SNAPCHAT FILTERS USING OPENCV

A PROJECT REPORT

Submitted by

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in partial fulfillment for the award of the degree

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BACHELOR OF TECHNOLOGY

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BONAFIDE CERTIFICATE

This is to certify that the project report entitled "SNAPCHAT FILTERS USING OPENCV" submitted by

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in partial fulfillment of the requirements for the award of the **Degree Bachelor of Technology** in "**ARTIFICIA INTELLEGENCE** Engineering " is a bonafide record of the work carried out under my(our) guidance and supervision at Amrita School of Engineering, Bangalore.

NAME OF SUPERVISOR

Dr. Suja P.

<<Signature of the Chairperson of the Department with date>>

NAME OF CHAIRPERSON-……..

This project report was evaluated by us on …… (Date...)

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INTRODUCTION:

Snapchat is a popularly known application where some cool and awesome face filters can be added on our pictures. This project put forward a technique for applying face filters on the detected facial region in a video frame and apply filters by taking input from the user to select the desired filter that could be applied on the face region. Applying face filters on a captured video frame will be done by tracking and detecting faces using face detection algorithms called Haar Cascades. It makes use of various features such as Edge Features, Line Features, and Centre-Surround Features to locate similar patterns in the images and hence identify objects.Results are obtained using Python code and with OpenCV.

Filters are design overlays that you add on top of your pictures. After you take a picture, you can select filters from different dropdown menus. Filters can add color effects, or different face filters to your picture.

In the past few years, face recognition has received significant consideration and appreciated as one of the most promising applications in the field of image analysis. Face detection can be a substantial part of face recognition operations. Object detection is one of the computer technologies, which is connected to image processing and computer vision and it interacts with detecting instances of an object such as human faces, buildings, trees, cars, etc. The primary aim of face detection algorithms is to determine whether there is any face in an image or not. In recent times, a lot of study work proposed in the field of Face Recognition and Face Detection to make it more advanced and accurate, but it makes a revolution in this field when Viola-Jones comes with its Real-Time Face Detector, which is capable of detecting the faces in real-time with high accuracy.

Face Detection is the first and essential step for face recognition, and it is used to detect faces in the images. It is a part of object detection and can be used in many areas such as security, bio-metrics, law enforcement, entertainment, personal safety, etc.

CONCEPTS:

OpenCV:

OpenCV is an open-source library mainly used for computer vision, image processing, and machine learning. It gives better output for real-time data, with the help of OpenCV, we can process images and videos so that the implemented

algorithm can be able to identify objects such as cars, traffic signals, number plates, etc., and faces, or even handwriting of a human. With the help of other data analysis libraries, OpenCV is capable of processing the images and videos according to one's desire. It is a library of Python bindings designed to solve computer vision problems. It mainly focuses on image processing, video capture and analysis including features like face detection and object detection.

Haar Cascade :

Haar Cascade is an Object Detection Algorithm used to identify faces in an image or a real time video. The algorithm uses edge or line detection features proposed by Viola and Jones. The algorithm is given a lot of positive images consisting of faces, and a lot of negative images not consisting of any face to train on them. The repository has the models stored in XML files, and can be read with the OpenCV methods. These include models for face detection, eye detection, upper body and lower body detection, license plate detection etc.

Haar Cascade Detection is one of the oldest yet powerful face detection algorithms invented. It has been there since long, long before Deep Learning became famous. Haar Features were not only used to detect faces, but also for eyes, lips, license number plates etc. The models are stored on GitHub, and we can access them with OpenCV methods.

IMPLEMENTATION:

Our project has two parts : 1.Implementation of face filters and 2.Implementation of frame filters

Implementation of face filters:

For detecting the face we used the Haar-features from Haar Cascade object detection algorithm.

At first we consider the frame on which the filter needs to be applied and then using the Haar Cascade we calculate the bounding box for the face.

