BREAST DBT IMAGE CLASSIFICATION

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OUTLINE

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- Classification
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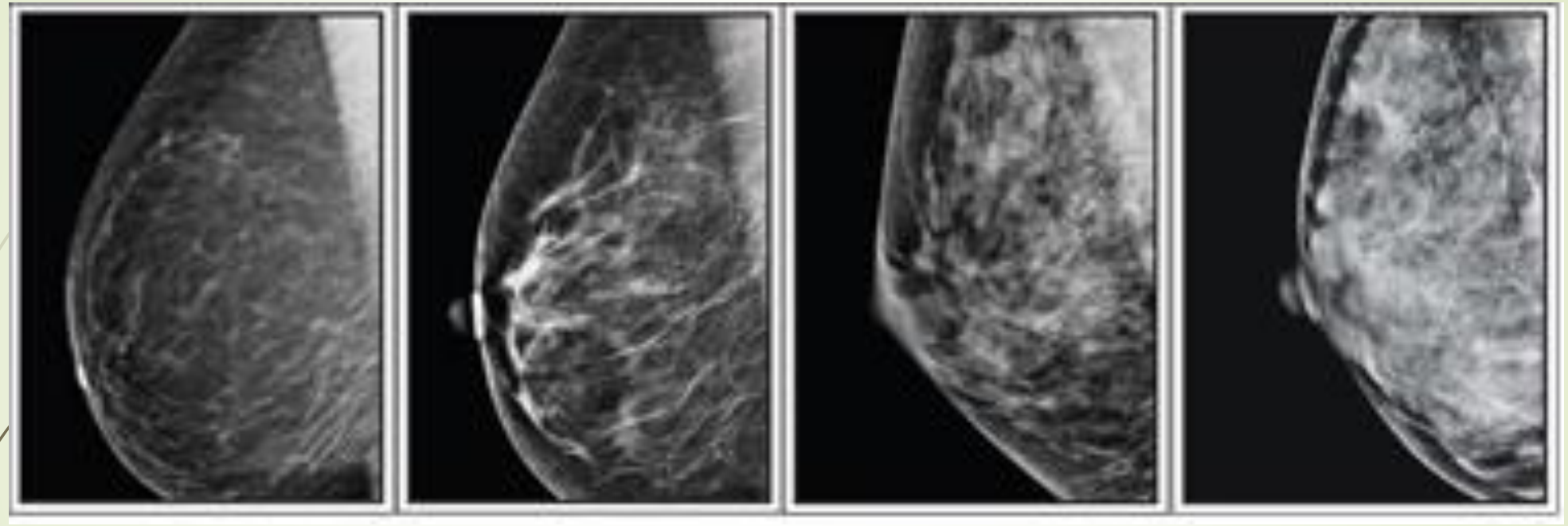
INTRODUCTION

- Digital Breast Tomosynthesis (DBT) images in 3D
- Four Different Classes divided for 16 patients
- BIRADS 1- 4 Labels
- 35 to 60 slices for each dataset

