LANVIN - An Application system to Visualize Makeup and Cream Cosmetic Effects

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Abstract- **Our research group has identified there are no appropriate methods to visualize the facial enhancements (makeup), appearance after treatments or the progress achieved by cosmetic product. And also the existing ones do not have the required functions. In that case customer is not able to decide whether the cosmetic product or the required makeup is suitable for them.**

The purpose of this report is to explain our project and give an idea about how our proposed system works to those who are involved in related industries and interested parties. Basically our research project focused on image processing techniques to extract facial features from the face image. After identifying the face area we are looking eye area and Lip area to apply effects and. Also to apply cosmetic cream effects we have to detect face area without eyes, lips, hair area.

In order to provide a solution, our research group creates a system to fill the gaps between consumer requirements and the actual outcome. We require our system to help our application users to virtually preview the effects on their own face before physically applying and re-correcting them, which is time-consuming and requires the patience of the participants. Another requirement is to help the cosmetic companies to promote and sell their products more efficiently and by helping the beauty fashion makeup artist and saloons in their practical sessions. Furthermore we intend to help and provide services to customers using user friendly handy website and android application.

*Keywords-***Face Detection, Feature extraction, Image Processing, Segmentation, Mask, Thresholding**

I. INTRODUCTION

Mainly most people are care about their facial appearance (women more than men). So they are applying cosmetics and makeup in order to enhance their facial appearance. After applying makeup or cosmetic the outcome may not produce the expected result. It may or may not be suitable. Users are not able to measure the progress of the cosmetic effects because they only have description about the cosmetic product which is provided by the manufacturer. To visualize their progress they have to use/apply the product some duration. Rather than using product they are able to save money and time by automation this process with the help of software system. But using an application like "**Lanvin"** to visualize cosmetic and makeup effects is the best way to visualize the effect of each and every cosmetic product and makeup styles.

II. LITRETURE REVIEW

By studying the previous research papers we know that basically there are four steps involved in image processing those are Preprocessing, Segmentation, Feature extraction, Recognition and classification. In that case we have to achieve accurate results in each and every step in the image processing. Because the final processed image output depended on these above related steps. So there are lots of techniques, technologies and methods that we are found from the literature survey are important to perform these above related tasks.

Some of the applications are used and work with expensive hardware parts which also time consuming (i.e. makeup mirror). Some of them are generate inconsistent image output as an example the foundation and powder apply for the face is inconsistent (Virtual Makeover Software) [10]. Some of the applications are not much that efficient means not real time. Most of the systems are not able to compare the process output image with the previous resulted image and measure the progress of the effect [7].

III. RESEARCH OBJECTIVE

The main objective of the research project is to create a software system to fill the gap between the client requirements and deliver the solution with the efficient and accurate outcome. At the moment some industries which are related with the makeup artists, beauticians, cosmetic companies, sales representatives who are working under cosmetic companies use manually recording like image albums, actress or actor collection of images. They are need a software system which able to visualize the results of the users at real time. There are lots of digital makeups and cosmetic apply systems which are inefficient, inaccurate. Our research team identified there are lot of benefits can be obtain using our proposed system for the above mentioned different parties.

This system can be used by sales representatives using their android phones. When they are going door to door it is hard to carry more heavy equipment just to show effectiveness of their products. By using the phone to take a picture of the client they can show the benefits of the product. Furthermore saloons can also use our system for similar results. When a person goes to a saloon for makeup they need to compare the original features of the person to confirm that they have achieved all the subtle variations and differences that is required. This app has the ability to convert a photo of the customer to the expected outcome of the customer to show as a sign of promise or to entice the customer. This app will also be included a facility to determine the fairness improvement pre and post concern. As a solution our application will take photo of yours and view the effect of the product and a server side application to process the image and visualize resulted image after specific time using the product. Application shows us the resulted image after four weeks.

IV. RESEARCH METHOLOGY

Basically a client's requirements are not met with just with a software. Their requirements would require websites and/or other features. In that case to obtain quality relates software we have to use software development life cycle model. For our project we have selected iterative waterfall methodology [13]. As a development team we have identified that the methodology provides more reliable, quality system. Rather than using other software development life cycle model it uses iterate each and every phase. So the problems of each and every phase can be identified and solve it completely. To obtain quality, reliable software system our research team has worked with image processing techniques, and development technologies [2] ,[3] ,[4].

