

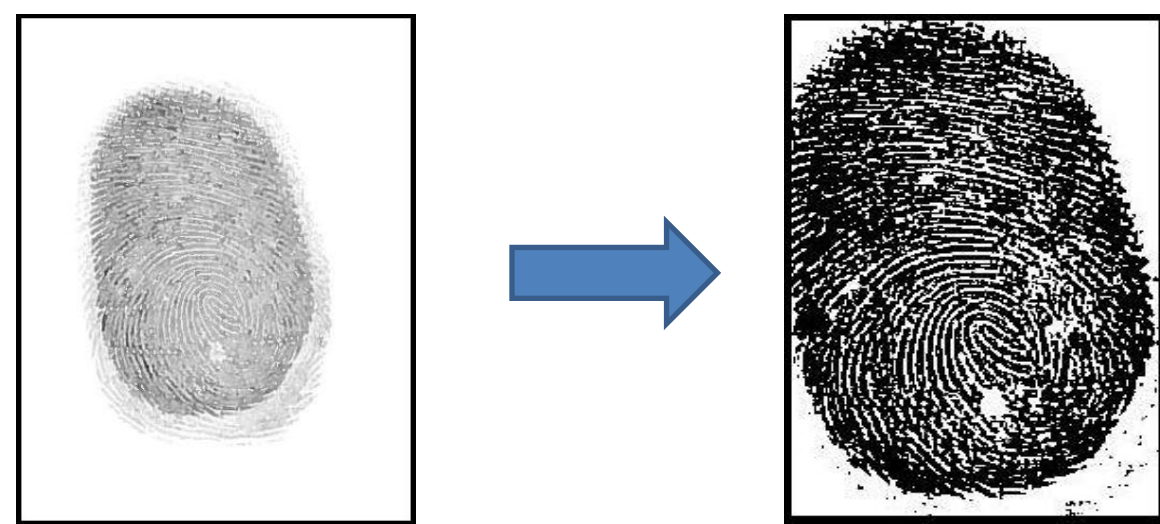
Fingerprint Identification using SVM

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Introduction

Fingerprint is the most popular biometric trait used for people identification due to its uniqueness and low cost. The task is to provide **SVM** as a non-traditional solution for **fingerprint identification** with higher accuracy and performance. Experimental results indicate that SVM is a promising approach for fingerprint identification

Data and Preprocess

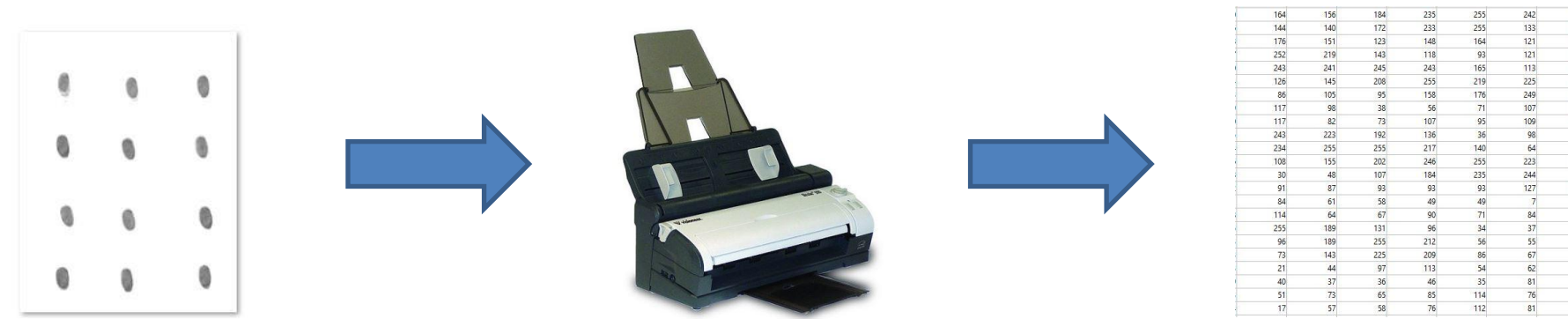


There are total 378 fingerprints collected from 5 volunteers(classes). Then extract the pixel values as raw input data. Before using raw data as feature, it's necessary to filter out these two noise from the raw data.

