Department of Computer Science
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Lab 6 Shape Classification
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## STEP 1: Shape Extraction (using Thresholding method)



Original Image → Binary Image → Postprocessing

## STEP 2: Feature Extraction

| MATLAB functions | Example |
|---|---|
| `STATS = regionprops(BW, properties)` | Measure properties of image regions. Property Name: 'Area','Circularity','Eccentricity',etc. |

**Feature Vector (X):**

| idx | $f_1$ | $f_2$ | ... | $f_n$ |
|---|---|---|---|---|
| 1 | | | ... | |
| 2 | | | ... | |
| ... | | | ... | |
| 25 | | | ... | |

**ClassNames :**
(trainLabel.mat)

| idx | Class |
|---|---|
| 1 | Phyllestachys pubescens |
| 2 | Phyllestachys pubescens |
| ... | |
| 6 | Acer Dalmatum |
| ... | |
| 25 | Ilex macrocarpa |

**Feature Vector (XTest):**

| idx | $f_1$ | $f_2$ | ... | $f_n$ |
|---|---|---|---|---|
| 1 | | | ... | |
| 2 | | | ... | |
| ... | | | ... | |
| 15 | | | ... | |

**ClassNames :**
(testLabel.mat)

| idx | Class |
|---|---|
| 1 | Phyllestachys pubescens |
| 2 | Phyllestachys pubescens |
| ... | |
| 6 | Acer Dalmatum |
| ... | |
| 15 | Ilex macrocarpa |

## STEP 3: Classification

3.1 Train a multiclass ECOC model using the default options.

```
load('trainLabel.mat');
Mdl = fitcecoc(X,trainLabel)
```

3.2 Prediction

```
load('testLabel.mat');
predictedLabels = predict(Mdl,XTest);
table(testLabel(:),predictedLabels (:),'VariableNames',{'TrueLabels','PredictedLabels'})
```

```
ans = 15×2 table

      TrueLabels                  PredictedLabels
    _____            _____

    Phyllestachys pubescens     Phyllestachys pubescens
    Phyllestachys pubescens     Phyllestachys pubescens
    Phyllestachys pubescens     Phyllestachys pubescens
    Acer Dalmatum               Acer Dalmatum
    ...                         ...
```

## Training Set :



Phyllestachys pubescens

Acer Dalmatum

Phoebe zhennan

Ginkgo biloba

Ilex macrocarpa

Image dataset © Flavia Dataset