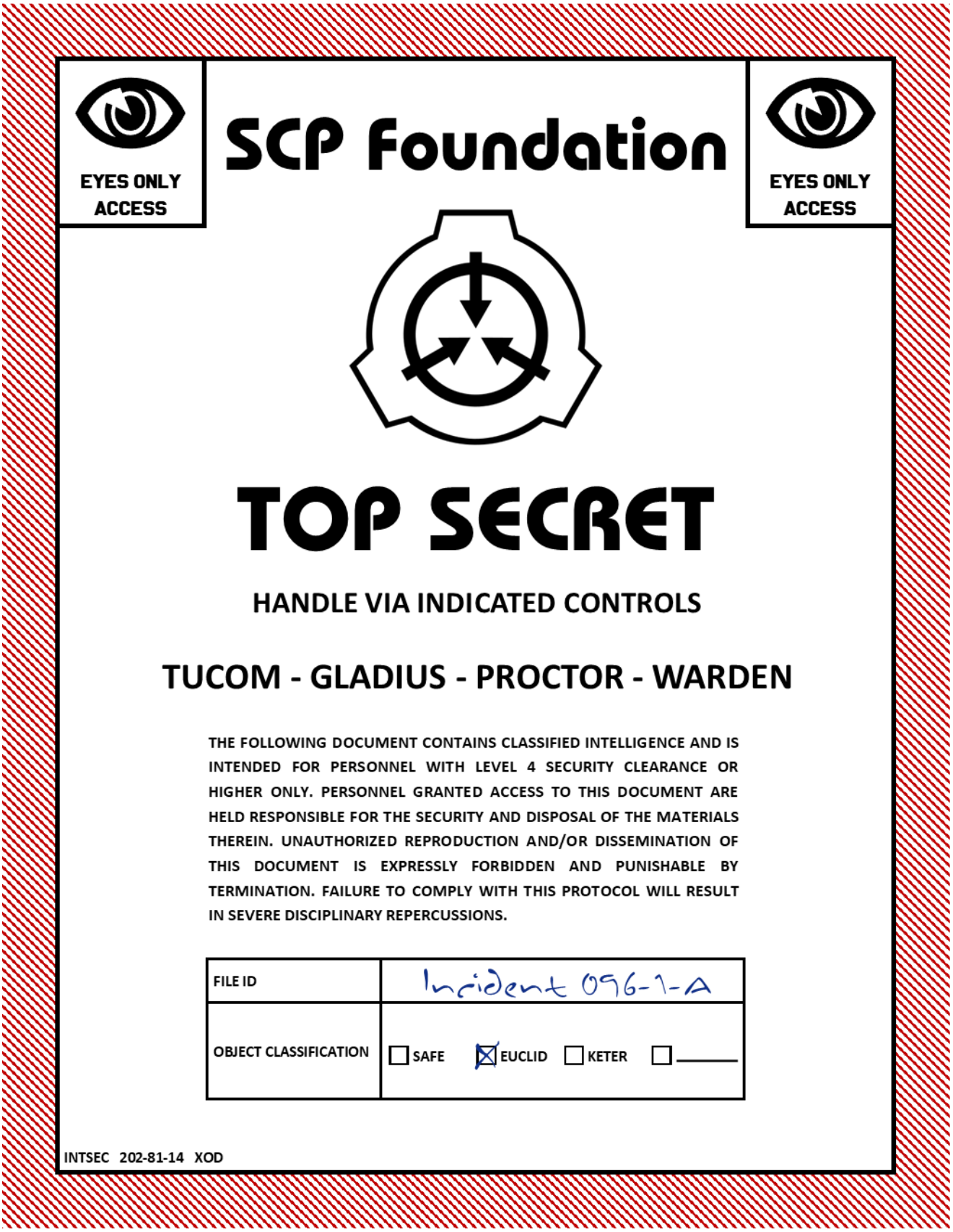
ML1_Gedächtnisprotokoll_08_3_2025



Of course the following content may contain errors. If you find any, please contact me :) Sorry for the mistakes in advance

1. Multiple Choice questions

- Activation Maximization aims to
  - find the input that maximally activates a specific neurons
  - find the neurons that maximally activates a specific input

2.Maximum likelihood and Bayes

very similar to exercise and altklausur in freitagsrund

3.Classification

a. Draw decision boundary and the weight vector w of NCC

Given a 2D classification problem with two classes, C_1 and C_2. The mean of these two classes are given. Using the **Nearest Centroid Classifier (NCC)**, find the decision boundary and the weight vector w that separates the two classes.

