analyzing their skin condition. We propose a method of digital analysis of skin condition of the applicant with the help of Convolutional Neural Network algorithm(CNN). By analyzing their skin type, personalized cosmetic product is recommended to the applicants. Finally, the cosmetics combination is displayed in the output layer.

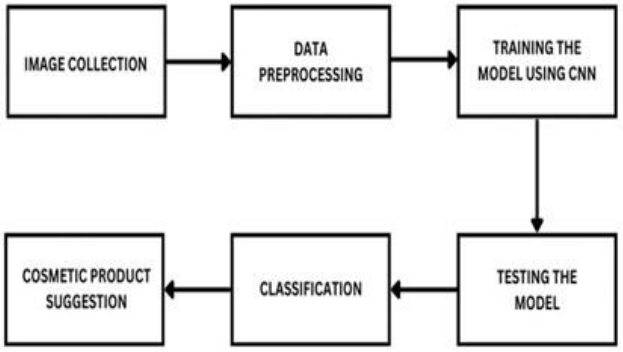

Fig -1: Proposed Methodology of Cosmetic Suggestion System.

3.1 Dataset generation

Dataset makes a difference in holding the a spatial properties of pictures. So here distinctive types of skin datasets which comprise of four categories are utilized. It is important to compile the total database for the corrective recommendation because it is crucial to examine the diverse skin type. Information is exceptionally pivotal for building an productive deep learning model. Without a clean dataset, building a deep learning model is incomprehensible. The pictures are at that point classified into four classes to be specific dry, normal and oily. Out of 600 pictures, 152 pictures are pictures of, the dry skin, 160 pictures are pictures of normal and 144 pictures are pictures of the oily skin.

3.2. Preprocessing

Preprocessing is a process of converting a raw data into a clean set of data. A resizing, normalization, and augmentation strategy was utilized amid the preprocessing arrange. The initial picture which is given as input is changed into a picture by resizing it to a standard measure. Normalizing the measure of the input picture is the primary step within the preprocessing method. Normalize pixel values to ensure consistency. In image processing, normalization is a process that changes the range of pixel intensity values. Apply augmentation techniques like rotation, flipping, or brightness adjustments to increase dataset variability. Label each image according to its skin condition.

3.3. Algorithm

Convolutional Neural network is a sort of deep leaning neural organize planned for processing structured grid data, such as images. CNNs are well-suited for errands like object

detection, picture classification. The brain comprises of billions of neurons additionally CNNs too have neurons organized in a specific way. In fact, a CNN's neurons are organized a bit like the brain's frontal fold, the range careful for planning visual jars. This course of activity ensures that the total visual field is secured. CNN calculation comprises of Convolutional layers , activation function, pooling layers and fully associated layers.'

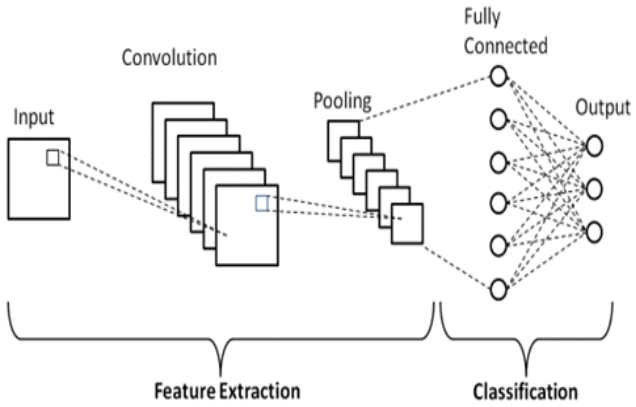

Fig -2: Convolution neural network architecture

3.4 Training and Evaluation

After implementing CNN algorithm ,the first step involves of feeding of training images into the CNN model and enhancing the calculation using Adam are utilized to change the appear parameters through backpropagation and optimization. Validate the model using the validation set to prevent overfitting. At last generate a model file containing the trained weights and architecture.

3.5 Testing and Validation

In testing phase apply the same preprocessing steps similar as training phase to test image and load the trained model file. Input the pre-processed test image into trained CNN model. Then obtain the prediction output from the model. At the final step based on the prediction appropriate suggestion of cosmetics is done to the specific skin condition.

