Case 1

Damage detection of the Valdemar platform model

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```
>    # use package knitr and read in used R code,
>    # which is in the file case1.R for better overview
>    require(knitr)
>    read_chunk("case1.R")
>    load("Case1.RData")
>    # preload other packages
>    require(data.table)
```

Please upload a file `yhat.txt` containing predictions $\{0, 1, 2, 3\}$ as one long vector with newline separating the observations. The corresponding order is that given in the Cas1_tst (Xt), and a small report with a brief introduction/abstract, pre-processing, modeling and model assessment, plus your evaluation of the actual dimensions needed to describe the data/problem.

Please note that the deadline is mid-day.

1 Introduction

There are three sensors on an offshore platform, that record data for detecting damage to the platform. Damage can occur at three different sites (see table 1.1) and for three different intensities $(5\%, 10\%, 15\%)$. The recorded data is given in the form of Frequency Response Functions (FRFs).

Class	Description
0	undamaged
1	damage in the bottom of the shaft
2	damage in one of the legs
3	damage in the top of the shaft

Table 1.1: Damage classes.

In this case, 4092 samples of the three FRFs are given, together with their respective damage classes. The goal is to form a model to predict damage and damage class.
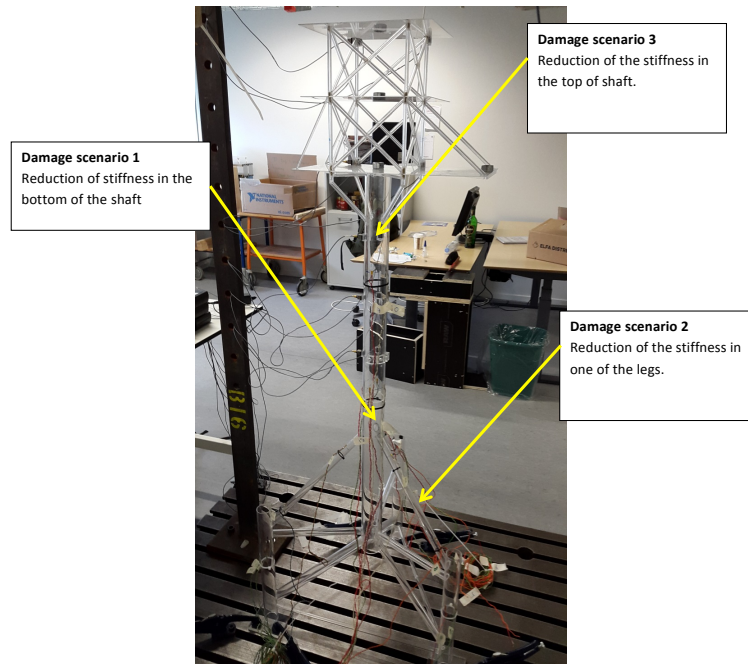
2 Pre-processing

2.1 PLS

3 Modeling

3.1 Cross validation & Majority Vote

3.2 KNN

3.3 Logistic regression

3.4 SVM

3.5 CART

4 Dimensions

test

Appendices