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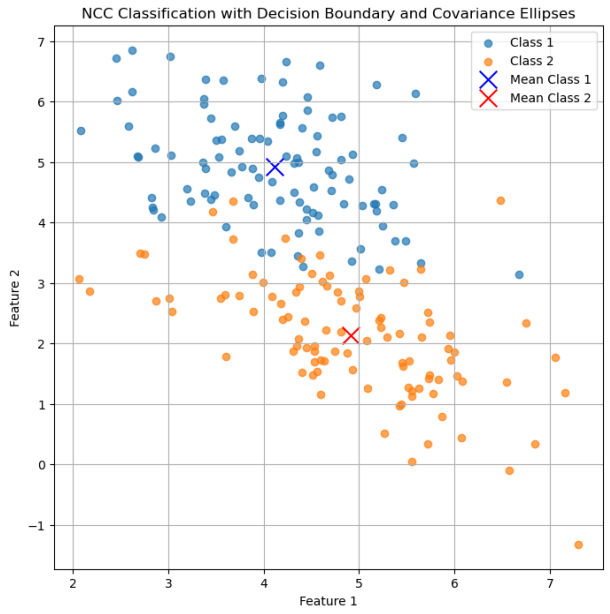
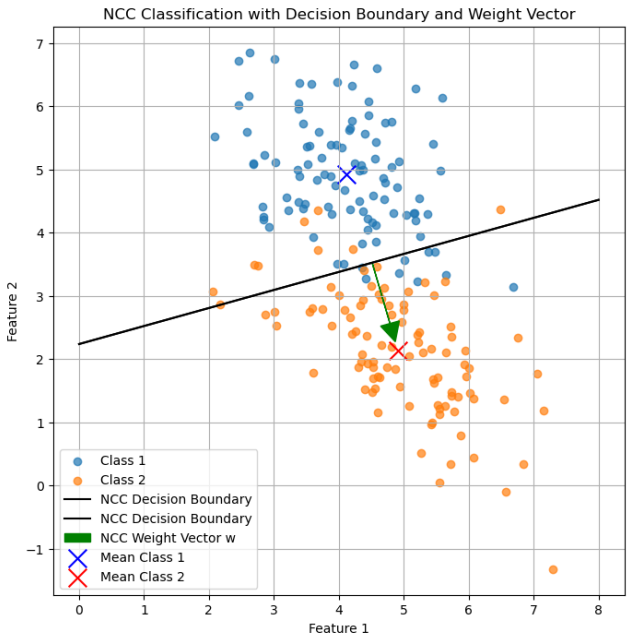
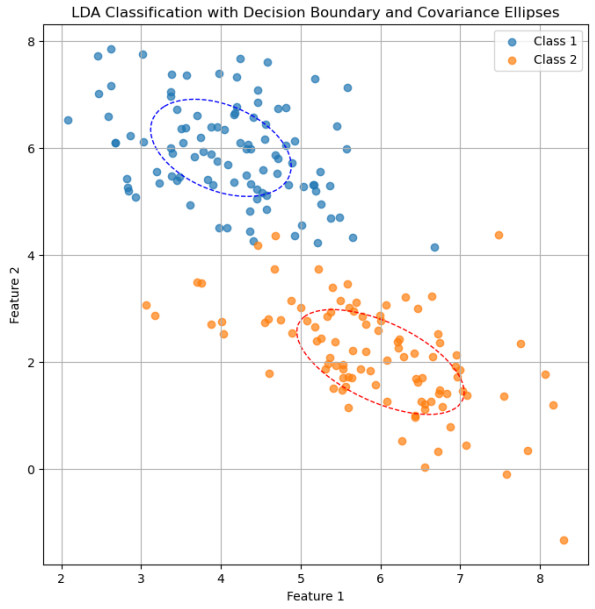
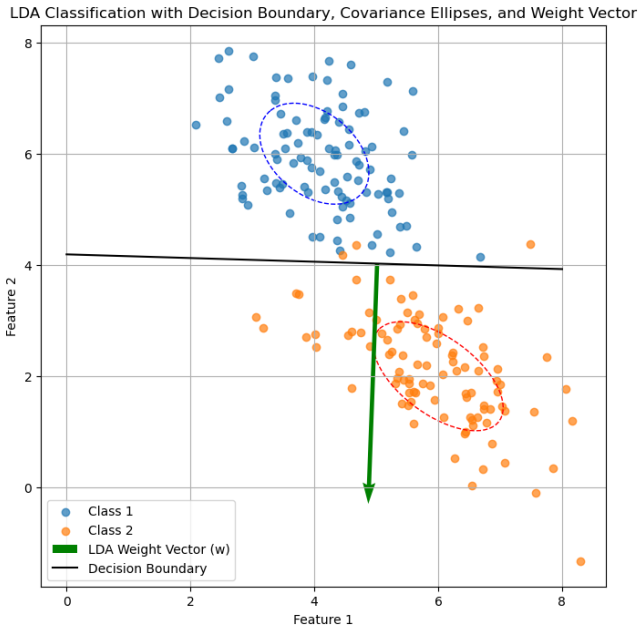


solution:



b. Draw decision boundary and the weight vector w of LDA

Given a 2D classification problem with two classes, C_1 and C_2. The covariance ellipse of these two classes are given. Using the LDA to find the decision boundary and the weight vector w that separates the two classes.

#####	##### solution:
	

c. Explain the objective of fisher discriminant

d. ??????

e,f,g

I can't recall the exact form, but basically, it's a problem that combines Maximum Likelihood / Bayes Estimation and LDA. First, we calculate the likelihood, then derive the maximum likelihood solution with respect to m, and finally we visualize the decision boundary and the weight vector $\mathbf{w}$.

4.SVM

Given an objective function with constraints:

a. Derive the closed form expression of the dual problem.

b. State the KKT conditions for the given objective.

c. Explain the relationship between the primal and dual problems.

d.(??????)

5.progeamming

Given a objective Function $J(w)$

a)

- rewrite J(w) in matrix Form
- implement the code of J

b)

- write gradient of J
- implement code of gradient descent