We now consider the filter and resize it to the size of the bounding box obtained from the Haar Cascade and then we pass these into the overlayPNG function

In the function first we extract the mask of the filter

Figure 1- mask of the filter

And then by using bitwise_and operator we find the image of the filter which is applied on the face

Figure 2 - image filter

The mask will be resized with respect to face and frame of the picture

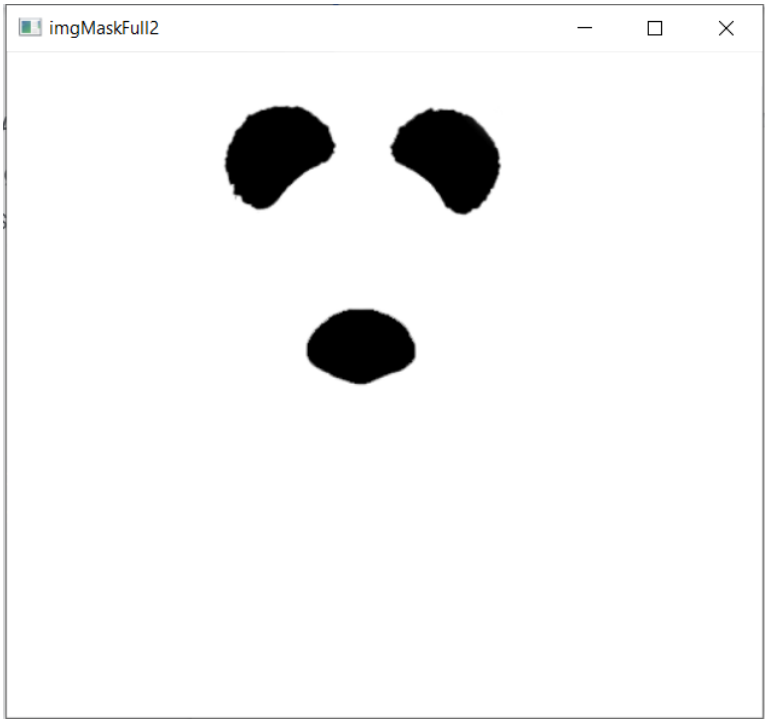

Figure 3 - image mask after resize

Now filter will be applied on the mask

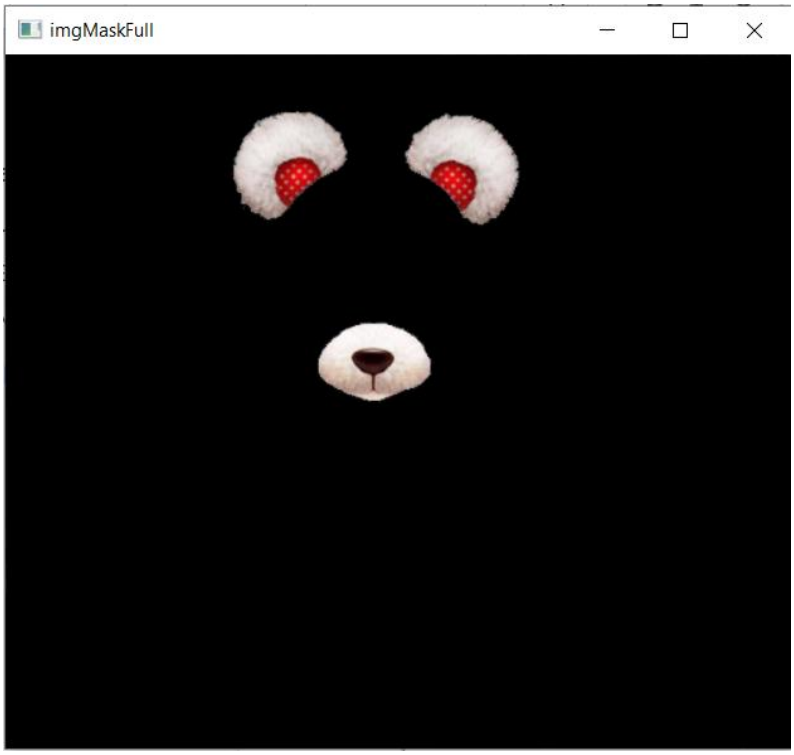

Figure 4 - image filter after resize

We now consider the frame and perform bitwise_and operator with the imgMaskFull2 and we get imgBack.

