# Face Album Protocol

## Suitable approach experiment

During the experiment stage, I researched on different approaches to achieve the aim of the project.

For face recognition, the OpenCV library offers a object classifier which uses a Haar-like cascade. The accuracy and speed of it is very fast, which makes it the best approach for detecting faces in pictures. But the downside of this approach is that it works only well with frontal face.

For emotion classification, I did experiment with the TensorFlow library, especially the high level API TensorFlow for Poet. This high level API uses a model that is trained with millions of images from google, it has the ability to classify a large variety of different kind of objects in pictures. The advantage is that we can use the high level API to re-train the model for specific classification task, in our case, the emotion of a face. Basically it only operates on the last layer of the convolutional nero-network and makes the model to be very good at classify certain category of objects.

To run a test and experiment of this high level API, I used the Cohn-kanade facial expression dataset, which contains more than 700 people’s photo of different emotions. The dataset offers 7 kind of facial expressions which are anger, contempt, disgust, fear, happy, sadness and surprise. I wrote a Python script ‘find\_emotion.py’ first to crop out the face from each picture, and then sort them according to their emotion tag and then feed the training image to the model to re-train it, and the result looks promising. For emotion type happy, sad, surprise, the model achieved a 100% successful rate. But once more types of emotions are included, the successful rate dropped. For the experiment with anger, disgust, fear, happy, sadness and surprise, the successful rate is 70%. The most wrong case are concentrated in sadness, anger and disgust. I think it is understandable because when I try to classify those emotion myself, I had some hard time to decide which one is which. So for now, I decided to stick with happy, sad and surprise in the application.

## Design the architecture

During the architecture design stage, I created the design decision document, Use case diagram, class diagram, component diagram and activity diagram for the application, ER-diagram for the database data structure.