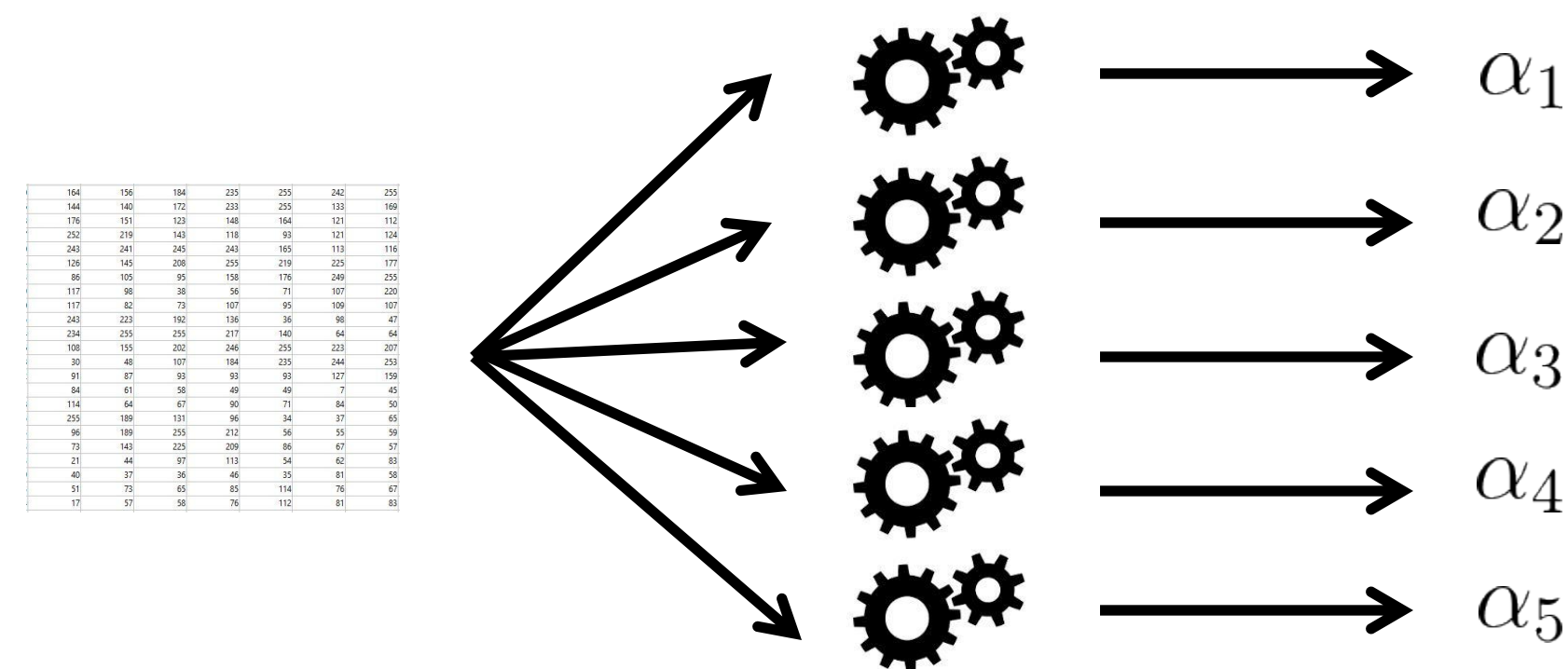
1. The **blank part** surrounding the fingerprint. Because the blank part contains no information of a fingerprint.
2. The **dark depth** of fingerprints. The dark depth of fingerprints are different because of pressure and ink.