PROBLEM STATEMENT



BIRAD-1 BIRAD-2 BIRAD-3 BIRAD-4

Non-Dense Dense

- Classify into one of the classes accordingly

FACTORS

Increasing Breast Density

- Pregnancy
- Weight Loss
- Breast Cancer
- Hormone Replacement Therapy

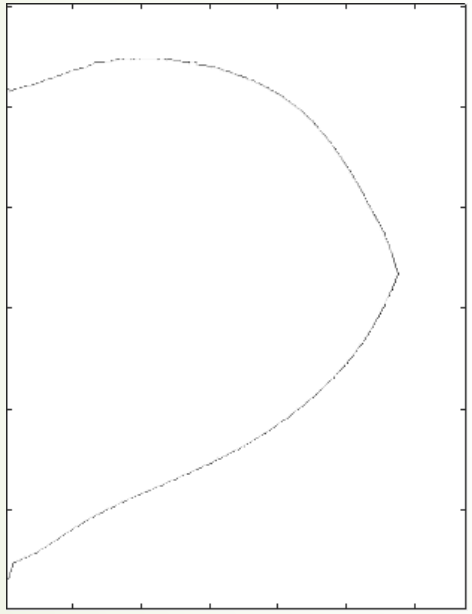
DecreasingBreast Density

- Age
- Weight Gain
- Medications
- Vitamin and Calcium Intake

PRE-PROCESSING

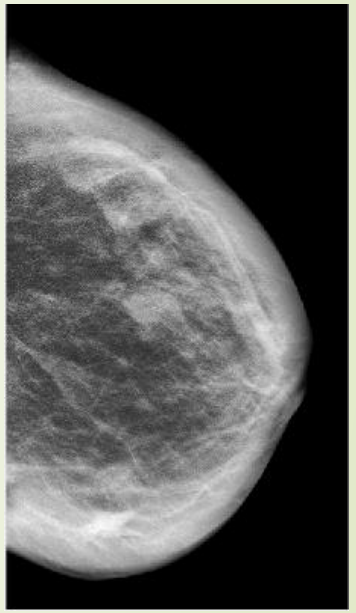
Function: [output_slice] = preprocessing(input_slice, skin_width)