We have an android application which will enable people to access our system through an android phone. Android application would go through a WCF service (WCF) to our server. Other than the mobile application users can also access our system through their PC or laptop. For this they need to take a picture and upload into our website which would connect to our server.

Our back end consists of the server. Server's main process consists of image processing . In image processing we focus on facial feature extractions [4]. By extracting the facial features we are able to apply makeup and cosmetic effects to the relevant features.

- First we detect face and skin areas.

- Then we move on to extracting the eyes, lips, chin and face without the lips and eyes.

- Then to apply foundation, lipstick and to show effects of the whitening creams we used

  o Pixel by pixel color differentiation- We change hue, saturation, brightness, intensity etc. in the color modes RGB and HSV to apply makeup and change to skin tone.

  o Mask approach to apply makeup to blush and eye shade- Here we use gray scaling to make a mask of the face in order to apply the makeup.
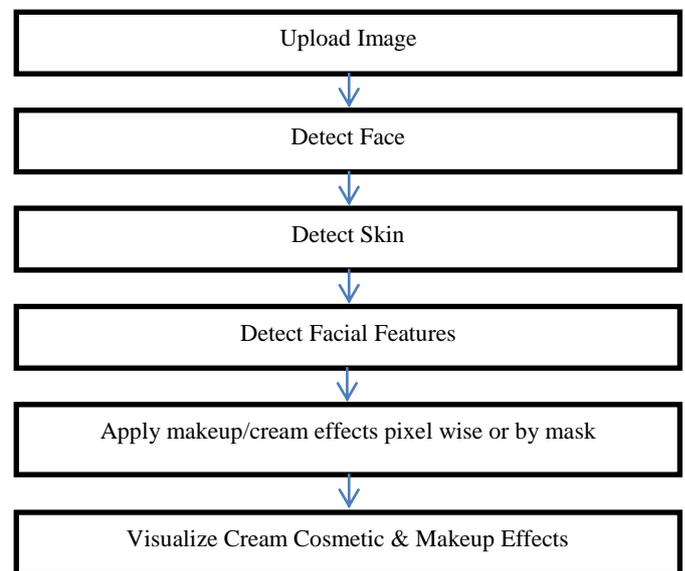

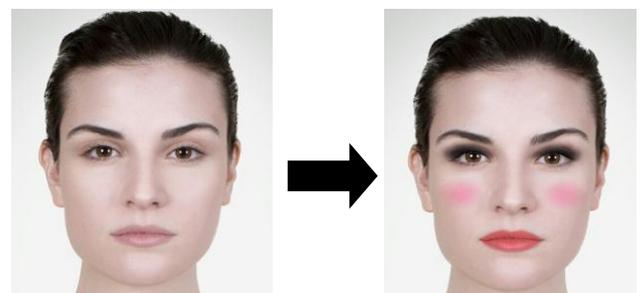Figure 1: High level architecture of the approach

Figure 2: Results of Makeup Effects

V. RESEARCH FINDINGS/RESULTS AND EVIDENCE

A. Face and Skin detection

Skin detection is the most difficult to do because the skin color varies from one to another. There are people who have dark skin with dark hair, golden skin with golden hair and average skin with hair. In that case we are eliminating the hair area by detecting face. The uploaded user faces with hands are not able to process because the skin color of the face and skin color of the hands are equal. Basically we all know to apply whitening effect or makeup effect to the face image we have to identify the face area. Within the face area we have identify skin area of the face excluding eye area, lips area. To remove lips area and eye area we have to identify skin area color. Because the lip area and eye area have different pixel intensity values when comparing with the skin color pixels intensity values and to achieve this we have to deal with color models. To apply whitening and makeup styles for the skin area by adjusting hue, saturation, and brightness values (HSV) .
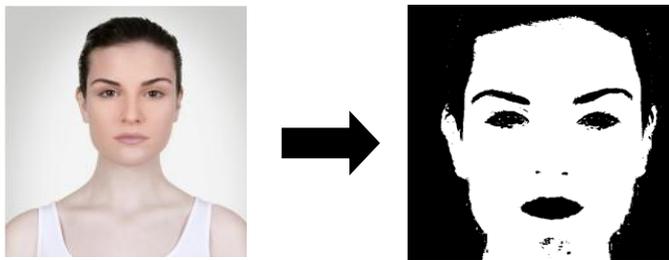

Figure 3: Face and Skin Detection

B. Facial Features extraction

Extracting the facial features of the face image is the most important to continue our research project. Without the extracted areas of eyes, lips and cheek we cannot apply the required makeups. For feature extraction generally we use Haar cascades. Haar cascades are accurate for eye area but for the lip area extraction it is not much that accurate. So we have to use alternative for the feature extraction part and we have used Haar cascade and Luxand Face SDK to extract features accurately. To apply eye shade, eye linear and mascara, apply lipstick and lip linear, and whitening cream effects facial feature extraction should be in a correct format.