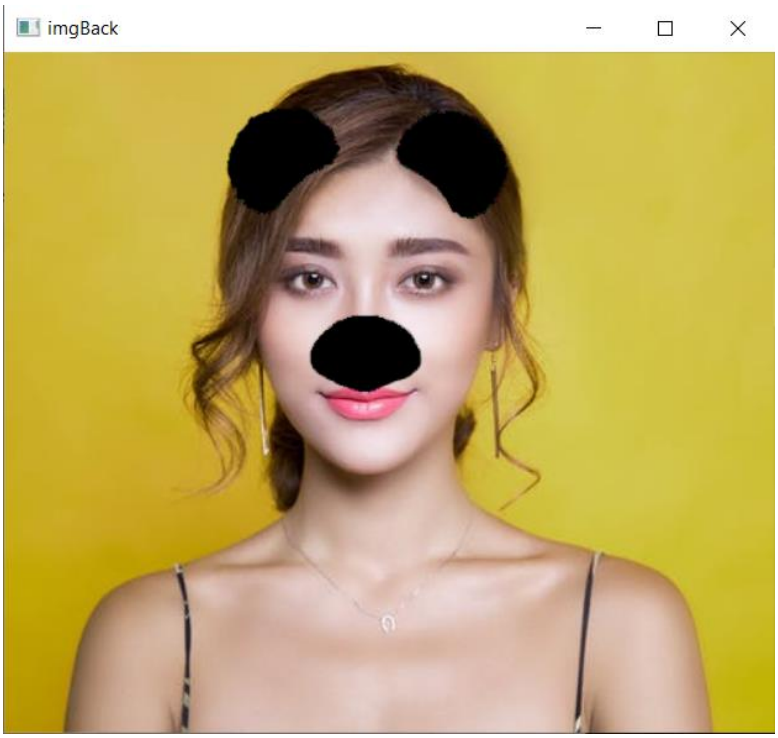

Figure 5 - imgBack

And then we perform the bitwise_or operator with the imgBack and imgMaskFull to get the final image.

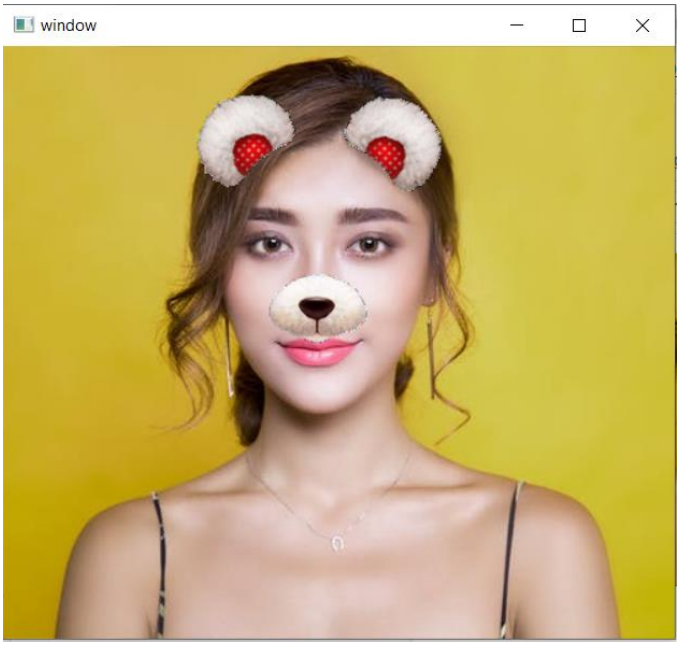

Figure 6 - Final Image

Implementation of the frame filters:

For the frame filters we have applied the filters directly over the video capture taken from OpenCv so we used colour_overlay on the copy of our frame with our desired values of intensities and RGB values.

