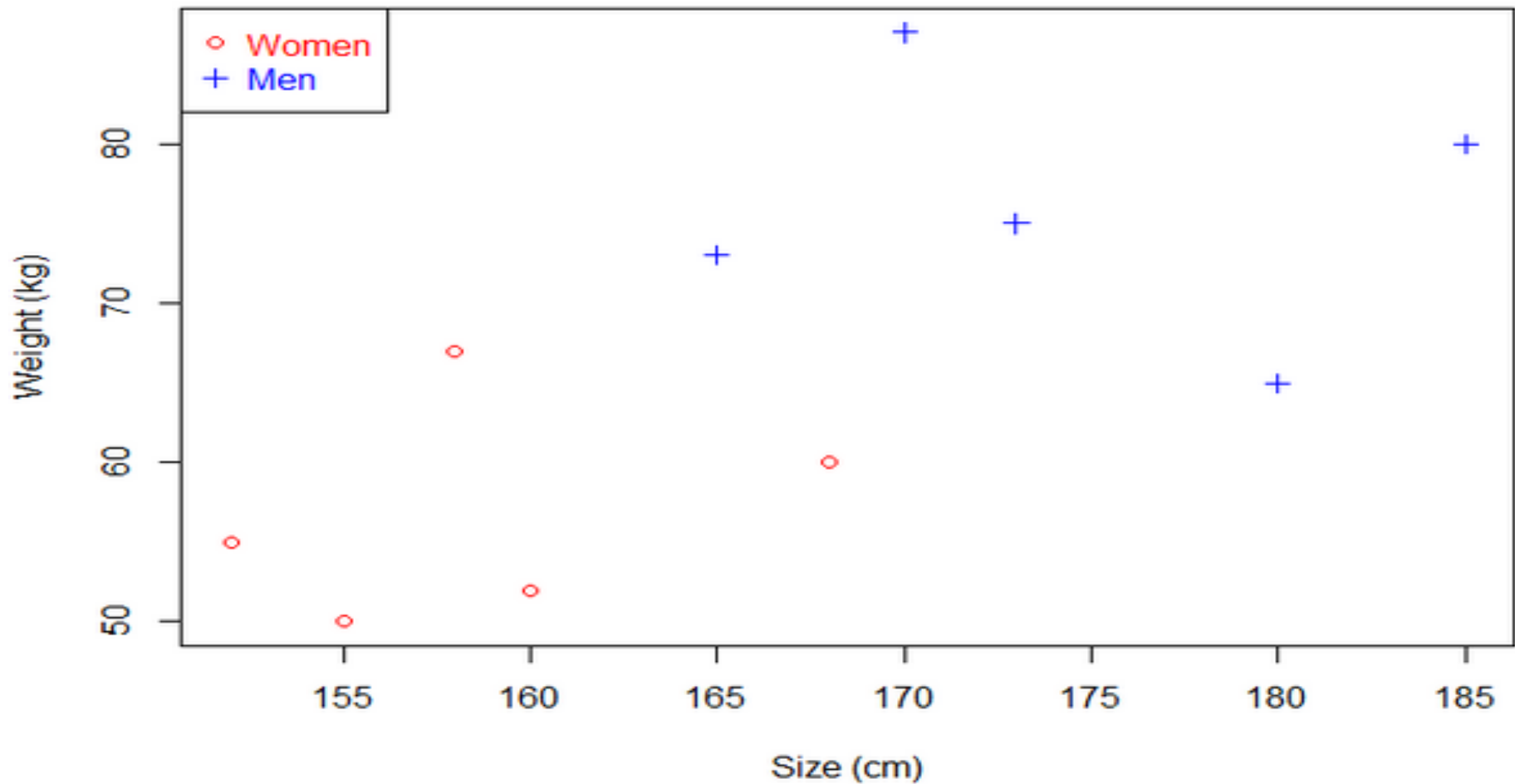
