Classifications of Cats and Dogs

Math 521

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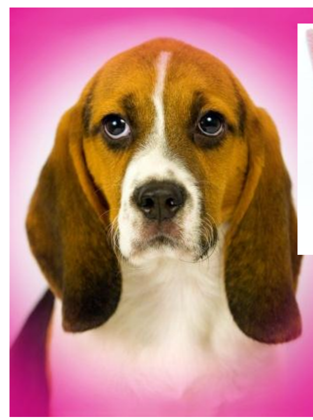
Introduction













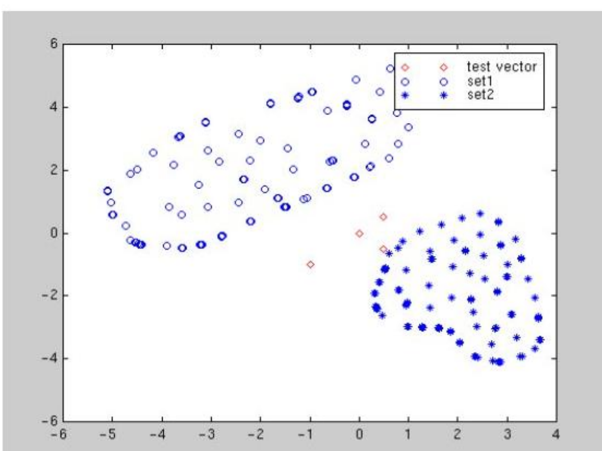
Theoretical Background

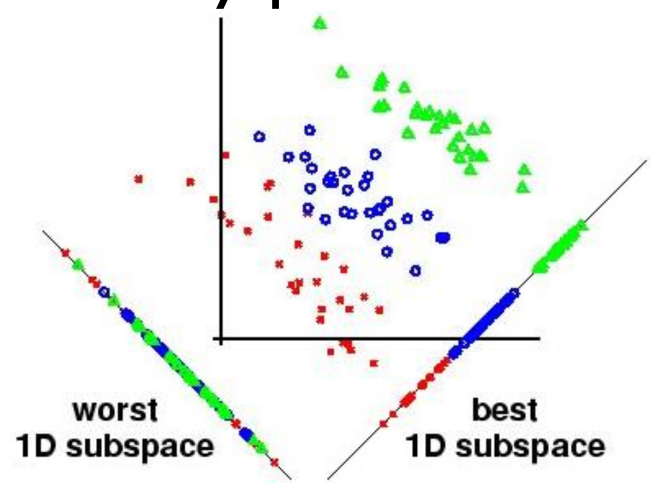
- Binary Filter
  - Try to get the shape of the images

Theoretical Background

Method 1 – Linear Discriminant Analysis (LDA)

- Principal Component Analysis (PCA)
  - Optimal basis (orthogonal basis)
- Fisher's Discriminant Analysis (FDA)
  - Project to line with boundary point





Theoretical Background

Method 2

- Novelty Filter
  - Applying PCA to obtain basis of training set
  - Decompose test data in two components
    - Subspace
    - Residual (Orthogonal to subspace)
  - Calculate norm of residual
    - Smaller is the classified

Algorithm Implementation

Binary Filter

- Finds Median
- ≥ Median = 1
- < Median = 0

Algorithm Implementation

Method 1: Linear Discriminant Analysis (LDA)

- Reduce dimension of training/test data
-

Algorithm Implementation

Novelty Filter

Computational Results

- Method 1 – LDA (78.95%)

Classify / Actual	Dogs	Cats
Dogs	**16**	**3**
Cats	**5**	**14**

Computational Results

Method 2: Novelty Filter (94.74%)

Classify / Actual	Dogs	Cats
Dogs	17	2
Cats	0	19

Questions???