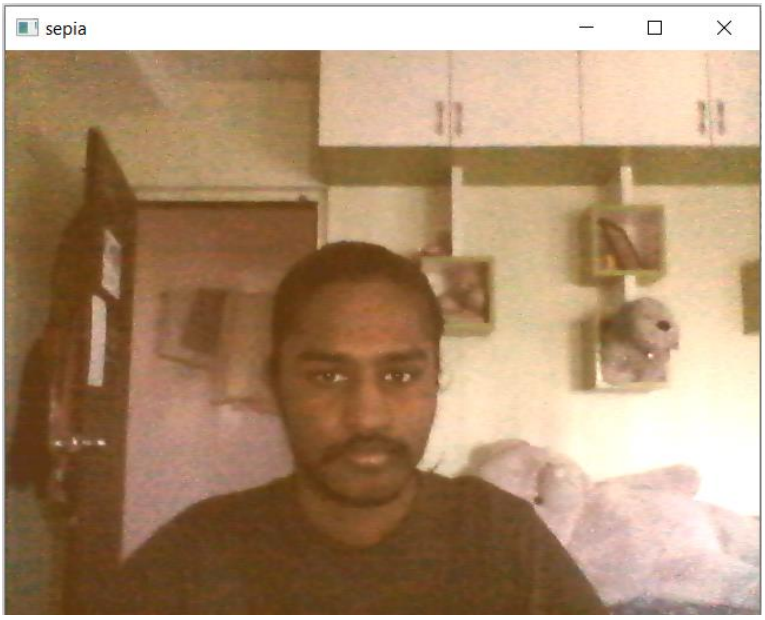

Figure 7 - Frame Filter (Sepia)

RESULTS:

We have successfully implemented snapchat filters using OpenCV and these are the results of our project :-