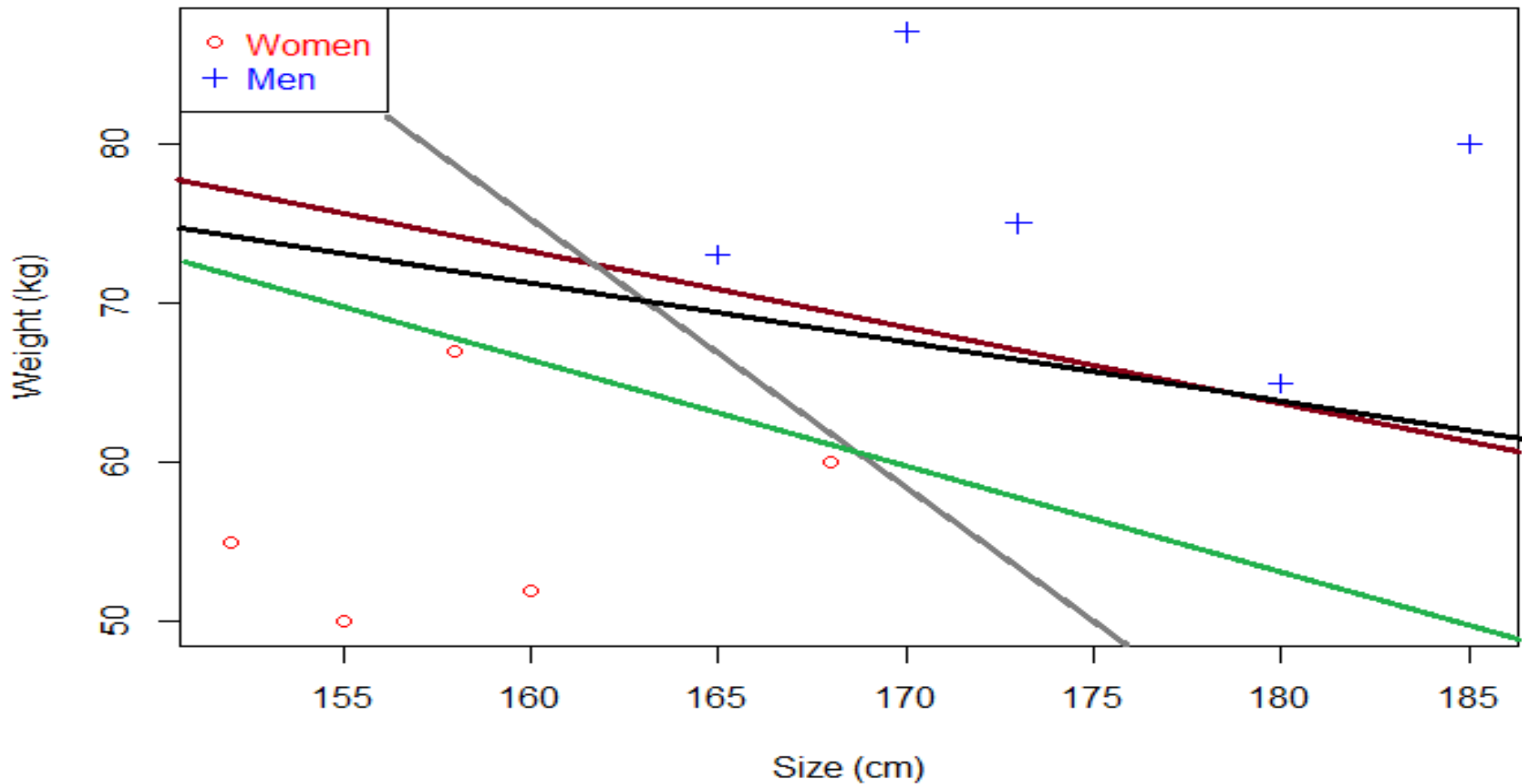