Convert original slice into binary image



Extract contour of the breast(skin) from binary image

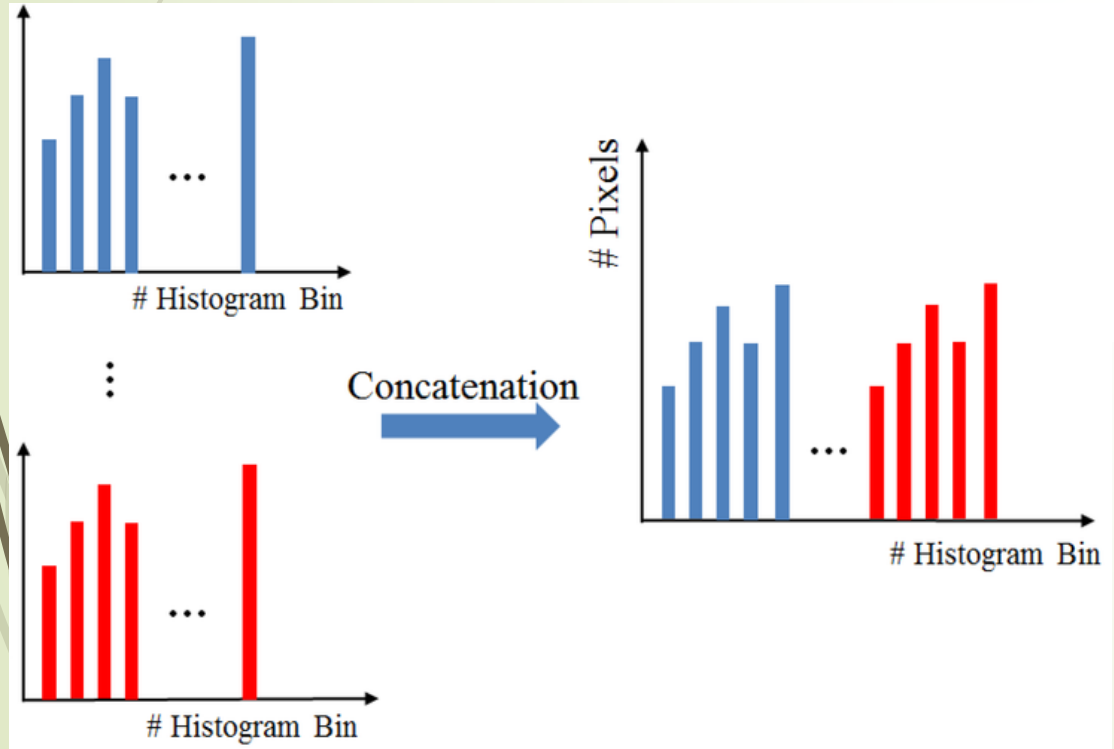
Specify the skin width and remove it

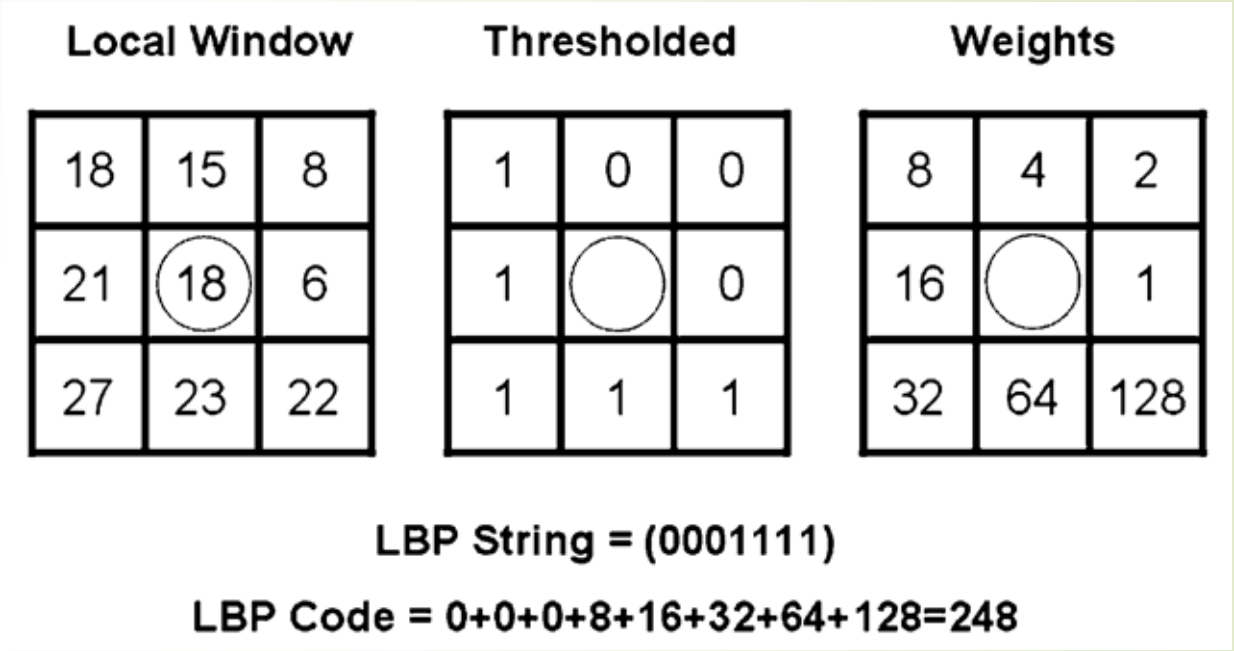


Enhance the image by histogram equalization

FEATURE EXTRACTION

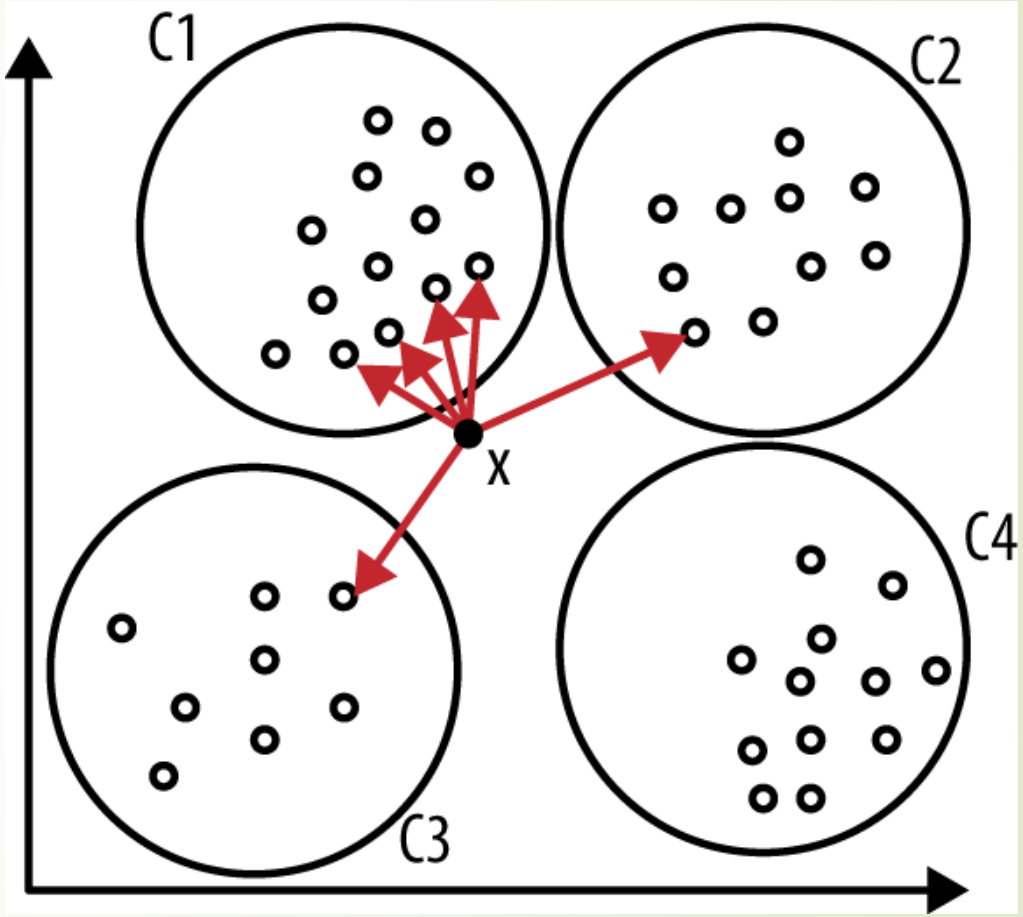
- Local Binary Patterns
- 8-24 neighbors
- Mean features of 21 slices