Identification of the required regions

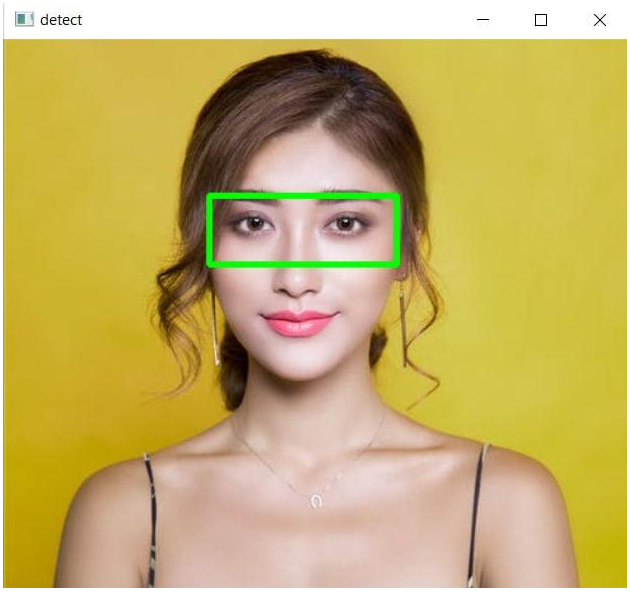

Figure 8 - Detecting Eyes

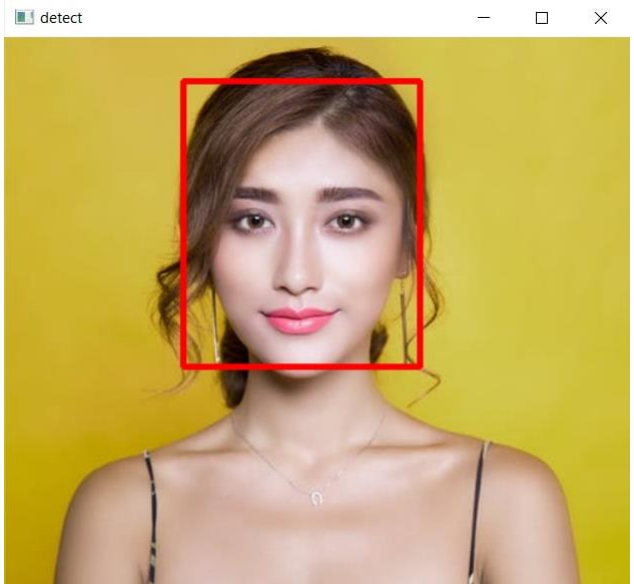

Figure 9 - Detecting Face

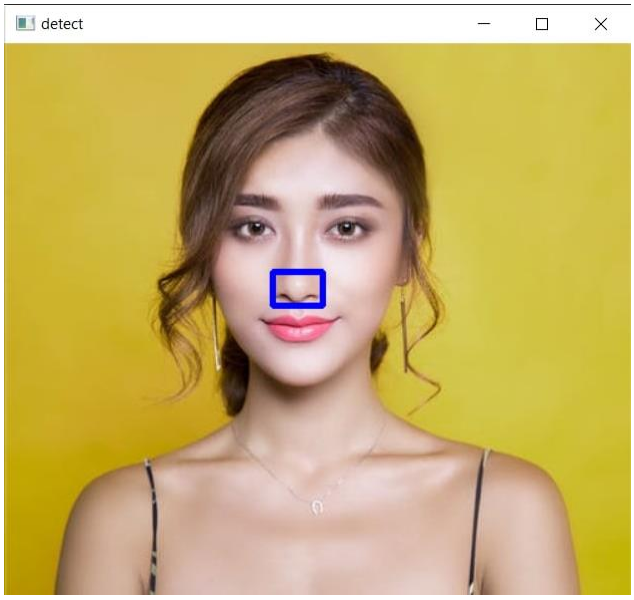

Figure 10 - Detecting Nose

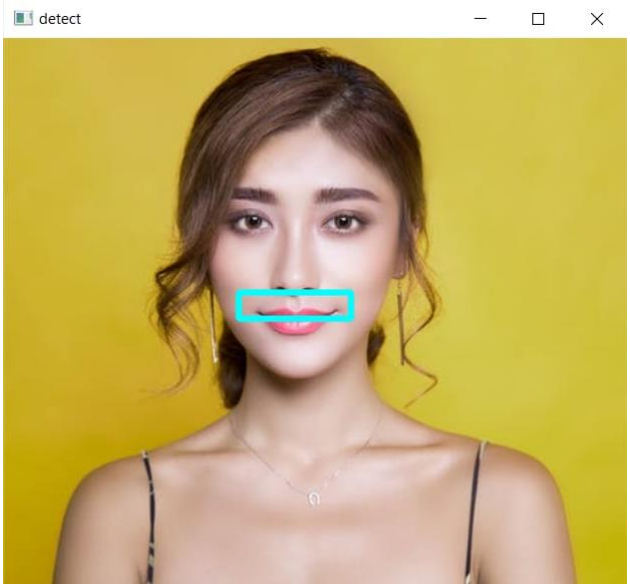

Figure 11 - Detecting Moustache

Application of filters :

