FACE RECOGNITION USING FISHER LINEAR DISCRIMINANT ANALYSIS (LDA)

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Outline

• Introduction
• Implementation
• Results
• Conclusion
INTRODUCTION

• Project 1:
  PCA on detected images?
  Eigenfaces!!

• Project 2:
  LDA on detected images using Eigenfaces?
  Fisherfaces !!

• Optimizing objective function:
  Minimize → Within class variance.
  Maximize → Between class variance.

• Gain clear separation between class of interest and other classes.
IMPLEMENTATION

- One versus-all (OVA) approach.
- Perform PCA on $\left( S_W^{-1} S_B \right)$.
- Fisherfaces.
- Project training data to particular Fisherface.
- Binning projection values into Histogram.
- Determining threshold using distribution.
- Using thresholds to classify.
- Projection coefficient.

IMPLEMENTATION

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Figure 1: Flowchart of the algorithm.
RESULTS

• Extracted Fisherface.
• Project test data onto Fisherface.
• Poor result: Inability to detect contempt and disgust.
• “Easy to distinguish” emotions.
• Distinct and blatant feature.

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fisherface only (Angry, Fear, Sad, Surprise, Happy)</td>
<td>90%</td>
</tr>
<tr>
<td>Fisherface only (All 7 emotions)</td>
<td>56%</td>
</tr>
</tbody>
</table>
FISHERFACES

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Figure 2(a): Happy Fisherface.

Figure 3(a): Threshold for Happy.

Figure 2(b): Surprise Fisherface.

Figure 3(b): Threshold for Surprise.

Figure 2(c): Sad Fisherface.

Figure 3(c): Threshold for Sad.
CONCLUSION

• Fisherface approach is limited in success by itself.
• Contempt and disgust are difficult to detect.

FUTURE WORK

• Develop another classifier in addition to the Fisherface based classifier.
• Most expression information is encoded within the inner facial features.