

Tallinn University of Technology

DEPARTMENT OF COMPUTER SCIENCE

SPRING SEMESTER 2014 - SAMPLE EXAM PAPER

Machine Learning

ITI8565

Time allowed ONE and a HALF (1.5) Hours

Answer ALL THREE questions

No calculators, mobile phones or other electronic devices capable of storing or retrieving text may be used.

ONE A4 page of handwritten notes is permitted.

DO NOT open the examination paper until instructed to do so

Question 1: True or False

Please circle **T** if the following statement is true and **F** if the statement is false.

- a. **(T) (F)** In the case of K nearest neighbour classification when the K is too large then the model tends to overfit. (1 point)
- b. **(T) (F)** Principal Component Analysis (PCA) is a method for reducing the dimensionality of data. (1 point)

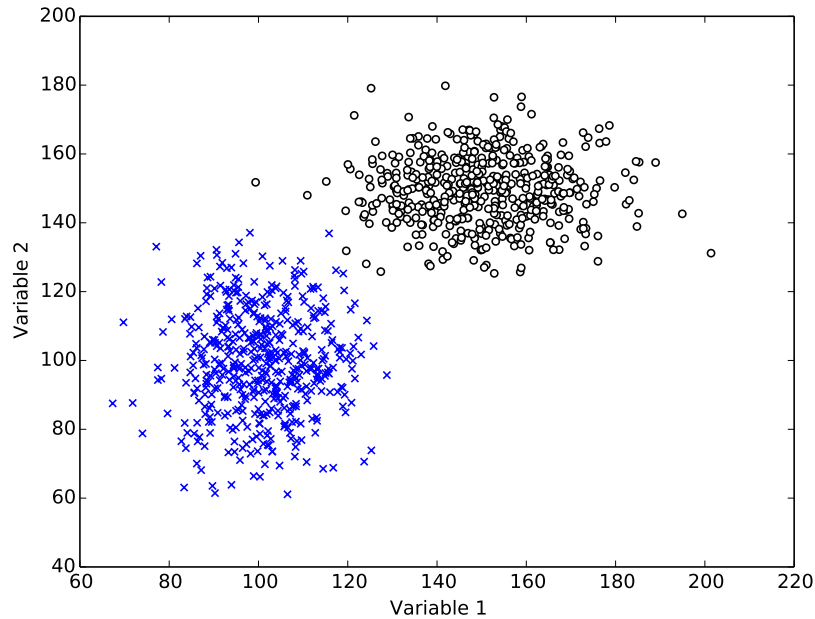


Figure 1: Data

Question 2: Support Vector Machines

- Can the classification task shown in Figure 1 be solved with hard or soft SVM?
- What is the optimization objective of an SVM classifier?
- Mark on Figure 1 a margin, its support vectors and slack variables (if applicable).
- Can this dataset be made linearly separable with the linear kernel? Why?
- How to use SVM for a multiclass classification task?
- What is the main difference between logistic regression and SVM classifiers?