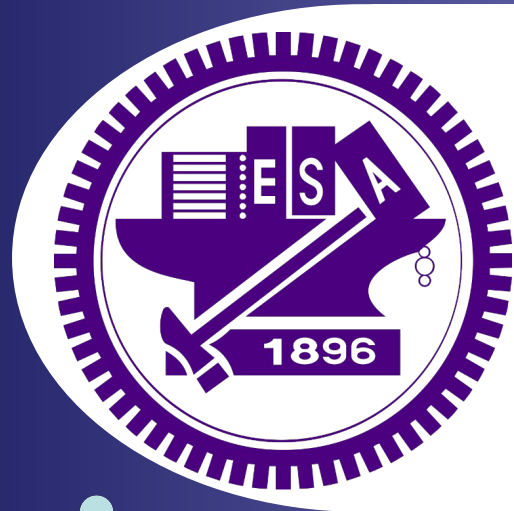


# Introduction to Pattern Recognition

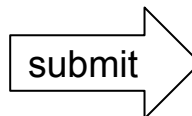
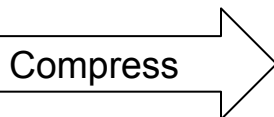
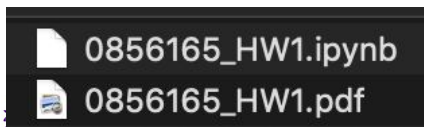
## Homework 2 announcement



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# Homework 2

- **Deadline: April. 21, Fri at 23:59.**
  1. Code assignment (60%): Implementing Fisher's linear discriminat using numpy
  2. Short answer questions (40%)
- **Submit your code (.py/.ipynb) and reports (.pdf) on E3**
  - [Sample Code](#)
  - [HW2 questions](#)
- Please follow the **file naming rules <STUDENT ID>\_HW2.pdf**, otherwise, you will get penalty of your scores



**E3**



# Coding

- Write beautiful Python codes with [PEP8 guidelines](#) for readability. Basic requirement: use whitespace correctly!
- [PEP8 online checker](#)

Python

# Recommended

```
def function(default_parameter=5):  
    # ...
```

# Not recommended

```
def function(default_parameter = 5):  
    # ...
```

## PEP8 online

Check your code for PEP8 requirements

Just paste your code here

1

Check code



# Reports

- Submit in PDF format
- Please include the answers of coding part
- See the sample submission file on E3

---

NCTU Pattern Recognition, Homework 1| Example

## **Part. 1, Coding (60%):**

Q1: Your answer...

Q2: Your answer....

Q3: Your answer....

Q4: Your answer....

Q5: Your answer....

## **Part. 2, Questions (40%):**

Q1: Your answer...

Q2: Your answer...

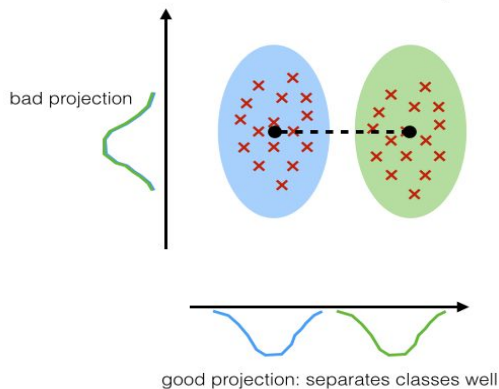


# Fisher's linear discriminant

- FLD seeks the projection  $\mathbf{w}$  that gives a **large distance between the projected data means** while giving a **small variance within each class**