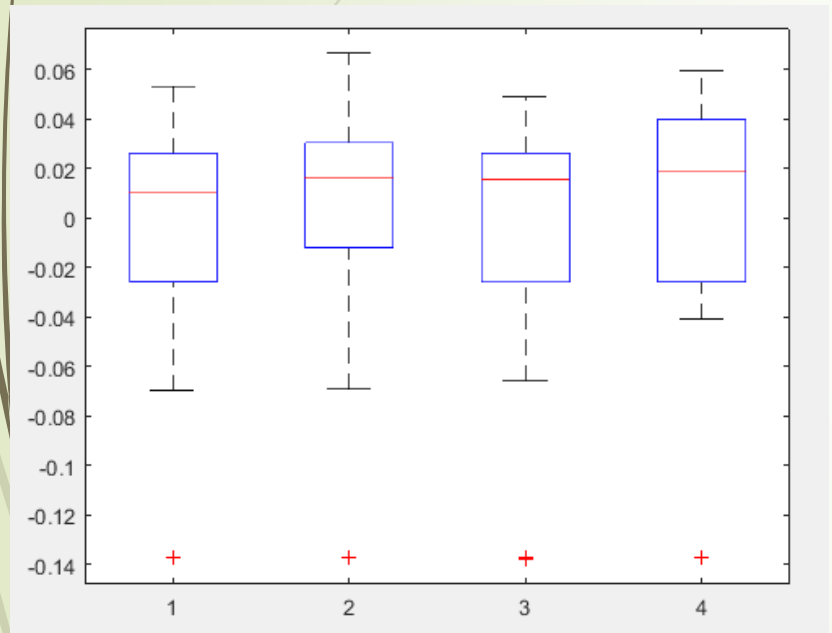
CLASSIFICATION

- K-nearest neighboring clusters
- 3 datasets from each class for training
- 1 dataset from each class for testing
- Apply PCA to the training dataset
- Euclidean or Minkowski distance
- Exhaustive search

