CS 229 Course Project Report:

Comparative study of SVM and ANN in face recognition

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# Abstract:

Face perception is a very important component of human cognition. Faces are rich in information about individual identity. During the past decades, face recognition was also one of the most important and successful applications of machine learning and computer vision. The basic procedure of face recognition contains two steps. The first step is feature extraction, for instance Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), Independent Components Analysis (ICA), and other methods. The second step is classification, such as Artificial Neuron Network (ANN), Support Vector Machine (SVM), Nearest Neighbor (NN), and others.

ANN and SVM are two very popular machine-learning techniques that are widely used in many fields. In my study, I want to try on NN and SVM in facial recognition with two different feature selection methods including PCA and ICA. I’ll use Yalefaces\_A dataset as my dataset to compare the algorithms. The database contains 165 GIF images of 15 subjects (subject01, subject02, etc.). There are 11 images per subject, one for each of the following facial expressions or configurations: center-light, w/glasses, happy, left-light, w/no glasses, normal, right-light, sad, sleepy, surprised, and wink.

In this project, I want to use these two most popular machine-learning algorithms (ANN and SVM) to do some near research works. I aimed at acquiring these two algorithms, which can be used in my future research. Also, I want to learn the techniques in facial recognition such that I am able to real research in this field.

# Introduction

About face recognition and difficulty

Traditional methods feature selection and classification, sometimes preprocessing

What I did in this project.

# Feature Selection Using PCA and ICA

What is PCA, what the do using PCA

What is ICA, what the do using ICA

# Classification Using SVM and ANN

Basics about SVM, why need improvements. Different ways of SVM: One versus all strategy, Pairwise-strategy, Bayesian SVM.

# Experiments

Yaleface\_A dataset.

PCA

PCA with ICA

# Discussion­

# Reference: