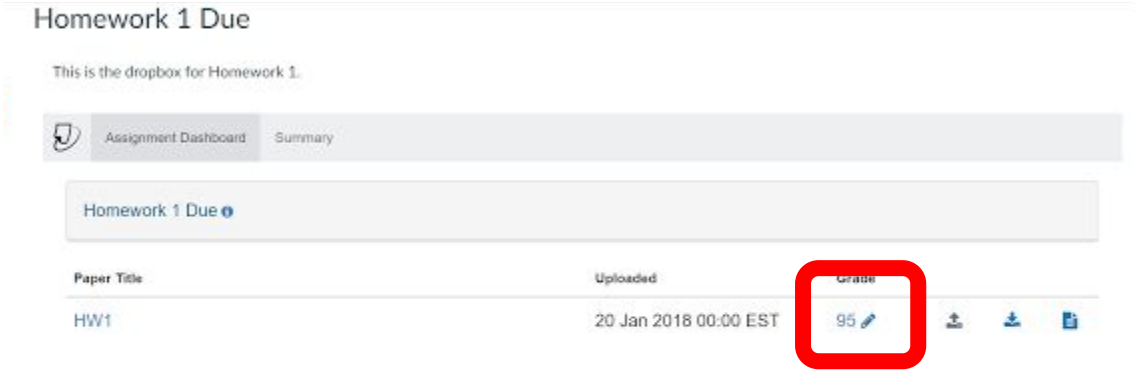
# Project 2

Supervised Classifiers

# Homework 1 Grades

- **The grades are on CANVAS**

  Look at the Grade feedback and click the blue button on the right




Grade Feedback button

Blue Button

# Administration

- **You do not have to use Latex for your project report.**

  The latex template is meant to guide you

- **Make sure to submit a pdf**

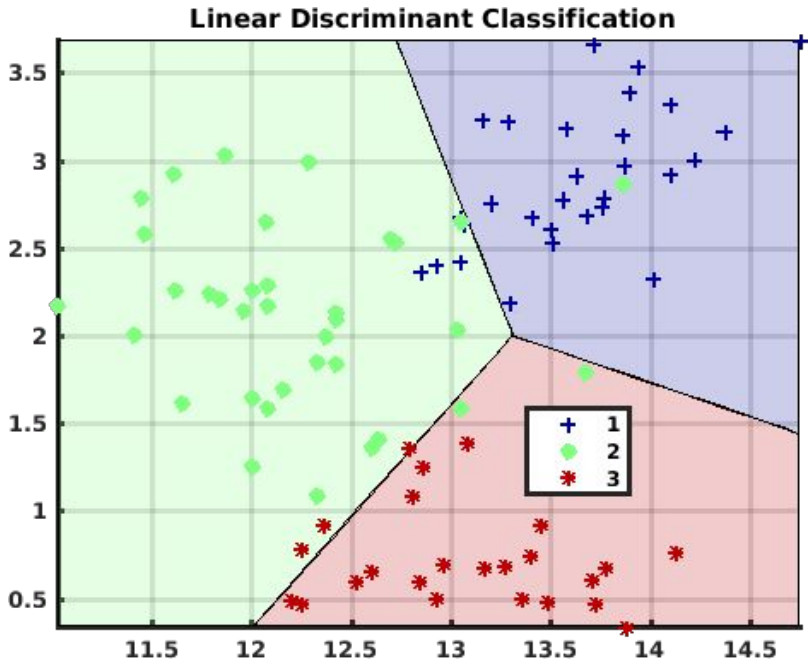
  Makes sure to submit a PDF

- **Don't use matlab in-built classifiers**

  You have to code these functions yourself

# Goals

- Learn about LDA
- Learn about Fisher Projection
  - How to classify in the projected space
- Learn how to compare two classifiers on three different datasets



# Wine Dataset

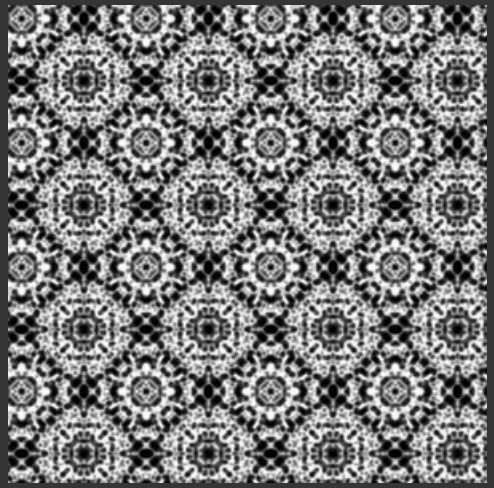
Using chemical analysis to classify three wines (cultivars) from the same region in italy.

Beat the wine experts who have been proven to not know the difference between wines

**Tip**

This dataset is smaller and easy to classify using only two features so it is a good one to use initially.

# Wallpaper Dataset



Find which of the 17 wallpaper patterns is contained in each image.