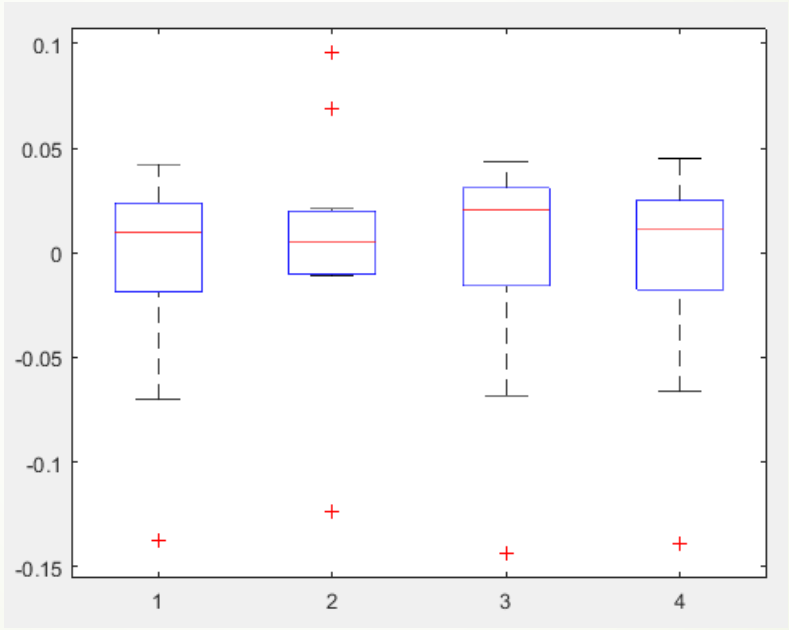


RESULTS

- 75% accuracy (3/4)