Methodology

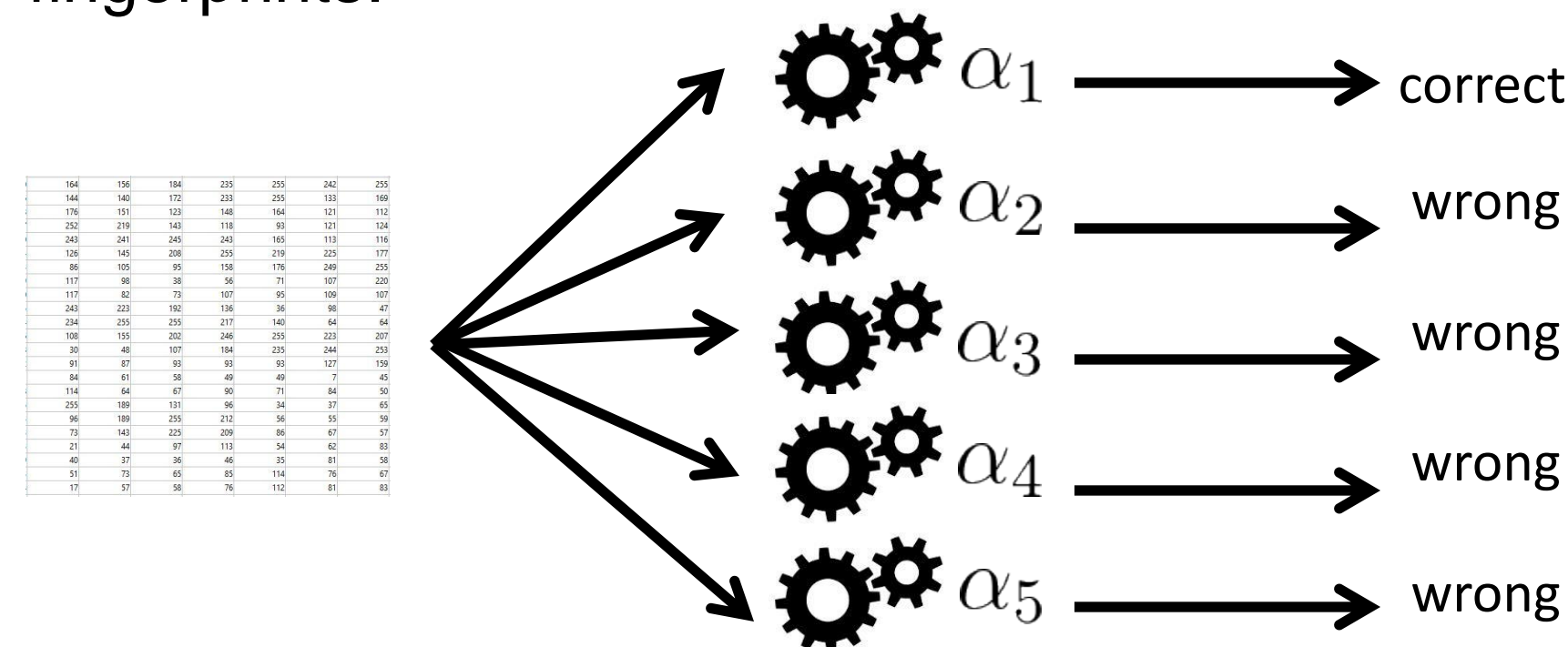
1. Scan fingerprints choosing 300 DPI and save as image. Then extract pixel values of all fingerprints.



