cse@buffalo

Face Recognition

Ricardo Nagel Rodrigues

rnr4@cse.buffalo.edu

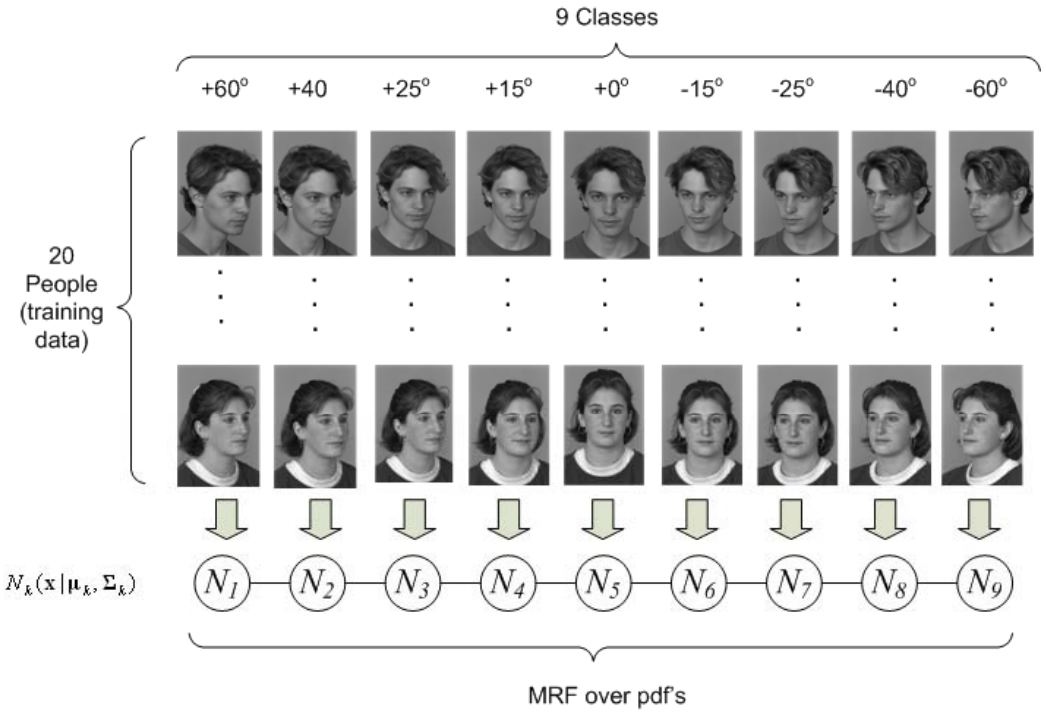
Outline

- Problem Statement
- Proposed Approach
- Results
- Future Work

Problem Statement

- Objective: Unconstrained face recognition
  - Pose variation
  - Expression
  - Illumination, etc.
- Only frontal image enrolled for each person

Proposed Approach - Training



- Learn pdf (using training data) for each pose/class
- Explore relation between classes using Markov Random Field (MRF) to induce a smooth prior over the pdf parameter space.

$$\Theta_{MAP} = \arg\max_{\Theta} p(\mathcal{D}|\Theta)p(\Theta)$$

- Apply PCA for each pose
- Learn a regression function between different poses.

Proposed Approach - Matching

- Enrolled image:
- Test image (60º):
- Enrolled projected into PCA frontal :
- Test projected into PCA 60º:
- Test projected into PCA frontal:
- Enrolled projected into PCA 60º:

Results

- Identification rates (without MRF prior):

Dataset	Regular Eigenface	Multi-eigenface
Rot. 60 Right	0.08	0.38
Rot. 40 Right	0.06	0.6
Rot. 25 Right	0.16	0.74
Rot. 15 Right	0.48	0.9
Rot. 15 Left	0.62	0.9
Rot. 25 Left	0.26	0.7
Rot. 40 Left	0.16	0.52
Rot. 60 Left	0.06	0.3
Different expression	0.9	0.88
Different ilumination	0.48	0.76

Future Work

- Repeat tests using MRF prior.
- Test non-linear regression between classes
- Extend methodology for handwritten word recognition.