Training feature vectors of 4 classes

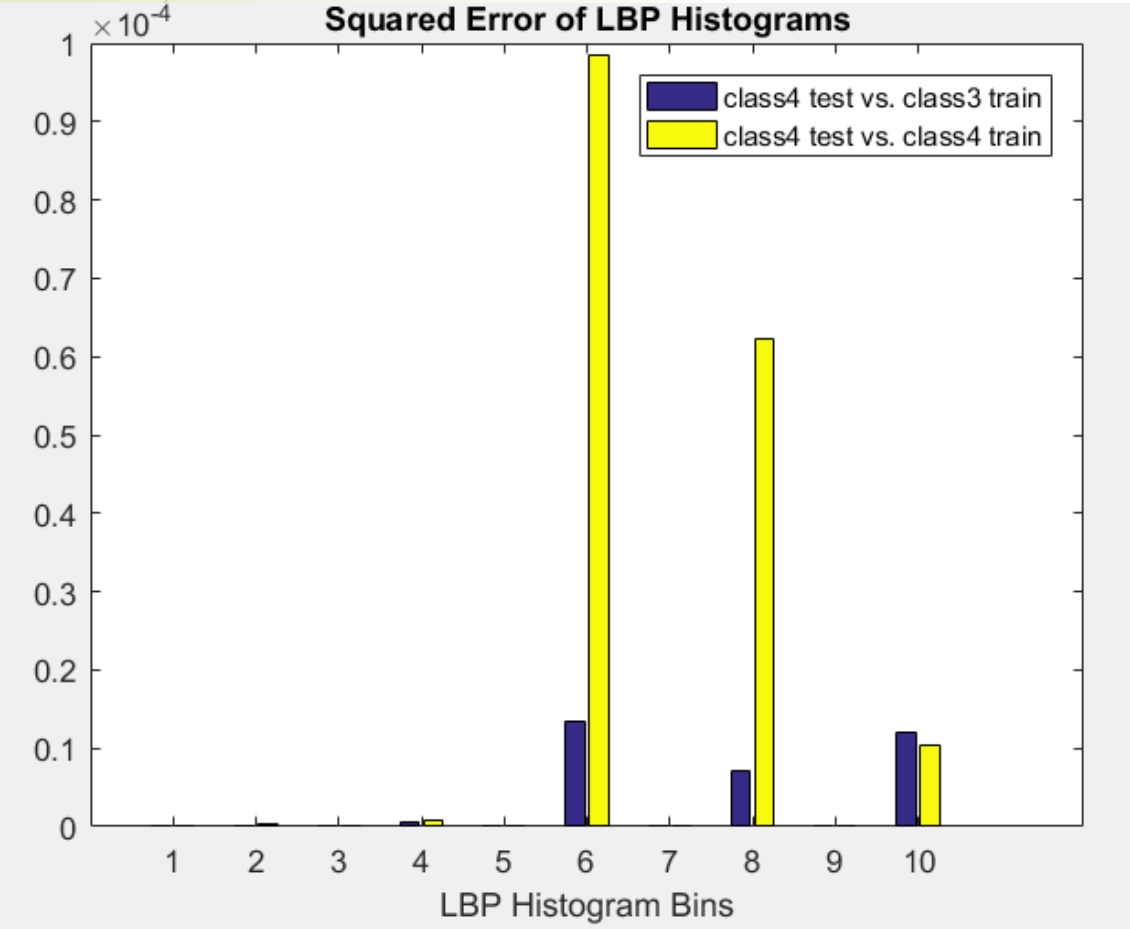


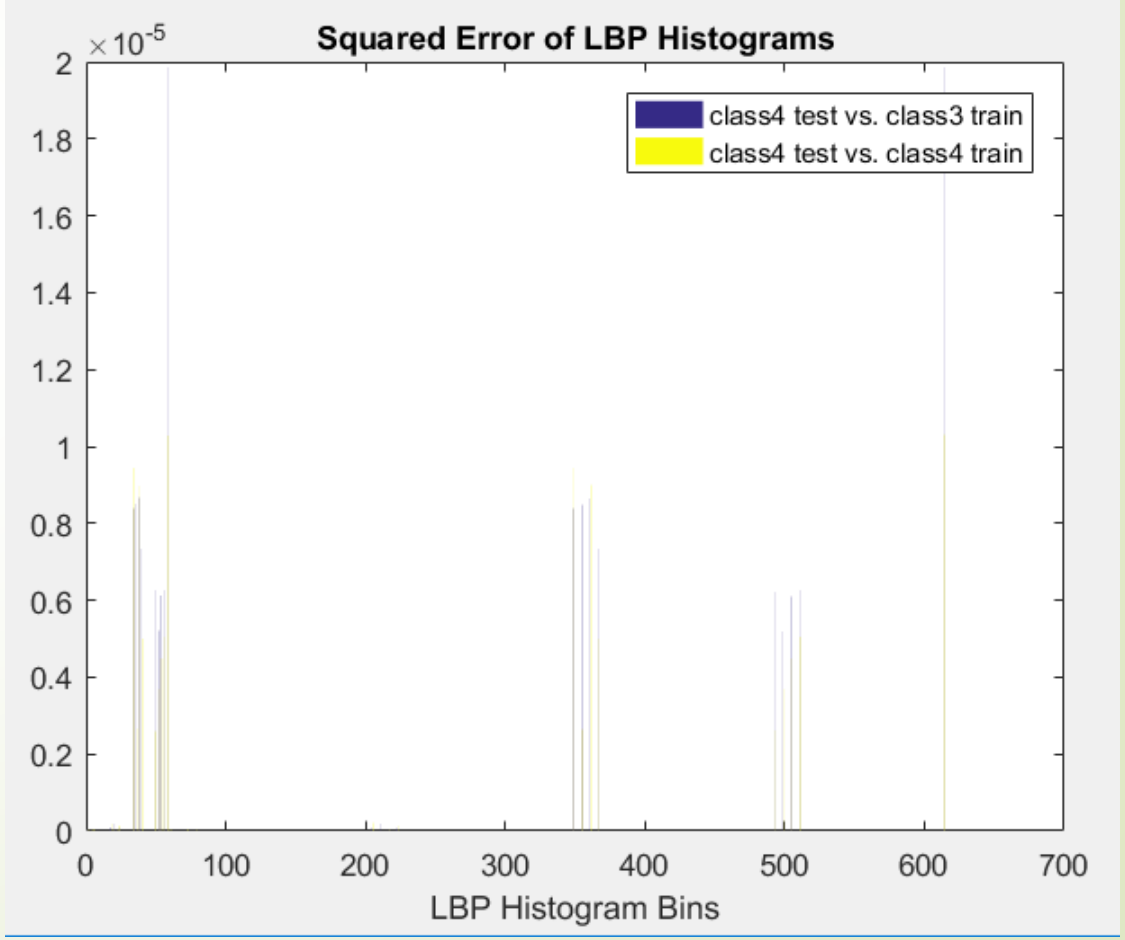
Testing feature vectors of 4 classes

```
label =

     1
     2
     3
     3


score =

     1     0     0     0
     0     1     0     0
     0     0     1     0
     0     0     1     0


cost =

     0     1     1     1
     1     0     1     1
     1     1     0     1
     1     1     0     1
```

SCOPE FOR IMPROVEMENT

- Feature vectors for 3rd and 4th classes are similar
- Try different parameters with LBP feature extraction.





CONCLUSION

- Skin of breast is removed and image is enhanced in the preprocessing
- Local binary pattern features are extracted from each DBT image
- KNN classifier is used for classification
- The result is not fully correct so that the method needs to be improved


MOLTES
GRÀCIES!!