Support Vector Machine

An Example

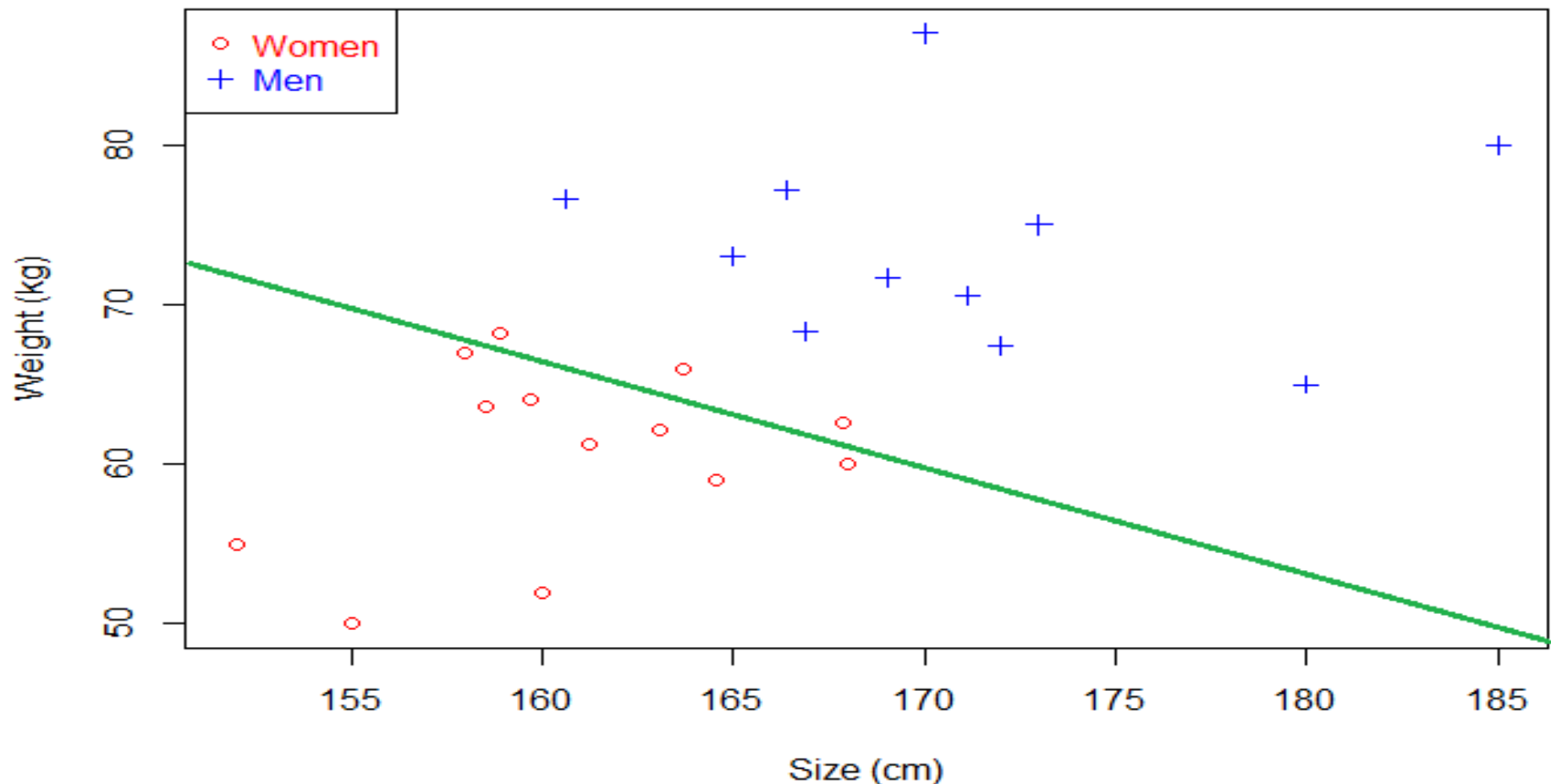


Separating Hyperplanes



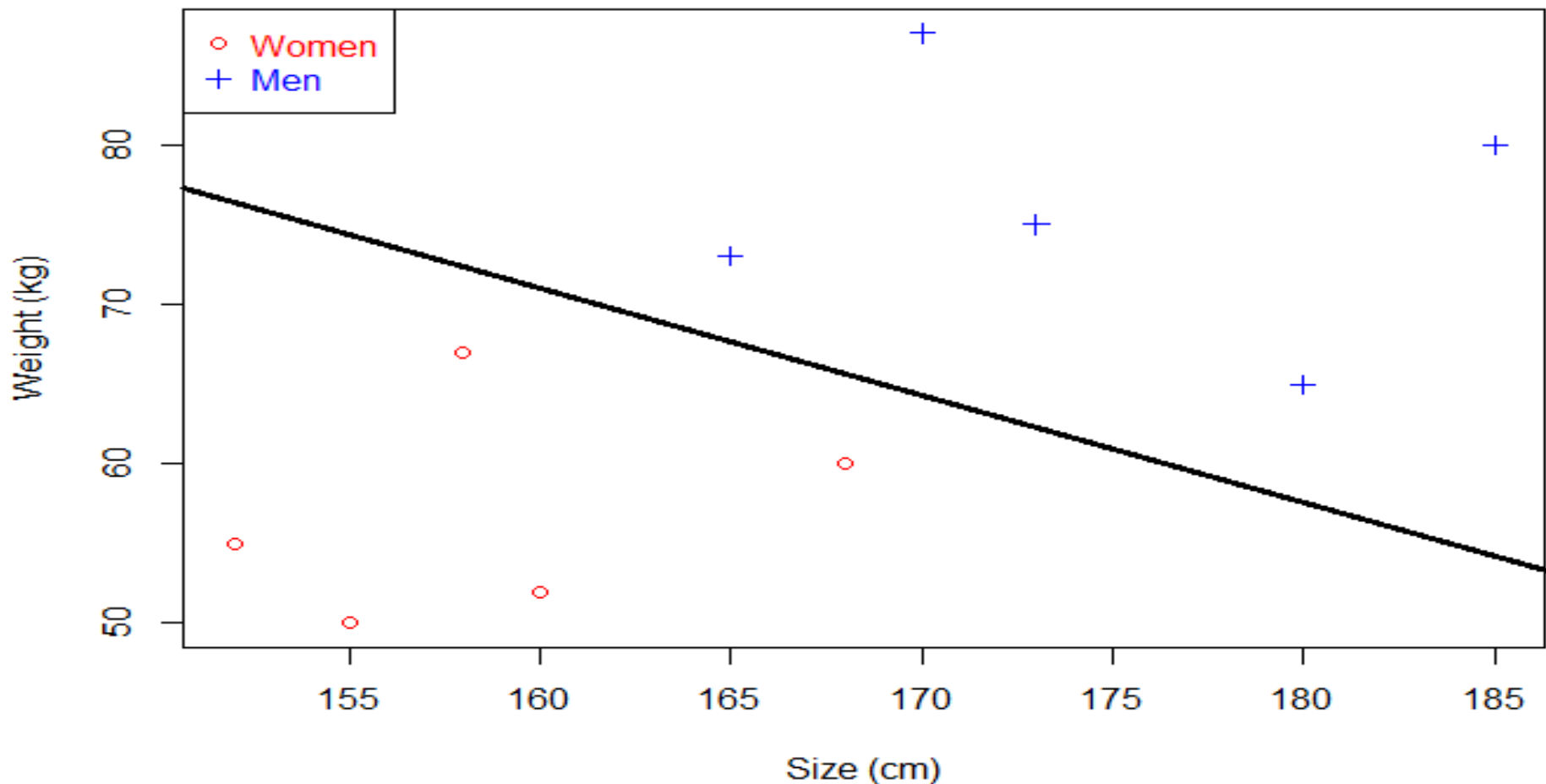
A bad choice of separating hyperplane

Selecting an hyperplane which is close to the data points of one class, might not generalize well.