There are 1700 images (100 from each class) in the train and test datasets

Features are a bag of Surf keypoints [1]

[1] Csurka, G., C. R. Dance, L. Fan, J. Willamowski, and C. Bray. Visual Categorization with Bags of Keypoints. Workshop on Statistical Learning in Computer Vision. 2004, ECCV 1 (1–22), 1–2.

# Taiji Dataset

Find which of the 7 moves is starting from the MoCAP joint angles (in quaternions).

Dataset contains 35 sequences of 4 individuals performing 24-form Taiji.

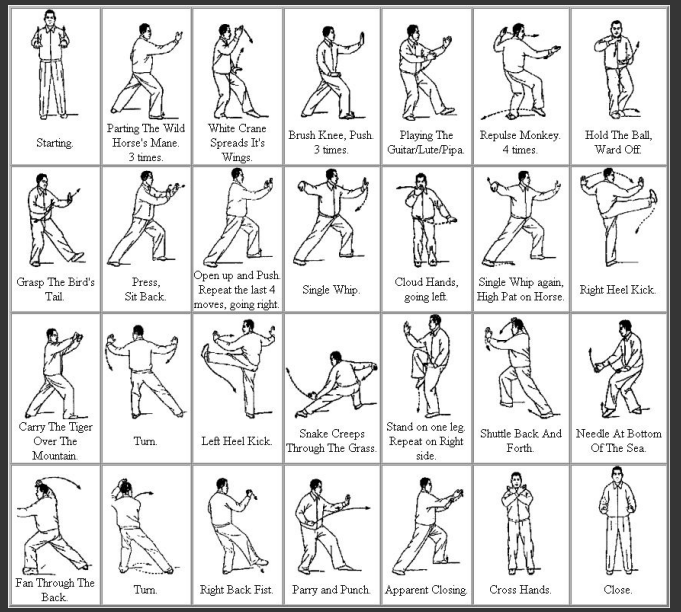
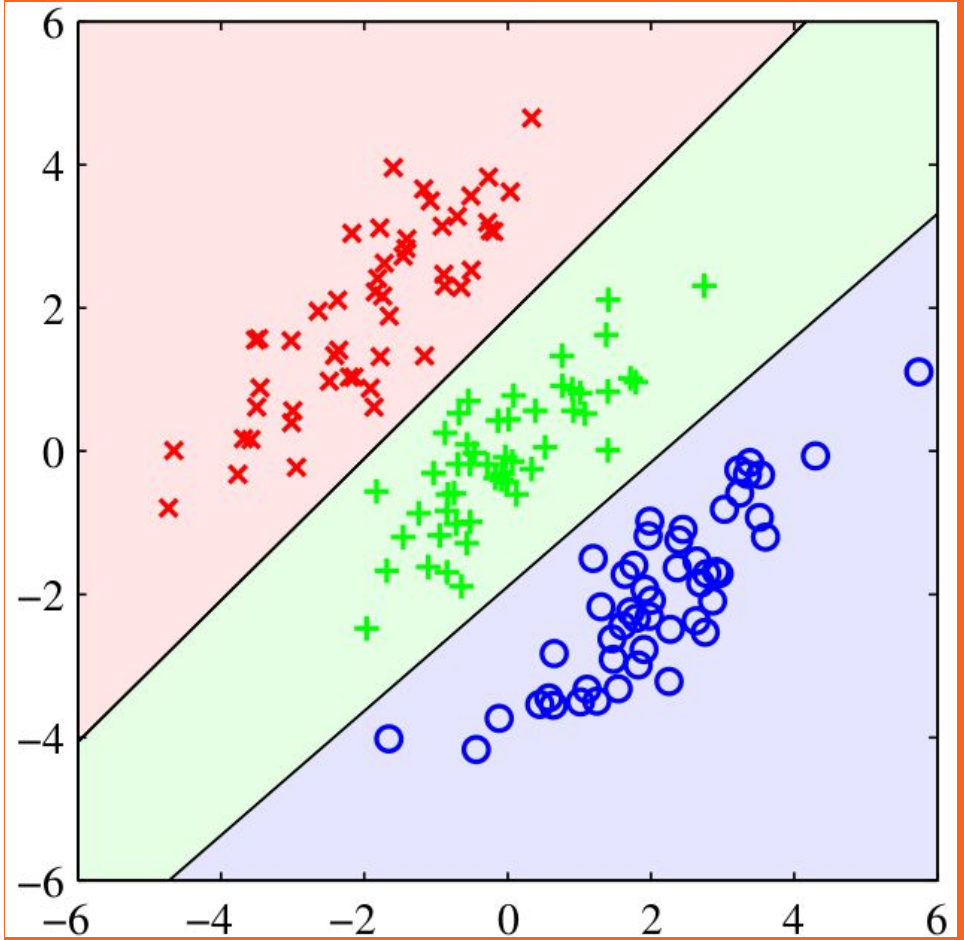



