

Introduction to Machine Learning

Lab 1 Block 2

Rasmus Holm

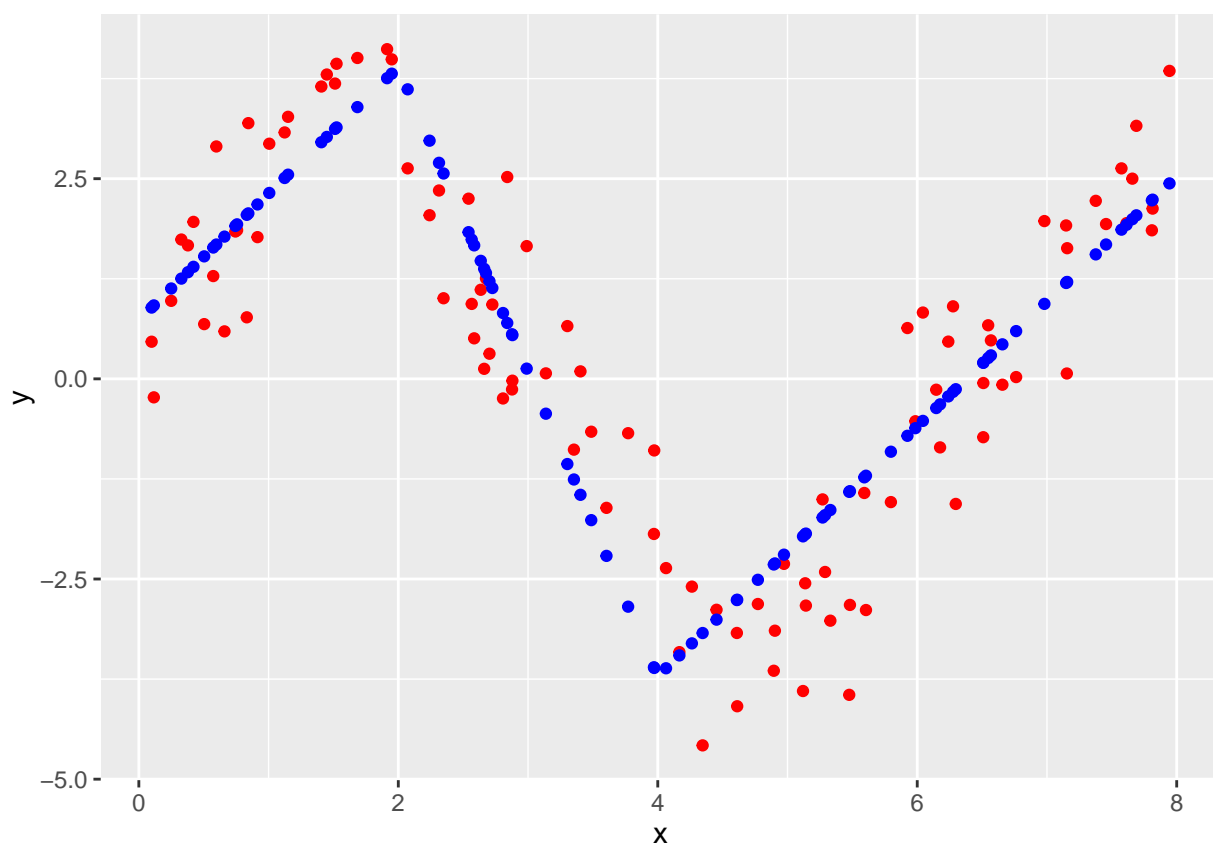
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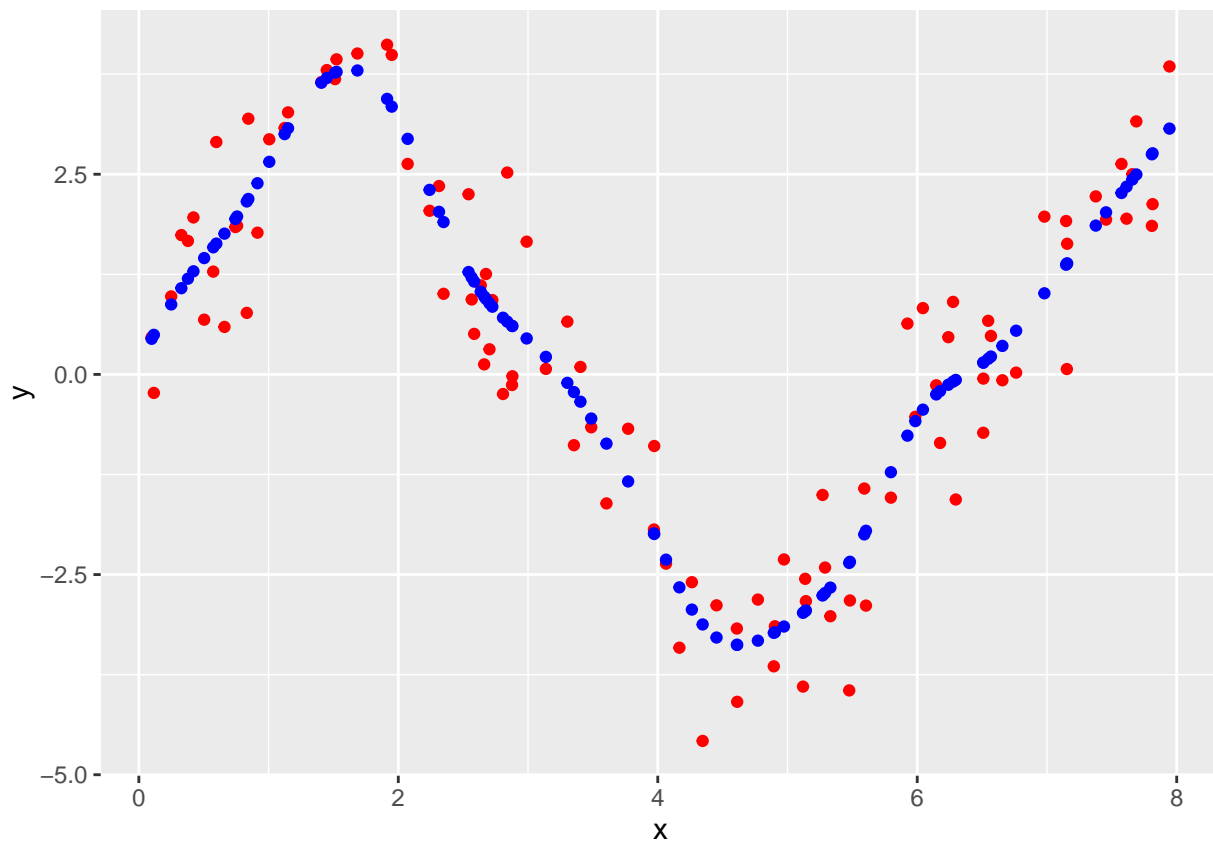
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Assignment 1

