# Project3

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```
## Warning: package 'quadprog' was built under R version 3.1.2
```

### Project 3

## Problem 1

This problem is to get some codes to perform the support vector data description (SVDD)

```
##Load Data Wang's Path
setwd("E:/Cloud Storage/Dropbox/Life long study/Ph.D/Lecture/2014 Fall/Statistical Computing/Project 2/I
##Load Data Your Path

train<-read.table("training dataset.txt")
```

a. Write an $R$ function to perform the SVDD.

b. Write an $R$ function to perform the prediction of a new observation using SVDD.

c. Write an $R$ function for detecting potential outliers for a new set of oservations, along with the upper threshold.

## Problem 2

The goal of problem 2 is to perform the support vector data description (SVDD) using the Mahalanobis kernel function. We will simplify the problem by using the identity function for g.

(a) Write an $R$ function to compute the Mahalanobis kernel distance $\boldsymbol{d_g(x)}$

(b) Write an $R$ function to perform the Mahalanobis kernel SVDD.

(c) Write an $R$ function to perform the prediction of a new observation using the Mahalanobis kernel SVDD.

(d) Write an $R$ function for detecting potential outliers for a new set of oservations, along with the upper threshold.

### Appendix with R code

```
# Clear working environment
rm(list=ls())

## Load Package
library(quadprog)
```

```
##Load Data Wang's Path
setwd("E:/Cloud Storage/Dropbox/Life long study/Ph.D/Lecture/2014 Fall/Statistical Computing/Project 2/
##Load Data Your Path

train<-read.table("training dataset.txt")
```