## LDA:

maximizing the component axes for class-separation



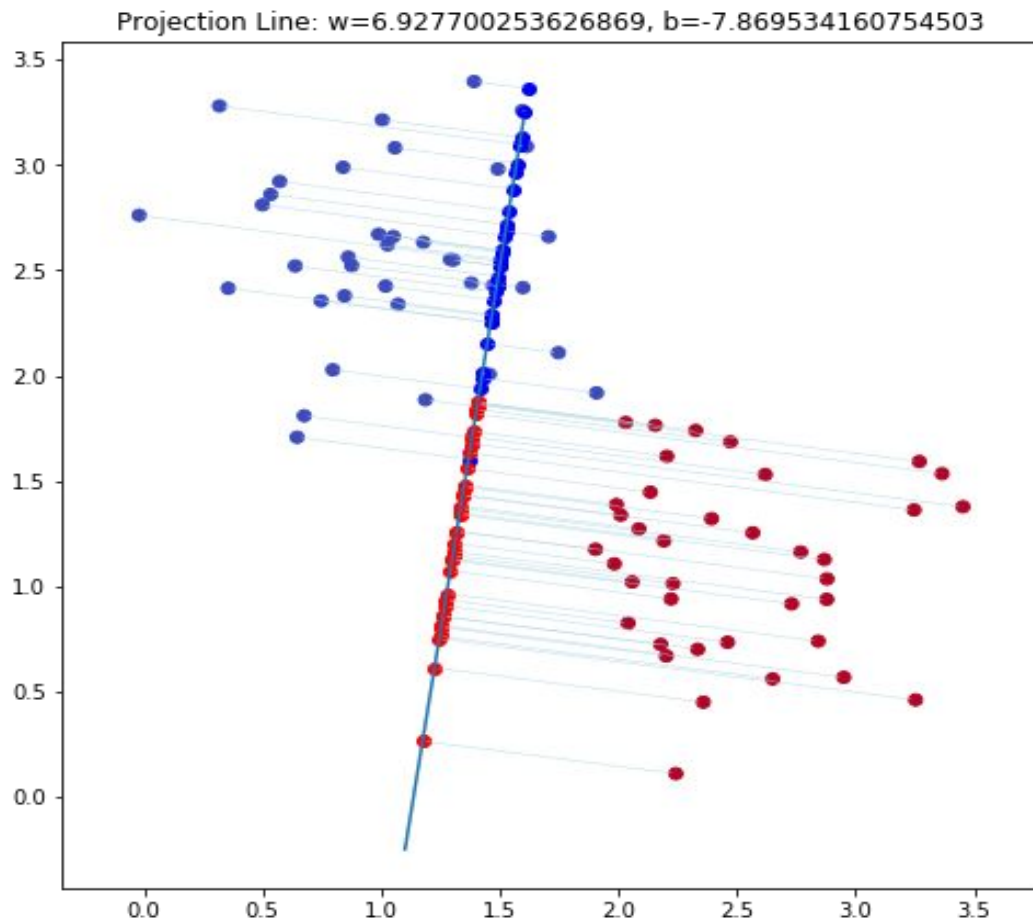
$$J(\mathbf{W}) = \frac{(m_2 - m_1)^2}{s_1^2 + s_2^2}$$

Between-class variance

Within-class variance

# Question 6

1. Projection line
2. Colorize the data points
3. Project the data points onto projection line



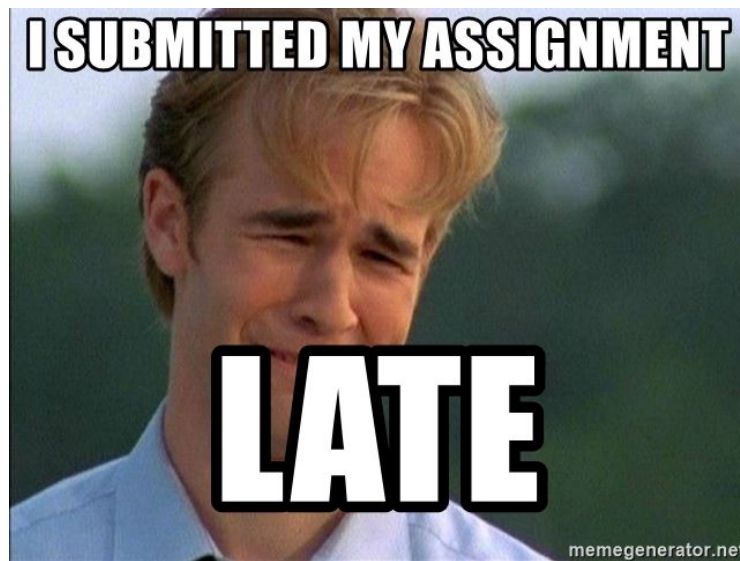
# Supplementary materials

- [An illustrative introduction to Fisher's Linear Discriminant](#)



# Late Policy

- We will deduct a late penalty of 20 points per additional late day
- For example, If you get 90 points of HW1 but delay for two days, your will get only  $90 - (20 \times 2) = 50$  points!





# Notice

- Submit your homework on [E3-system](#) !
- Check your email regularly, we will mail you if there are any updates or problems of the homework
- If you have any questions or comments for the homework, please mail me and cc Prof. Lin
  - Prof. Lin, [lin@cs.nctu.edu.tw](mailto:lin@cs.nctu.edu.tw)
  - TA Jimmy, [d08922002@csie.ntu.edu.tw](mailto:d08922002@csie.ntu.edu.tw)
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  - TA 玉霖, [oscar861201@gmail.com](mailto:oscar861201@gmail.com)



# Have fun!

Lady tasting tea



國立交通大學  
National Chiao Tung University