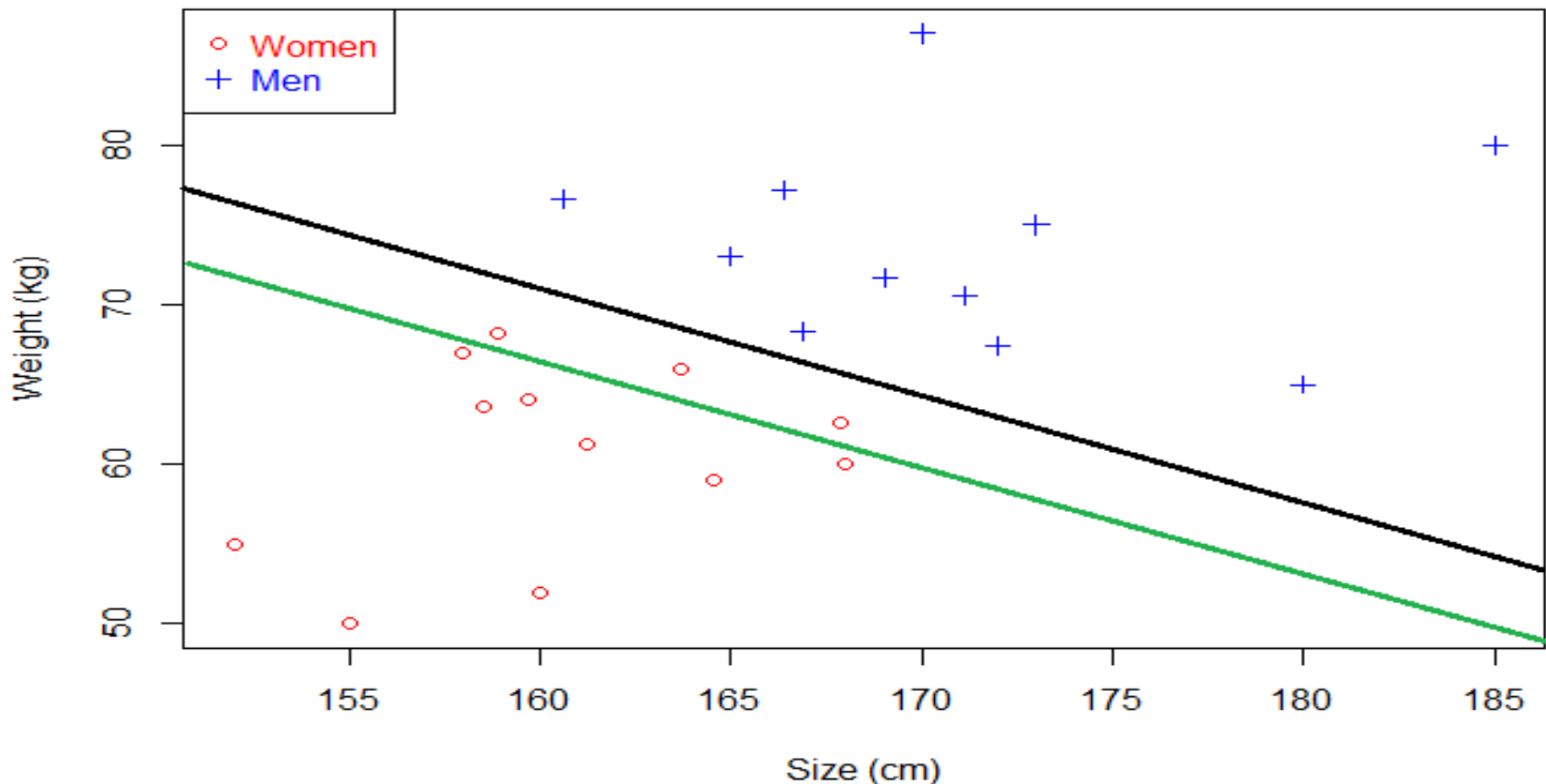
A good choice of separating hyperplane

Selecting an hyperplane which is as far as possible from data points of each class, might generalize well.



Optimal separating hyperplane

Correctly classifies training data as well as it generalizes better with unseen data.



