Image → Feature Generation → Feature Selection → Classifier Design → System Evaluation

preprocessing & feature extraction

[optional]

↳ We will study this module now!

[Intensity t/f
  Histogram
  Histogram Equalization + variant
  Filtering (Edge detection, Sharpening)]
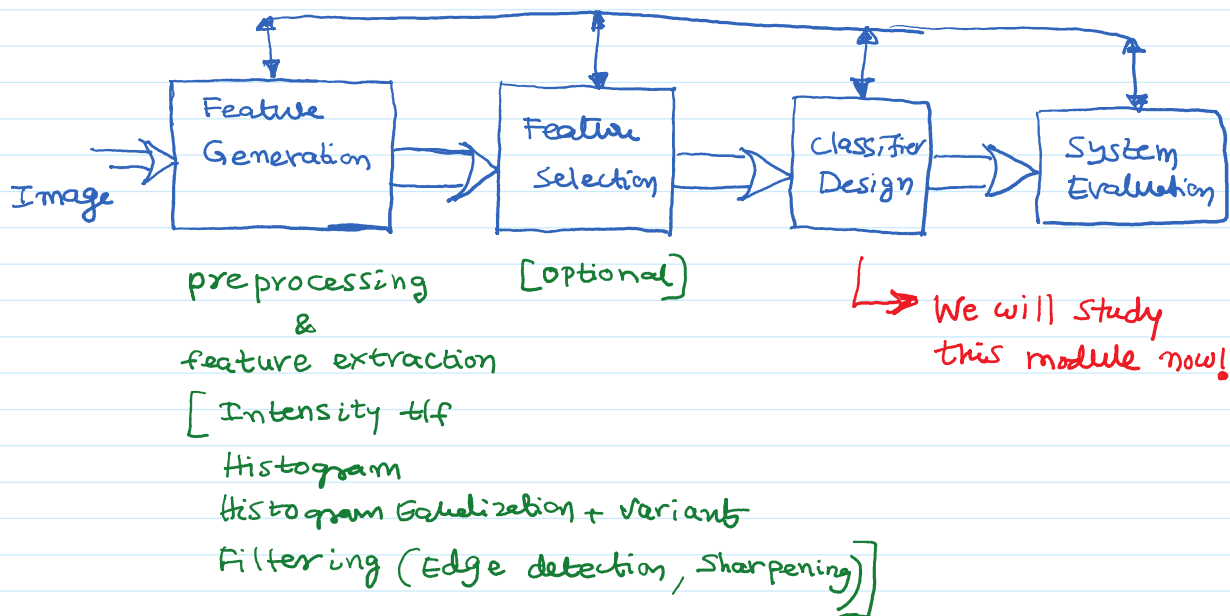
2.1 Classifier Design Based on Bayes Decision Theory:

* Design of classifier is critical because of
  (i) statistical variations of the pattern, and
  (ii) Noise in the measuring sensors.

* Given a feature vector, Classify it into the "most probable" class!

* Let the number of classes be 'M' with each of them denoted by $\omega_1, \omega_2, \cdots, \omega_M$

  let $\vec{x}$ be the feature vector characterizing the given sample

  $$\vec{x} = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_\ell \end{bmatrix} \qquad (\ell\text{-Dimensional space})$$

* The goal now is to compute $P(\omega_i | \vec{x})$ for $i = 1:m$;

  then assign $\vec{x}$ to the class j where

  $$P(\omega_j | \vec{x}) > P(\omega_i | \vec{x}), \quad \forall i \neq j$$

  $P(\omega_i | \vec{x})$ is referred to as

  Conditional probability (or)
  a posteriori probability