Politecnico di Milano
Scuola di Ingegneria Industriale e dell'Informazione
Applied Statistics
July 6th, 2021

Problem n.2

The file `orthopaedics.txt` reports biomedical data of 150 orthopaedic patients (70 normal and 80 abnormal). The data consist of measurements of the pelvic incidence and the pelvic tilt angles for each patient (measured in degrees). Knowing that, on the average, 35% of orthopaedic patients are abnormal, answer the following questions.

a) Build a classifier for the patients based on their biomedical data. Report the model for the data, the estimates of its parameters (means and covariances), the priors within the groups and verify the model assumptions. Report a plot of the classification regions.

b) Estimate the AER of the classifier through leave-one-out cross-validation.

c) Using the classifier built at point (a), how would you classify a new patient with pelvic incidence equal to 60 [deg] and the pelvic tilt equal to 0 [deg]?

d) Use a support vector machine with linear kernel to classify patients. Set the cost parameter to the value 0.1. Report a plot of the classification regions. Comment on the result. How would you classify the patient at point c) with this classifier?

Upload your results here:
`https://forms.office.com/Pages/ResponsePage.aspx?id=K3EXCvNtXUKAjjCd8ope612LHtvIHvFEsEi2L6mhPglUQTAxNTlPVElHWFMwODQ1RTk0VktKU0ZRNi4u`