Practical 4

Neural networks

Exercises

- The following code allows to hand-code a neural network by choosing weights

```
library(nnet)
# bias,x1,x2 -> first hidden, then second hidden; bias,h1,h2 -> output
W <- c(-3,10,0,-3,0,10,-2,2,2)
nn <- nnet(matrix(c(0,0),nrow=1, ncol=2), matrix(c(0), nrow=1, ncol=1), size = 2, maxit = 1)
# the following line hand-sets the weights
# nnet can be trained automatically by providing real data above and removing the following line
nn$wts <- W

x <- (0:20) * 0.05
y <- x
xy <- expand.grid(x, y)
z <- predict(nn, xy)
z <- matrix(z,nrow=21,ncol=21,byrow=TRUE)
contour(x,y,z)
```

- Run the code and try to understand the neuron's output
- Choose the weights differently so that the neural network implements a XOR function of the inputs
- Inspect loadMNIST.R script uploaded on Moodle