There are total four **.py** files in the **.zip** folder,
rescale_image.py: aim to adjust the size of raw training images
train_the_recognizer.py: aim to prepare the training data (one image contains one face with corresponding label) and train the face recognizer with training data
face_recognizer_for_one_image.py: recognize all faces in one image, label them and mark them by rectangles.
face_recognizer_for_camera.py: recognize all faces within the field of view of camera in time.
And three folders in the zip. Folder:
The **training_data** folder contains raw training images, there are three subfolders in it, each one represents one label and contain 23 images. The **resized_training_data** contains processed training images. Then the **test_data** contains several images of different labels and combination of them.

Here is the general idea of the code.

Train the face recognizer

1. Download some images contain only one face in each online, crop these images to get rid of too much background, then resize these cropped images.
2. Prepare the training data set
   The structure to store training image: the main file named 'Training_data' which contains three (or could be more) subfiles (named by 'c1', 'c2', 'c3'...). The name of subfile represents its label, and one subfile only contain images belong to that label. For example, subfile 's1' contains images belong to label 1.
3. Detect and extract faces in face_images (which are supposed to contain only one face in each image), get faces[ ] with corresponding groundtruth labels[ ]
4. Feed faces[ ] and labels[ ] to train recognizer
5. Save the recognizer

Face recognizing with camera

1. Read the trained recognizer
2. Load the face detector
3. Open the camera
   For each frame:
   Detect all the faces in the frame
   For each face:
   Recognize the label
   Draw the rectangle
   Write the name above the rectangle

The mainly used library is OpenCV, to use its built-in face detector (Haar) and recognizer (LBP) and do some simple image processing. Some other libraries include numpy and os are also used. Numpy is for some array operation and os is used for loading the directories of training and test dataset. These codes are fully comment.