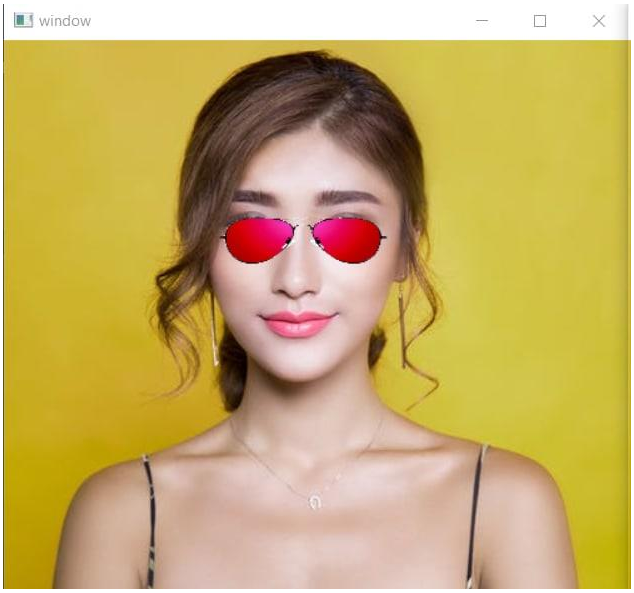

Figure 12 - Eye Filter

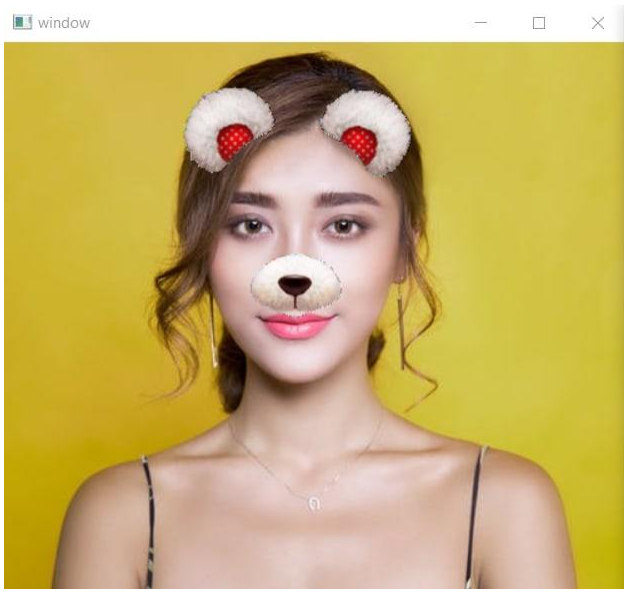

Figure 13 - Face Filter

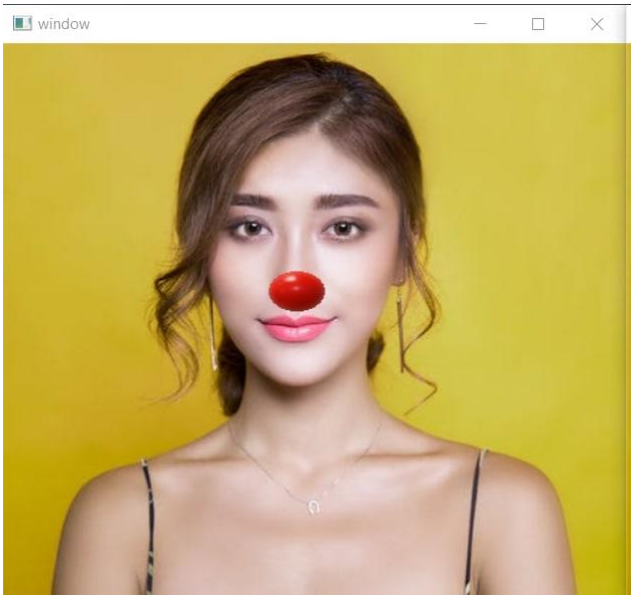

Figure 14 - Nose Filter

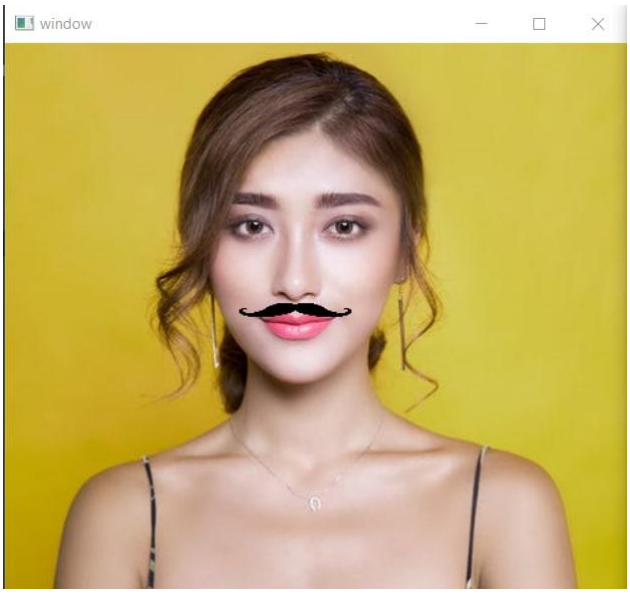

Figure 14 - Moustache Filter

Application of multiple filters :