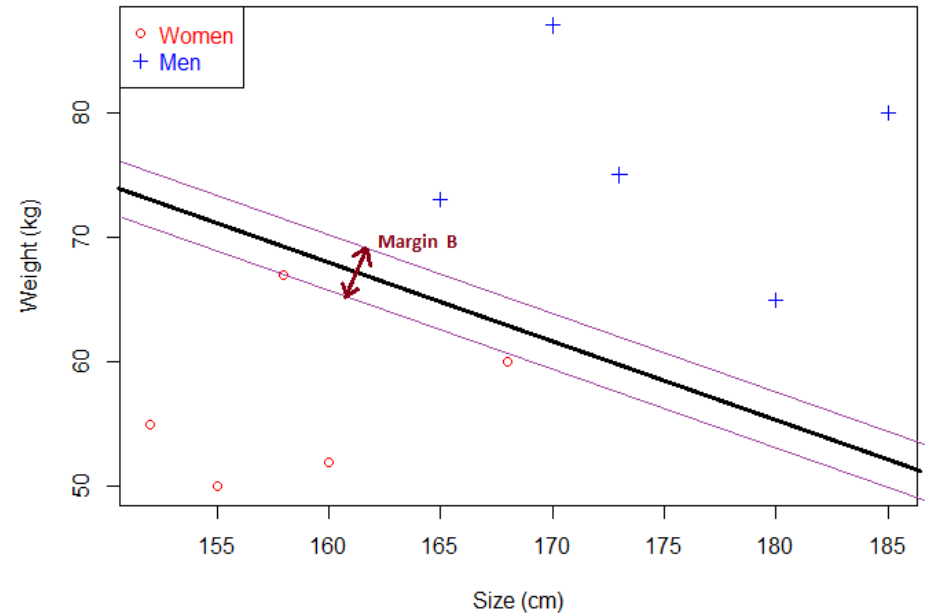
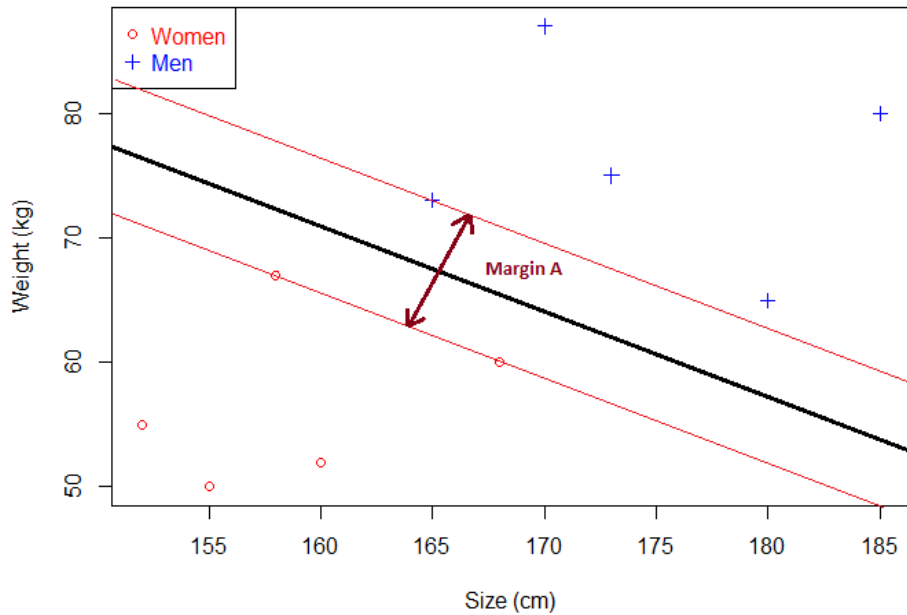
Support Vector Machine (SVM)

- It is a supervised learning algorithm used for classification.
- The goal of a support vector machine is to find the **optimal separating hyperplane** which maximizes the margin of the training data.

What is margin?

- Given a particular hyperplane, we can compute the distance between the hyperplane and the closest data point. Once we have this value, if we double it we will get what is called the **margin**.
- Basically the margin is a no man's land. There will never be any data point inside the margin.
(Exception: noisy data)

Which one is better?



The optimal hyperplane will be the one with the biggest margin.