Image Processing Group Assignment  
Facial Feature Recognition

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# Summary

Our proposed project will be a facial feature detection/ recognition program, that will capture a live image of face and be able to provide details of the face in the image. These features involve face shape, hair colour, eye colour, eye shape, facial hair type, facial colour, skin colour, accessories (piercings, eyebrow slit, etc). This program will be able to describe the users face and highlight the areas of the features that the user has selected on a facial feature menu provided. The program will also be able to compare other faces with each other based on the features they have in common. There will also be a smile intensity feature that will determine based on the facial images mouth on how happy or sad they are in the image.

# Proposed Approach

Our first approach to this project is to preform some research on different libraries and ways we will be able to identify the outline of the face and its features. Being able to track the face and capture it as an image will be our first plan. Then being able to reduce noise and sharpen the image so we can identify the features a lot more. We will use a git repository to be able push and pull the code from our devices, and constantly update the project. The primary environment we will be using is PyCharm to code it. The plan for the program is to be able to work any device with a camera, to be able to scan an image of a face. The making of Use cases will also be necessary for the interactions with the program and the user. The design process will involve the development of prototypes and storyboards on how the program will be interacted with. The general design of the application will be a basic GUI system for the user to be able read and view the features of the face and be able to select the features in a drop-down menu that will then be highlighted on the screen. Once the research and design phase are complete then the coding will begin on the actual project. The implementation of the features will be constantly pushed and developed to meet the deliverables set out in the project. Then following full implementation of all features, the user testing will begin, using first us the developers then asking volunteers to interact and give feedback on the program.

# Deliverables

* User can interact with the program
* The program can identify the face
* The program captures an image of the user’s face
* The program reduces the noise and sharpens the image
* The program then runs through a feature checklist
  + Identify Face Shape
  + Identify Hair Colour
  + Identify Eye Colour
  + Identify Eye Shape
  + Identify Facial Hair Type
  + Identify Facial Hair Colour
  + Identify Skin Colour
  + Identify accessories (piercings)
* The program will have a drop-down menu of the features identified after the scan
* When the user selects the feature it will highlight the feature on the image to the user

# Technical Requirements

* Laptop with a camera
* Python
* Python Libraries: cv2, numpy, matplotlib