5. EXPERIMENTAL RESULTS

The overall output of the application is shown in this section .It involves skin type detection using CNN algorithm and suggesting personalized cosmetic products based on skin type. Also it involves capturing live image of the user face and a voice over is provided for cosmetic recommendation. Following figure depicts the output(GUI) page of the system for user interaction with the application.

Fig -3: User interface

The above figure 3 shows home screen of this application is designed with three buttons that provide easy access to different functionalities. The first button "browse image" is used to browse the image from the directory and select the required image for classification. Once the image is selected it will be displayed on the home screen above this browse button. The second button on the home screen "show description" button which is used to provide personalized cosmetic products details which is recommended according to the particular skin type which can be either oily , dry or normal. The third button "web cam" button is used to upload the real time image of the user . After user facial image is captured using web camera , their skin type is predicted and further personalized cosmetic product is recommended.

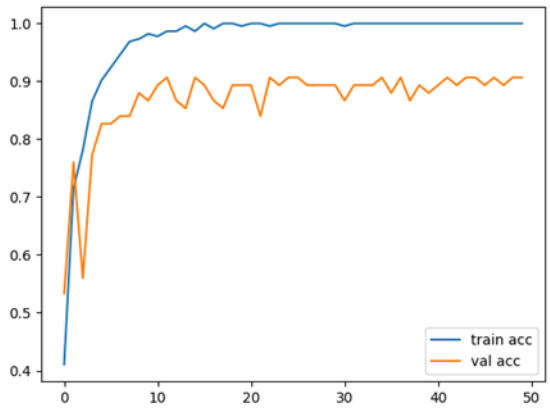

Fig -4: Training and Validation accuracy

The above figure 4 shows training and validation accuracy which are very important measurements utilized to assess the viability of machine learning models amid the preparing handle. The preparing exactness measures the extent of accurately anticipated names on the preparing dataset. As number of epochs goes on increasing the accuracy of the system also increases since the model learns from the training data . Validation accuracy surveys the model's execution on unclear information from the validation set. It speaks to the extent of accurately anticipated names on this autonomous dataset. Comparative to training accuracy, higher validation accuracy shows superior generalization capacity, proposing

that the demonstrate can make exact predictions on unused, concealed information.

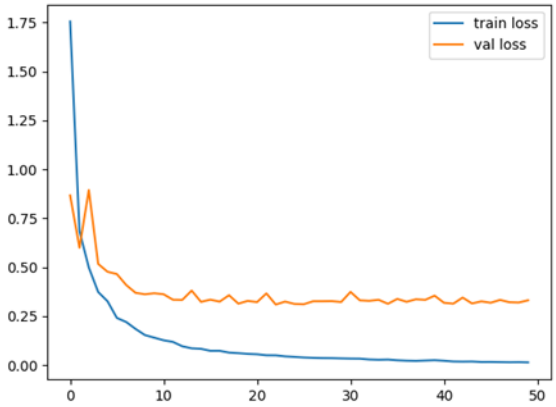

Fig -5: Training and Validation loss

The above figure 5 shows training and validation loss that are basic measurements for assessing machine learning performance . The training loss evaluates the difference between the model's expectations and the genuine target values on the preparing dataset. In a perfect world, this loss diminishes as the application iteratively learns from the training information, showing improved generalization and prescient exactness. Validation loss, on the opposite, assesses the model's execution on concealed information from the validation set. Lower approval loss means superior generalization to unused information, associated to preparing loss. Checking both measurements over epochs gives bits of knowledge into the model's learning direction and its capacity to generalize viably.

6. CONCLUSION

Making decisions nowadays is more challenging than ever, particularly for consumers who are offered wide range of options for numerous brands and product categories. Thus we created a CNN model to classify the facial skin type, which takes the input as a pre-processed image and accurately and efficiently classifies the skin as oily, dry or normal type. The skin detection system provides awareness among customers about their skin. A few areas that can be improved upon by this system and are being considered for future work include expanding the dataset and achieving more accuracy.

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