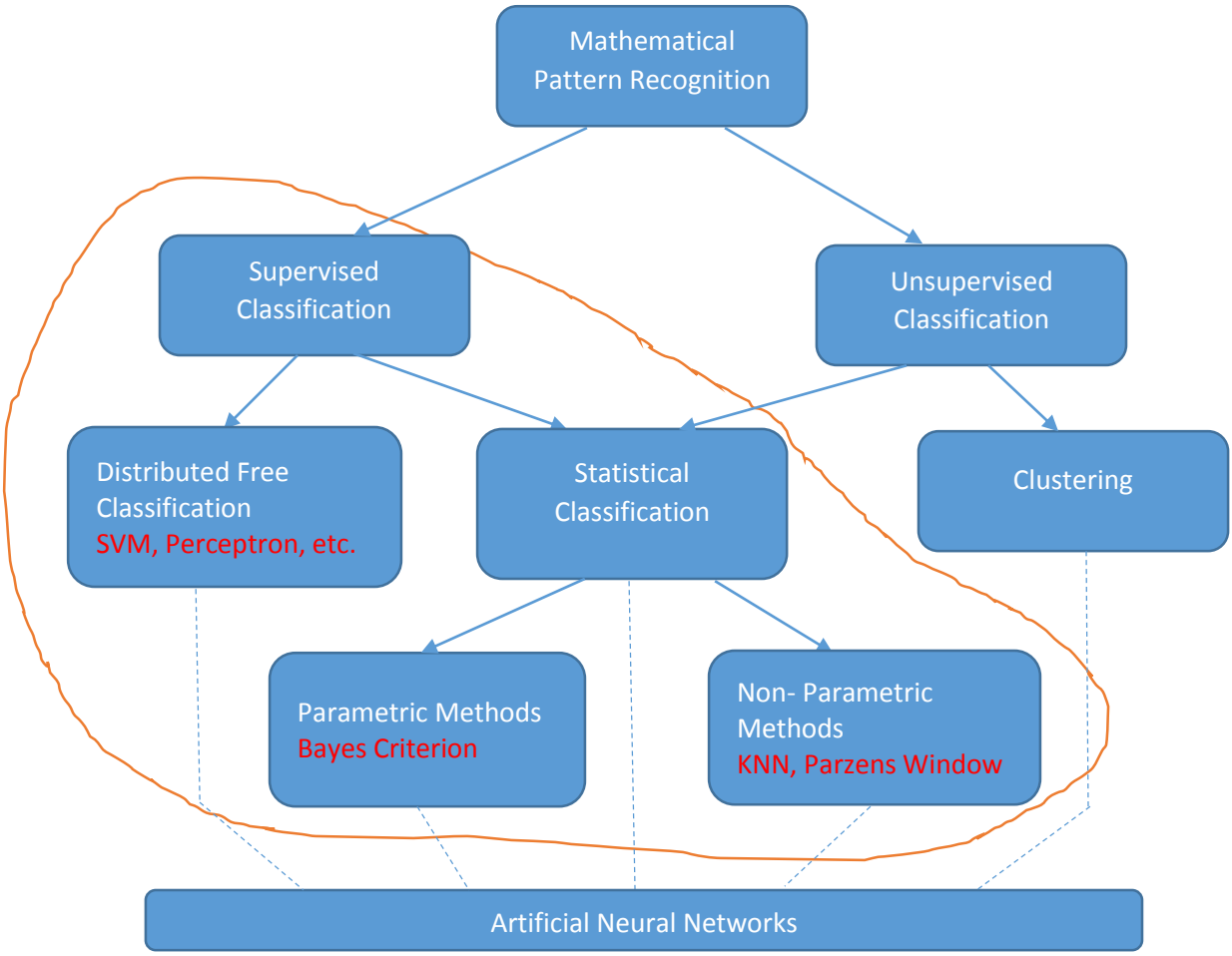
Pattern Recognition using PR Tools

Pattern Recognition can be divided into following categories:



We will be covering the highlighted section in the code but you can easily modify the code to include other categories and functions as well.

Other tools and techniques for Data processing can also be done using PR Tools

1. Data normalization
2. Feature Selection
3. Dimension Reduction

Libraries

All the functions used in this project are from **PRTools** and **LibSVM**.

You need the download the two packages and set the paths of the folder in MATLAB. Refer the Video for more details. Youtube Video

You can download PR Tools and LibSVM from the following links:

- http://www.csie.ntu.edu.tw/~cjlin/libsvm/
- http://www.37steps.com/software/

Instructions to use the functions of PR Tools and libSVM can also be found in the above links.

Using the Code

A separate configuration file (**test.ini**) has been prepared where you can enter the details of the classifier you want to use.

In order to use a particular classifier, simply set that classifier = TRUE.

E.g. To use radial basis SVM (C = 1000, P = 10) with variance normalization, set the following sections in the configuration file.

```
#---------------- Data Normalization ----------- #
# This section is used to normalize the data either by mean or variance
[Data_norm]
useThis = TRUE
# Use any of [mean, variance,domain]
routine = variance

# ------------ SVM -------------------------- #
[SVM]
# Use any of the [p,h,e,r,s,d,m,c,o]
routine = r
#Enter the degree/ Value of P in the above expressions
Deg = 10
# Enter the Trade_off parameter
C = 1000
```

After setting the desired configuration in the test.ini file, simply run the **main.m** file. This will call the routines set in the configuration file and output the Cross validation Error rate (if set TRUE in config file) and the error rate on the test set.

About the Code

The code has been divided into sections which can be seen in the test.ini file.

Data Normalization

- Mean, variance and domain normalization.

Dimension Reduction

- PCA, KLM and LDA

Feature Selection

- featself, featseli, featselb, cmap

Classifiers:

Distribution Free Classifiers

- fisherc, perlc, nmc, nmsc, polyc

SVM

- libsvc

Parametric Statistical Classifiers

- ldc, qdc, udc

Non-parametric Classifiers

- knnc, parzenc

Cross-validation can be performed using each of these classifiers by entering,

`doCrossValidation = TRUE`

and can also specify the **number of folds** and **number of times** for cross-validation.

More details about other functions used in PR Tools can be found here.

More details on using PR Tools

http://www.37steps.com/prtools/

User Manual