

The Skin Problems Detection System

Progress Report2

DP 39

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Group Meeting Time: 9th.Oct, Implement Face Detection

13th. Oct, Test Face Detection

16th.Oct, Implement Blob Detection

Advisor Meeting Time: 10th.Oct, 17th.Oct

Professionalism:

The skin problems detection system aims to help customers to analysis their skin conditions and generate their own skin reports. It requires engineers to use the appropriate approaches and algorithms, precisely detect the corresponding data based on the input customer's selfie. We read lots of relative technical papers and learn algorithms and methodologies. We use the opencv library in our program. Since we would like to detect acnes precisely, we spend several days to adjust the parameters in the blob method, such as the size of area, the color of the target, threshold, circularity, convexity and inertia. Since we should detect the location of face in selfies, we also implement three different methods to detect, which are the LBP Classifier, HAAR Classifier and Dlib library. Finally, we use several different samples to check the performance of the three methods. By compared these results, we decide to use the dlib to detect faces. Since it can recognize side faces and different parts of face include eyes, nose, mouth, jaw and brows.

Team Work:

For the second progress, we divide our tasks equally. Zhuzhen are responsible for implement the two pre-trained classifiers which are LBP Classifier and HAAR Classifier. Test two different selfies which include the side faces, write the conclusion for these tests. Xinquan implement the dlib method and test the performance same as what Zhuzhen does. Then he wrote the blob program to detect the acne position.

Impact on the Environment:

Same as the Progress one we mentioned, the greenhouse gas which the data center and our laptop produces is harm for the environment.

Ethics and Equity:

The ethical dilemmas we encounter is that we have to use numbers of customer selfies as our training dataset. However, we found the data collection is super hard since the selfies are customers' privacy. Few of people are willing to provide us their personal selfies. The ideal dataset should be generated by ourselves. Last time, we mentioned that we would like to write a program to stick acne images on the selfie image and feather the boundary of acnes to make it looks real. But the selfie image we use is still real customers images. Put the acne image on their faces have ethical problems. Therefore, we try to use the generate adversarial networks to generate lots of fake selfies. This selfie can look real but these people don't exist in the world. We can use these images to generate skin problems images.

Life Long Learning:

We have learned several face detection methods include the LBP Classifier, HAAR Classifier and Dlib library. It is very essential for our project since the selfies maybe complex background. We have to detect the boundary of face first to ignore the information of background. Especially for the Dlib method, it not only can detect the positive face and side face, but also can precisely locate the position of right eye, left eye, nose, mouth, jaw, left brow and right brow. For further blob detection, since the mouth color is same like the acne color, we should remove the mouth part first, then use blob to detect acnes. The Dlib method is really useful in our program.

We should keep learn opencv method such as sobel to detect the boundary of the acne. It is another way to detect acnes. We will also need to learn the neural network implementation, analysis other sample of projects to learn their basic knowledge.

Recent progress:

1. We used the two pre-trained classifiers of OpenCV and Dlib library for face detection:
 - LBP Classifier
 - HAAR Classifier
 - Dlib library
2. Test the three methods separately, input ten different selfies include positive faces and side faces.
3. Compared the results of these methods, we decide use the dlib to detect faces. Since it can recognize side faces and different parts of face include eyes, nose, mouth, jaw and brows.
4. We found that after we transform the RGB image to CIELAB image, the A channel of the LAB color space can increase visual contrast between acnes and health skin.
5. Base on the A-channel image, we use the blob method to detect the location of the acne. We are adjusting the parameters of blob function to get precise results.

Future Plan:

1. Learn and implement the sobel to calculate the derivatives of image. It can help us the detect the edge of acnes. Then we can locate them easily.
2. Start to generate the fake selfies which contain the acne problems.
3. Label these acnes in the image, help us to train the network in the future.
4. Keep to adjust the parameters of Blob functions.
5. Keep to search the computer vision method to detect acnes.