



Introduction to Machine Learning

Homework 2 announcement

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Homework 2

- **Deadline: Nov. 1, Tue at 23:59.**
 1. Code assignment (60%): Implement Fisher's linear discriminant using **numpy only**
 2. Short answer questions (40%)
 - **Submit your code (.py/.ipynb) and reports (.pdf) on E3**
- Please follow the file naming rules <STUDENT ID>_HW2.pdf, otherwise, you will get penalty of your scores



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National Central University

0856165_HW1.ipynb
0856165_HW1.pdf

Compress



0856165_HW1.zip

submit

E3

Reports

- Submit in **PDF** format
- Please include the answers of coding part

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...

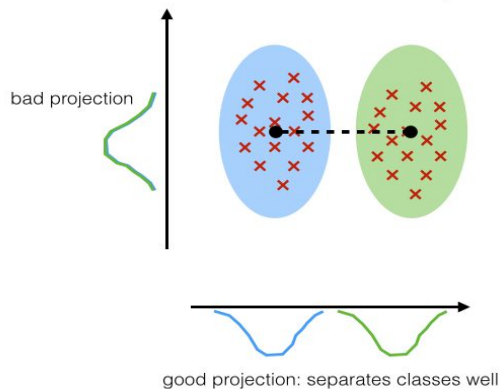


Fisher's linear discriminant

- 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



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

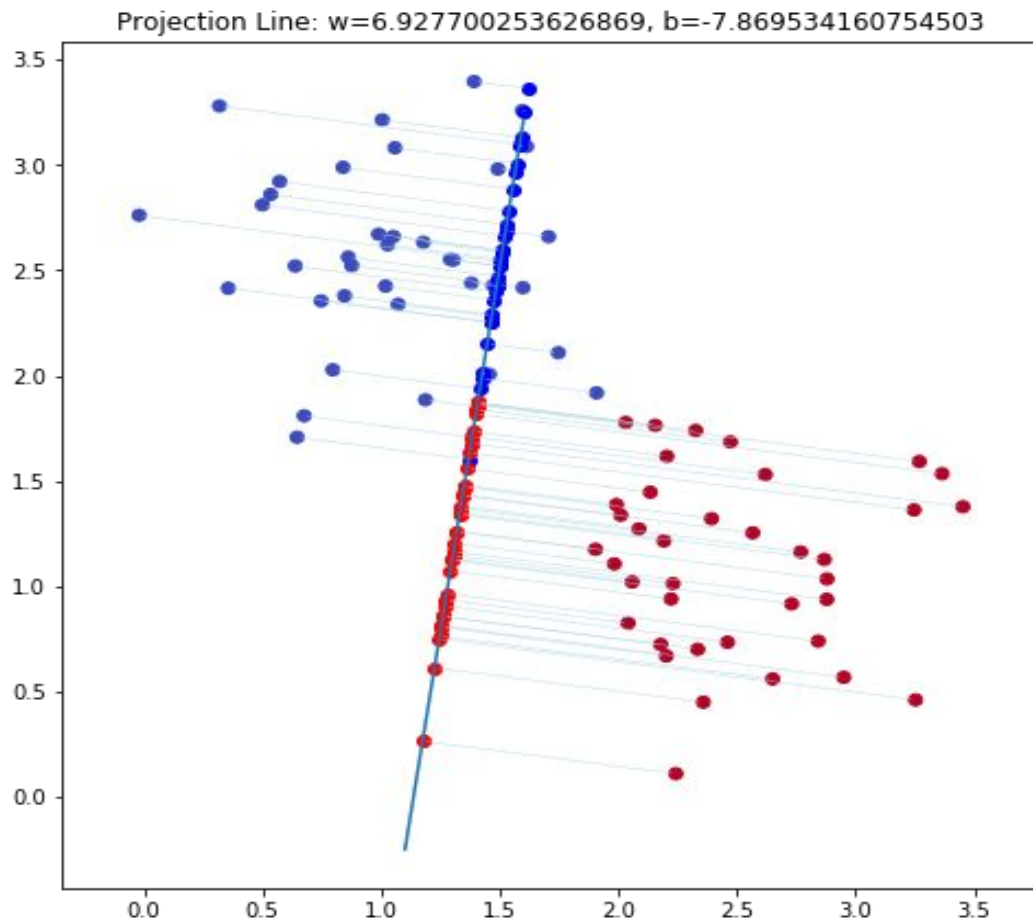
Between-class variance

Within-class variance



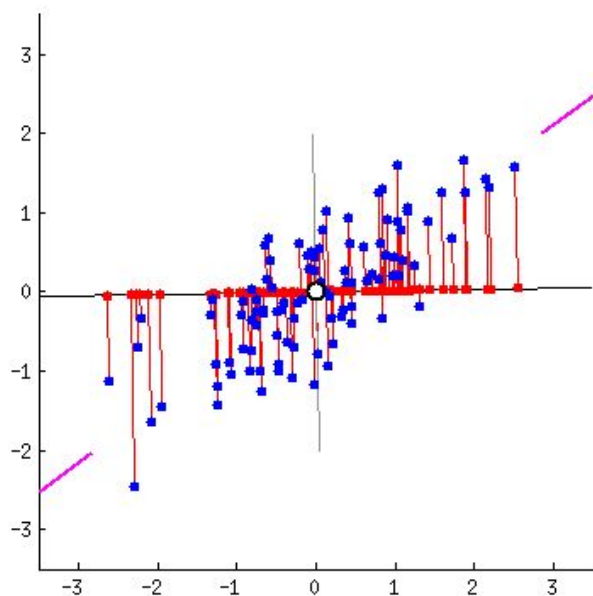
Question 6

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



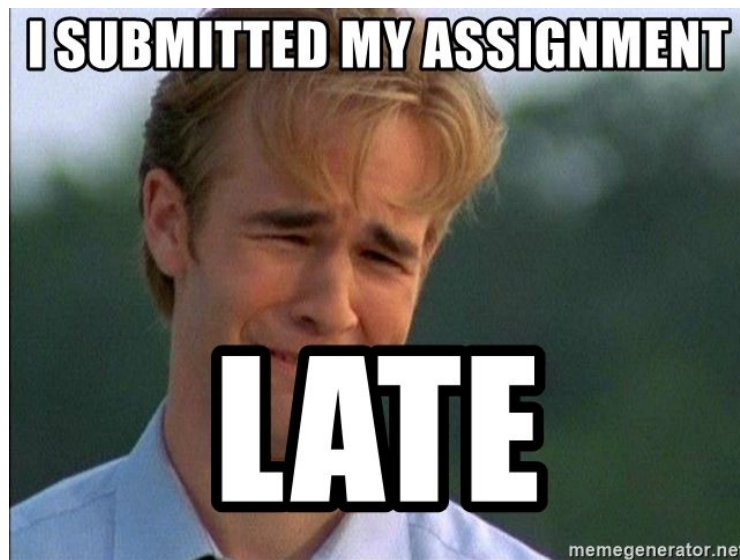
Supplementary materials

- 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 HW2 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
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Have fun!

Lady tasting tea



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