N.B: The system has already been trained and recognizes at least 28 of the 30 images for each target.

The GUI Interface is divided into 2 major sections:

1. **Testing**
2. **Training**

**For Testing:**

* On opening the project folder, look for the matlab file **“Texture\_Analysis.m”** and run it on MATLAB. This is the main file.
* At the middle part of the GUI interface is where testing of fundus images after training is done. Each image is picked using the “TEST SYSTEM WITH IMAGE” pushbutton.
* Preprocessing is done using the specified pushbuttons for grayscale, histogram equalization and thresholding, respectively.
* There is a pushbutton representing GLCM, which performs feature extraction and displays the output in the dialog boxes for the different degrees, with the average used as input to the neural network.
* The “ANN CLASSIFICATION” pushbutton then does the disease diagnosis based on the features received from GLCM feature extraction stage.

**For Training:**

* The Training section is on the left part of the GUI Interface, where there are 2 “edit boxes” and 1 push button.
* The first “edit box” is named “Dataset Folder Name”. This represents the name of the folder where all the fundus images to be used are stored. And the name of the folder where all my training images are stored in this case is **“diseasetrain”**
* The second “edit box” is named “Number of Images per target”. This represents the number of fundus images available per target inside the **“diseasetrain”** folder; and in this case, **30 images** per target, which will then make a total of 90 for 3 targets.
* Now, when you check the **“diseasetrain”** folder, there are 3 categories of fundus images there, with each category representing each target.
* The total number of fundus images in the “diseasetrain” folder is 90, with each target having 30 images each.
* The 3 targets are “Healthy, Diabetic Retinopathy, and Glaucoma”.
* The fundus images are named as 1\_**1**, 1\_**2**, 1\_**3**, 2\_**1**, 2\_**2**, 2\_**3**, 3\_**1**, 3\_**2**, 3\_**3**, 4\_**1**, 4\_**2**, 4\_**3**, 5\_**1**, 5\_**2**, 5\_**3**…etc
* Now, the **prefix numbers**  only signifies increasing serial number while the **Suffix numbers signifies a target**

**For the Suffixes:** 1 – Represents Healthy Image

2 – Represents Diabetic Retinopathy Image

3 – Represents Glaucoma Image.

* In order to train the system, all you have to do is click on the **“Train with dataset folder”** pushbutton. This does 3 activities:

1. Acquires data by looping through the specified dataset folder
2. Performs Preprocessing on the images and saves it in some specified folder
3. Performs GLCM Feature extraction on the Preprocessed images and
4. Sends those features as inputs to ANN, and then does training.

* There is a dialog box that shows the progress of the training.
* At the extreme right side of the GUI interface, there is a box where the training parameters for the neural network can be specified or edited. This is where the hidden layers and neurons can be specified, number of epochs and training function.
* The result of the training is stored in **bpnntrainresult.mat**