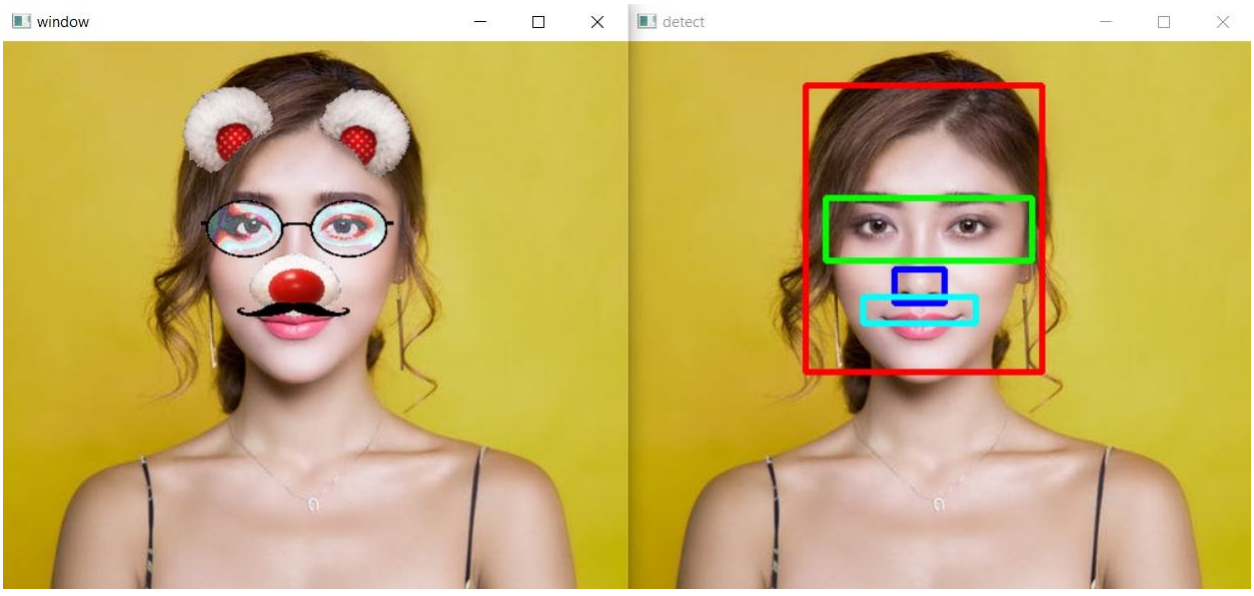

Figure 15 - Filters applied-(1)