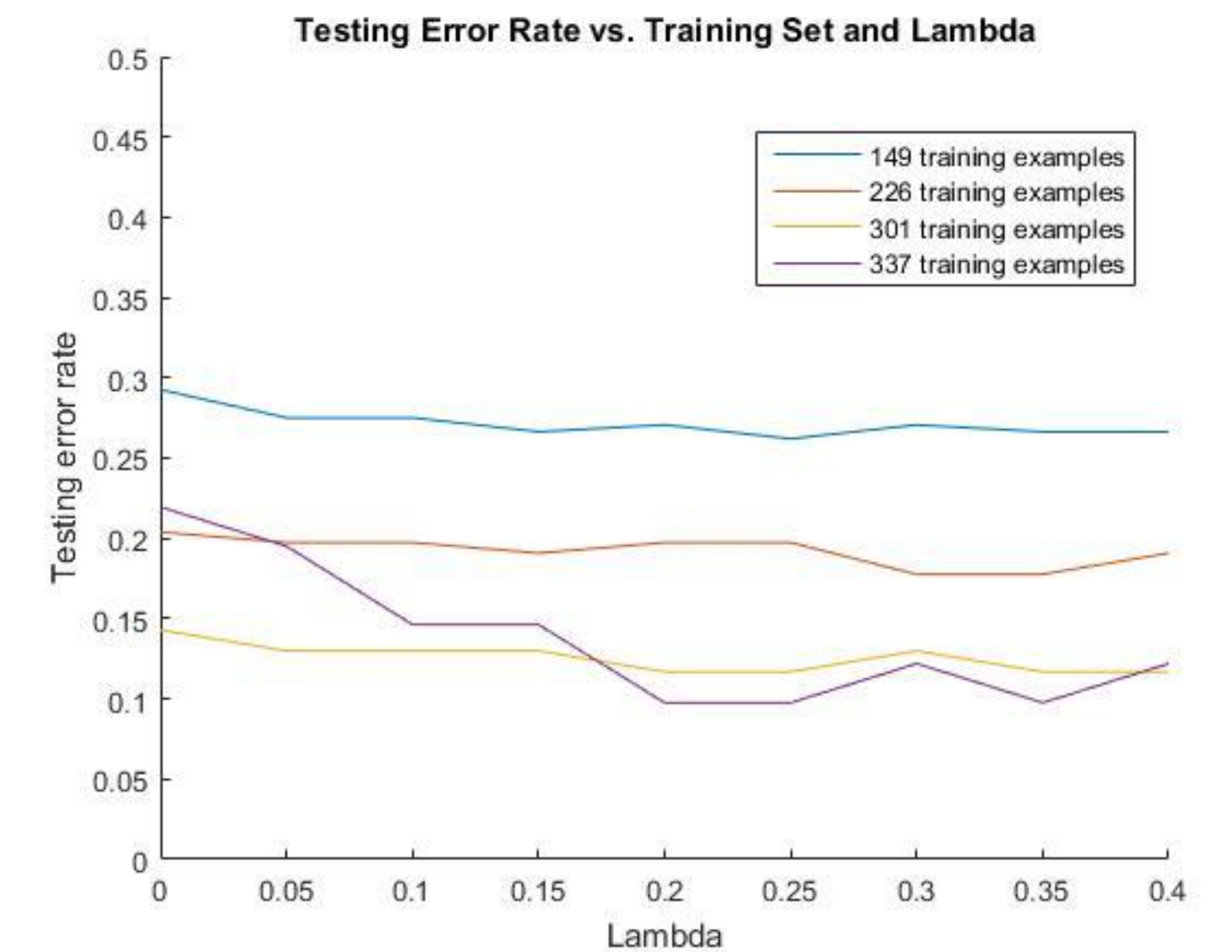
2. Normalize feature to make it fit for RBF kernel.
3. Send training examples into one vs. all SVM and train alpha for each class.



4. Run cross validation using trained alpha and classify fingerprints.



Result and Discussion



The accuracy increase when training set is growing. The highest accuracy is 90.24%. The main reason of misclassified cases is the low quality of fingerprint. The lines in the fingerprints are blurred.

Future Work

1. Try different SVM kernel for better performance. RBF is too computation intensive and impact the run time.
2. Extract central part of fingerprint as feature. It's most useful part for traditional fingerprint identification process.
3. Find decision boundary to find fingerprint of 6th class and increase the class number.