Optimize each of the two methods by fine-tuning the parameters and computing the PCC for each case.

- For the Laplacian pyramid the optimal parameters are:

Number of pyramid level = 4

Number of features = 4 (mean, variance, skewness, kurtosis)

- For the Laplacian pyramid the optimal parameters are:

Number of pyramid level = 4

Number of features = 3 (mean, variance, skewness)

Number of scale and orientation are 4 and 6 respectively.

Discuss and compare the two texture analysis methods in terms of their performance.

- The Laplacian pyramid method gives lower accuracy than the Gabor filter bank.
- However, the Gabor filter bank is computationally burdensome as it generates multiple filters.
- For the Gabor filter, the number of features are greater as each feature generates number of scale multiple number of orientation times features.
- Therefore, for the Gabor filter, less feature combinations provide better accuracy.
- The final accuracy of Laplacian pyramid is 5.63%.
- The final accuracy of Gabor filter is 84.22%.

For each method, discuss the mis-classification cases for some poorly classified texture images.

- For the Laplacian pyramid, there were a lot of misclassified images. However, in most cases, the correct class was very close to the error rate of wrongly identified class. Nevertheless, in most cases, it fails to identify the right class.
- The Gabor filter classified the classes successfully using the Euclidean distance as among the 100 segments of images, most of them are correctly identified.
- Turns out the longer feature length but less variation of feature provided better classification accuracy for the Gabor filter bank.

Compare the usefulness of different statistics combinations of the Laplacian pyramid and Gabor filtering regarding their performance for texture classification.

- The combinations of different statistical terms provided variational results of both methods.
- However, considering only one from each features or two provides relatively lower accuracy for both.
- Mean provided comparatively better accuracy than the other features alone.
- For both, combining 3 features provide better accuracy than 2.
- For the Laplacian pyramid, all the four features provided the highest accuracy.
- The Gabor filter provided highest accuracy with 3 features that are mean, variance and skewness.