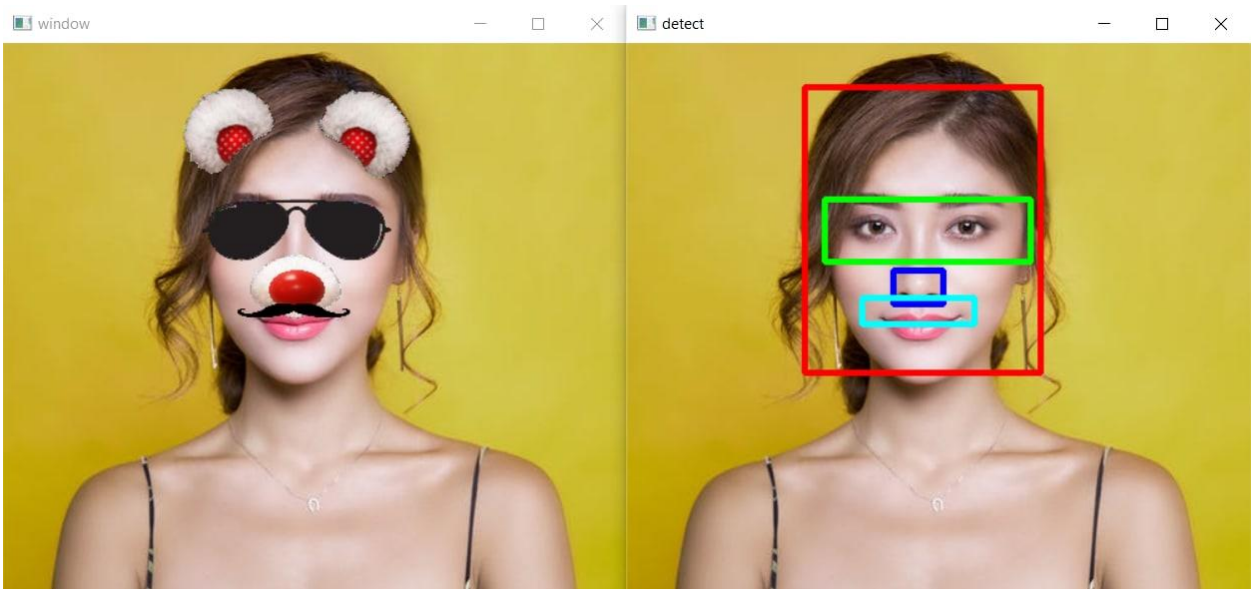

Figure 16 - Filters applied-(2)

Filters applied on live videos :

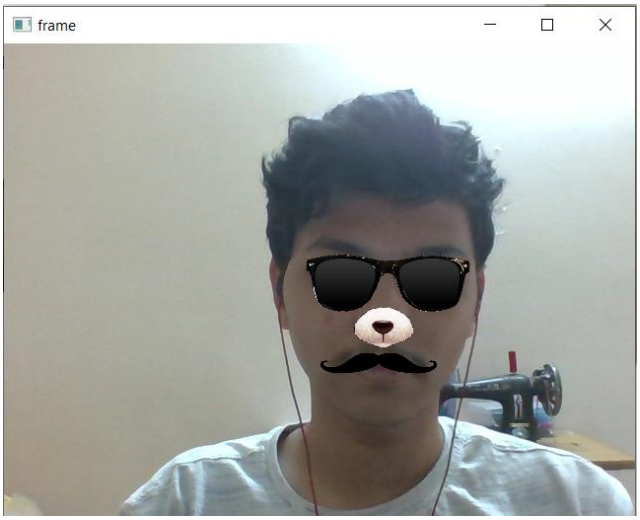

Figure 17 - Filters applied on live video capture

Frame filters application on video :

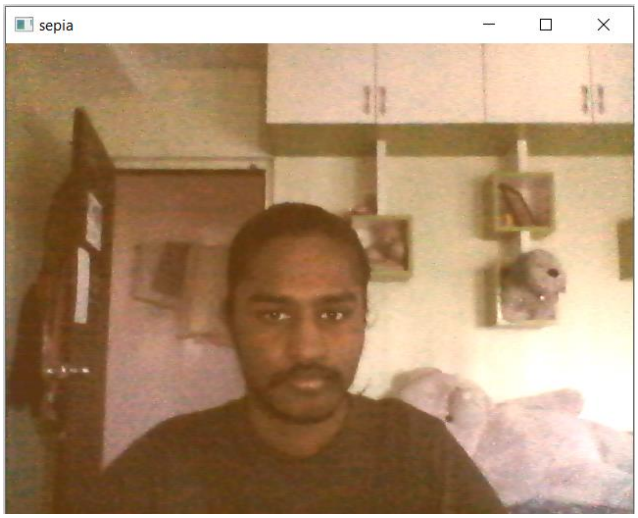

Figure 18 - Frame Filter applied on video capture

CONCLUSION:

In this project we have successfully implemented snapchat filters on our desktop devices. We have successfully used Haar Cascade and detected the features of the face and applied filters on them. We have also implemented Frame filters on all over the video capture.

FUTURE SCOPE:

We intend to develop more reliable face recognition technology as part of our future study. We can train our own models and with the help of deep learning our project can detect faces with more accuracy. This project can be further enhanced with Augmented reality. Haar Cascade can be used for various other pre-trained models that exist for different parts of the body which escalates the number of applications that might be used.

REFERENCES:

[1]https://www.analyticsvidhya.com/blog/2021/07/give-hermione-granger-a-cool-pair-of-glasses-by-building-snapchat-filter-using-opencv/

[2]https://towardsdatascience.com/creating-a-snapchat-style-filter-with-python-b42ecfd2ff54

[3]https://syzible.com/snapchat-filters.pdf

[4]https://medium.com/ai-simplified/create-your-own-instagram-filters-using-python-6d8bd3a86d4