**Figure: Taiji Moves**

**All the Taiji Moves from the 24-Form. We are only use 7 of them.**

You will need to program a

# LDA Classifier

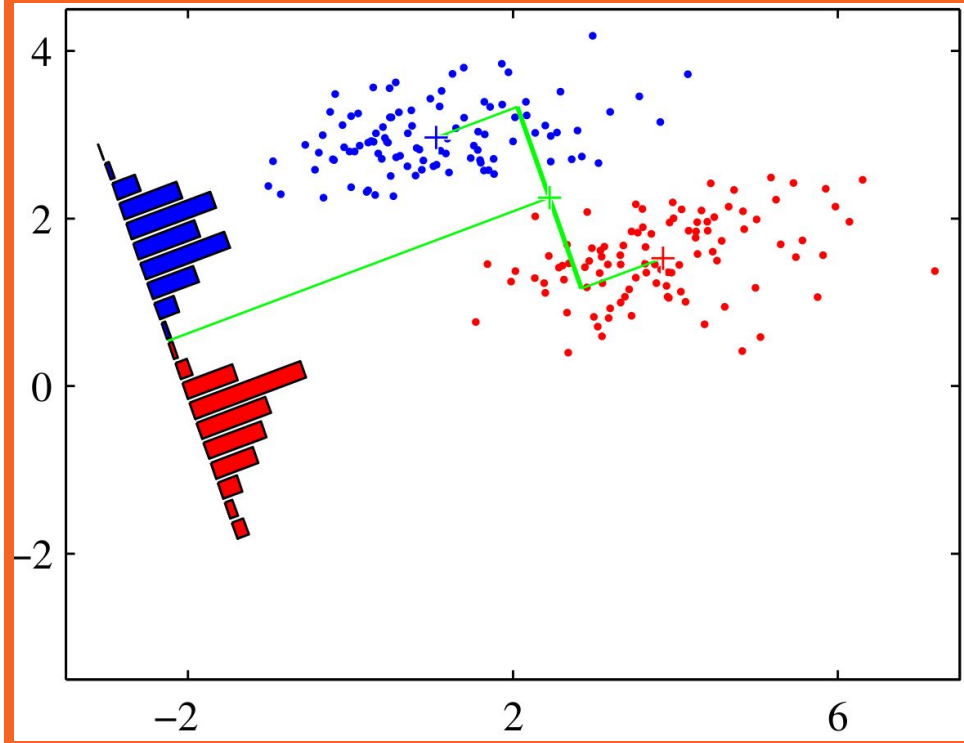


You will need to program a

# Fisher Projection

As well as a **Classifier** in the projected space.
Either:

- KNN (Bishop 2.5.2)
- Decision Theory (end of Bishop 4.1.4)



# Each Approach needs

- **Training Function**

  To take the training features and labels and return the trained classifier

- **Testing Function**

  To take the trained classifier and a set of features and return the class labels

# Report

- **Explanation and Equations**

  For both approaches

- **Analysis**

  Explanation of your results (not just figures)

  Confusion/Classification matrix

  Any Outliers in the data?

- **Extra Credit**

  Make sure to add this to the report

# Confusion/ Classification Matrix

- **What each group is classified as**

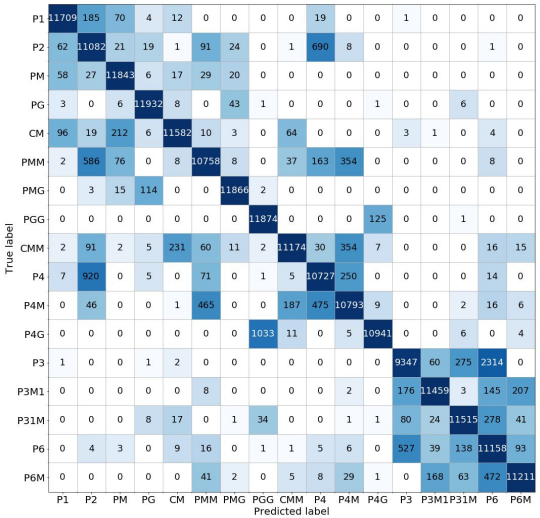



Figure: Confusion Matrix

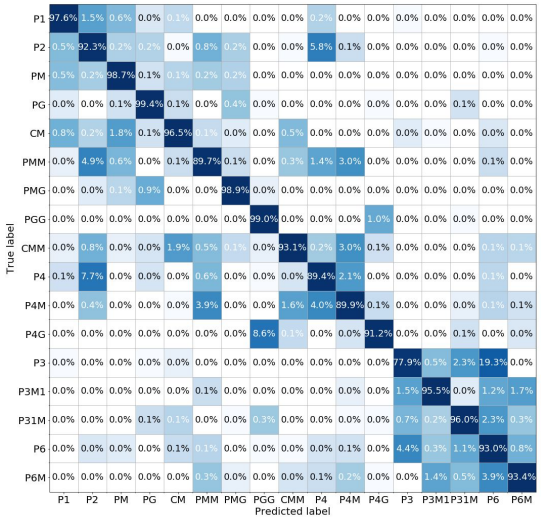



Figure: Classification Matrix