Face Detection

Group Name: Beta

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**What is Face detection and how it works**

Face detection is an extremely easy task for humans. Even babies can detect faces. But How hard it is for computers? Face recognition based on the geometric features of a face is probably the most intuitive approach to face recognition.

Face detection is a method of identifying the presence of people’s faces within digital image. Face detection applications use machine learning and formulas known as algorithms to detecting human faces within larger images.

**Project Overview**

The program we’re creating can detect faces in a live stream from webcam or in a video file stored in the local machine.

This program can detect faces in real time and can track it.

It uses the OpenCV library to detect faces in a live stream from webcam or in a video file stored in the local machine.

It uses pre-trained XML classifiers for the same. The classifiers used in this program have facial features trained in them. Different classifiers can be used to detect different objects.

**Vision:** The project we’re proposing to work on is currently only limited to face detection. But it has potentialities on a high level.

It can detect different kind of gestures on an advanced level.

Think about moving your hands in thin air and see things done in your computer or smartphone. Let’s say you want to capture a picture of anything infront of you. All you have to do is move your hands and the image will be captured and saved in your smartphone which is inside your pocket.

Now let’s say you want to write and send an email to your mother. All you have to do is to find any piece of paper near you and write whatever you want. It’ll automatically get written on your laptop’s screen and the email will be sent to your mother just with a simple hand gesture.

This project has the potentiality to connect your digital world to your real world.

**Software Architecture:** Gesture Technology enables devices to recognize human gestures using sensors and the data is then processed using mathematical algorithms.

An imaging sensor like camera will read human body’s movements and and send the data to the computer. The computer will uses the gesture captured as inputs , processes input to understand what was gestured, and then sends the answer as a command to the application. Accelerometers, gyroscopes, bend sensors, data gloves etc will be needed for gesture recognition.

For now we’ll use OpenCV (Open Source Computer Vision) library for face detection.

The program will use pre-trained XML classifiers for face detection. The program will be written in C++.

**Challenges and risks:** There may be some conventional problems in face detection as listed below.

* Variations in skin color under different lighting conditions
* Presence of eyeglasses, make up, pimples
* Different face angles with respect to the camera
* Clarity of the face image, distance from the camera
* Different facial expressions (e.g., varying levels of smile)
* Hats, caps, or hairstyles that may partially cover the face

There maybe some other challenges and risks we may face as we start our project. Hopefully we’ll overcome everything through trial and error.