Emerging Technologies Coding Challenge

To complete this challenge, I have used Python3 along with several libraries and packages. In this report, I have briefly described the packages and the modules that I have built. I have also provided the steps for setting up the program and the output of some test cases.

Code Description

1. Pulling the image from Google Drive
   In order to pull the image from Google Drive in Python, I have used GoogleAuth [1] and GoogleDrive [2] libraries of the PyDrive Package. PyDrive provides functions in Python for Google Drive's API. In the provided code, the download_image() function in the addMakeup,py file downloads the images in the RBS Directory and returns the names of the downloaded files in a list format.

2. Application of Makeup
   Three different types of makeup have been applied for the image - eyeliner, lipstick and blush.

   For the application of eyeliner and lipstick, the Visage [3] package of Python has been used. This package includes the Dlib library [4] to detect the facial landmarks and then, smoothens the application of color. This package was not directly compatible with Python3. I have modified the files - apply_makeup.py and detect_features.py to make this work.

   For the application of blush, in the same apply_makeup.py and detect_features.py file, I have made use of the dlib library to calculate the landmark on the cheek Then, I have used PIL library's Image, ImageFilter, ImageEnhance and ImageDraw to draw, sharpen, smoothen and blur the blush.

   After calling the download_image() method, on each of the images downloaded, the apply_eye_liner(), apply_lipstick() and apply_blush() functions are called respectively from the same script.

Setup

1. Create a clients_secrets.json file for providing authentication. The steps can be found here. [6]
2. Run the addMakeup.py file which should download the necessary libraries.
3. Replace the apply_makeup.py and detect_features.py files with the files provided to make it compatible with Python3.
4. The output will be generated in file name - output.png

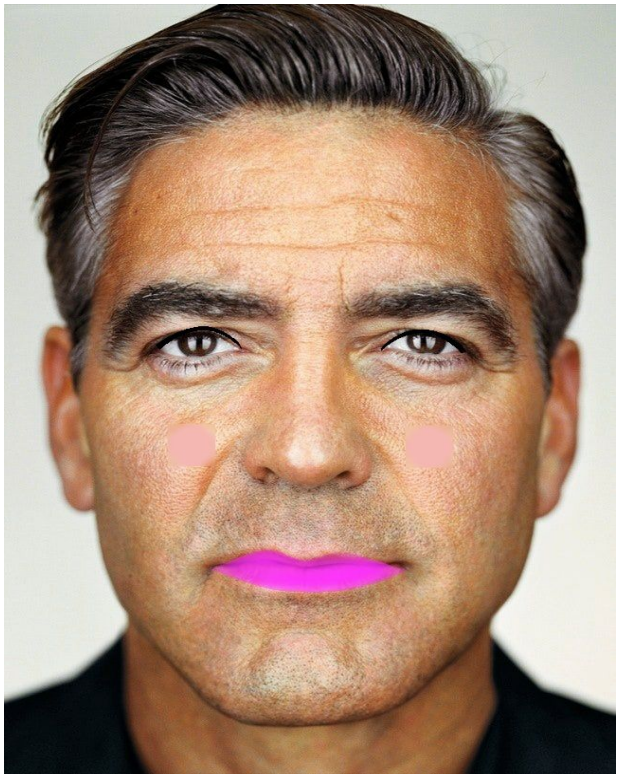
Alternatively, the visage package can first be downloaded. Then, the two files can be modified as provided in the attached code and then, the addMakeup.py file can be run.

Test Cases

1. Nicolas Cage

Output:

2. George Clooney



3. Brad Pitt

4. Different Lipstick Colors:

This program presents the user with multiple lipstick color choices such as red, pink, blue, magenta, green. The output in the other colors is as follows:

Acknowledgement:

I would like to thank RBS for giving me this learning opportunity. Though I had prior knowledge in Artificial Intelligence and Machine Learning, I had no experience or background knowledge in Computer Vision and Image Processing. I learnt a lot of things and I had fun learning. I would also like to thank all the people who have made makeup application programs publicly available, that have inspired me and helped me finish this assignment successfully.

References:

1. GoogleAuth : https://pythonhosted.org/PyDrive/oauth.html
2. GoogleDrive : https://pythonhosted.org/PyDrive/filemanagement.html
3. Visage : https://libraries.io/pypi/pyvisage
4. Dlib: http://dlib.net
5. PIL : https://pillow.readthedocs.io/en/stable/
6. Google authentication : https://medium.com/@measurespace/hands-on-tutorial-for-managing-google-drive-files-with-python-ec20d917c114