C. Pixel by pixel colour and intensity processing for Cream Cosmetic effects and Makeup

In this function we focus on applying makeup and changing skin tone of the extracted features. By selecting the pixel range and location we can apply the eye shade, lipstick and foundation etc. as required. And also from the cosmetic effects function we can show the whitening effect applied to the face using the percentage values given by our client companies. Here we are using the methods of adjusting hue, saturation, brightness values in HSV, RGB color models. Other than filling the pixel range using above mentioned

methods, in this function we do the edge correction, smoothing lines and etc. to give a natural outlook to the image.

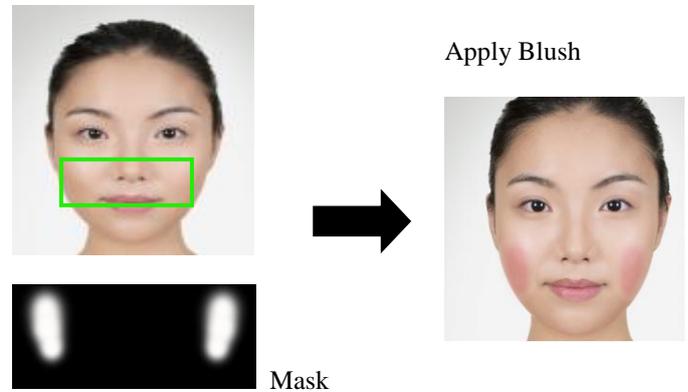### D. Apply virtual Makeup to face using predefine mask

Figure 4: Applying Blush Using Predefined Mask

Uploaded user image will be converted to a 600X600 pixel image. After that the image is divided/segmented into three areas. By dividing to three areas we are able to identify that there is a common area to apply blush and eye shade using predefined mask. Mask is contains with black color background with identical two blush areas. Blush area's middle point intensity value fully saturated and the spread area is less saturated. This theory same for the eye shade. After that predefined mask placed on the original face image and use image overlay techniques to apply the effect for the user image.

E. Website design

Website is the one of the main interface for the image processing unit or the server component. We have used to design the website using visual studio IDE. To create webpages we have use html, to apply styles we have use bootstrap and CSS and also JQUERY. Users of our system able to create user account through the website and login to the system to try out the cosmetic cream effects and makeup styles by uploading their face image to the system. After that the process will be done inside the server component. Within few seconds user are able to see the effects of the image.

F. WCF service to access server component by using android application

To access server component we have to use WCF service. In here we pass the image as the JSON byte array to the server for the processing. We can use SOAP, REST message format to achieve this task. But the most efficient and secure method is JSON byte array passing.

G. Android application design

Android application is one of the main interfaces for the image processing unit or the server component. We have decided to design the android application using eclipse IDE. Android layout has been designed by using xml. Users of our system are able to create user account through the android application and login to the system to try out the cosmetic cream effects and makeup styles by uploading their face image to the system. Then process will be done inside the server component. Within a few seconds user will be able to see the effects of the product.

VI.   CONCLUTION AND FUTURE WORKS

With the natural impulse of vanity people will always look to enhance themselves with cosmetics and makeup. Among the methods available to achieve the perfect look or improve the skin tone we have found the most cost-effective and accurate method. By using our system people can apply makeup to a picture of themselves and decide whether it suit them or not. If it doesn't suit them then they can scrub it with a click/touch of a single button and re-apply it. Our system not only allows people to check their makeup but they can also check and maintain record of how cosmetic products give them the results they promise. This way people will be able to know for certain that the cosmetic products they use yields results.
Our product will enable cosmetic companies to bridge the gap between the company and the customers. This can also be used as a marketing tool to enhance the consumer trust about the company and the products.
In the near future we hope that we can improve the accuracy and the real-time application of our system. We will try to broaden our system to be able to change hair styles, hair colour, apply tattoos and dressings. We can also try and see the results of not only whitening cream but the effects of acne removal creams and spa products.

VII.   ACKNOWLEDGEMENT

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