2





Assignment 2

Appendix

Code for Assignment 1

```
library(ggplot2)

myspline <- function(X, y, knots) {
  n <- length(X)
  m <- length(knots)
  df <- m + 2

  H <- matrix(0, nrow=n, ncol=df)
  H[, 1] <- 1
  H[, 2] <- X

  for (i in 3:df) {
    H[, i] <- pmax(X - knots[i - 2], 0)
  }

  data <- data.frame(y=y, H)
  ## Removes the intercept term (have it already)
  lmfit <- lm(y ~ 0 + ., data=data)
  coefficients <- as.numeric(coef(lmfit))
  yhat <- H %%% coefficients

  yhat
}

data <- read.csv2("../data/cube.csv", header=TRUE, sep=";")
knots <- c(2, 4)
yhat <- myspline(data$x, data$y, knots)

plot_data <- data.frame(x=data$x, y=data$y, yhat=yhat)

ggplot(plot_data) +
  geom_point(aes(x, y), color="red") +
  geom_point(aes(x, yhat), color="blue")
smooth_fit <- smooth.spline(x=data$x, y=data$y)
yhat <- fitted(smooth_fit)

## plot(smooth_fit, col="blue")
## points(data$x, data$y, col="red")

plot_data <- data.frame(x=data$x, y=data$y, yhat=yhat)

ggplot(plot_data) +
  geom_point(aes(x, y), color="red") +
  geom_point(aes(x, yhat), color="blue")
```

Code for Assignment 2