Lab_7

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Lab Exercise No:7

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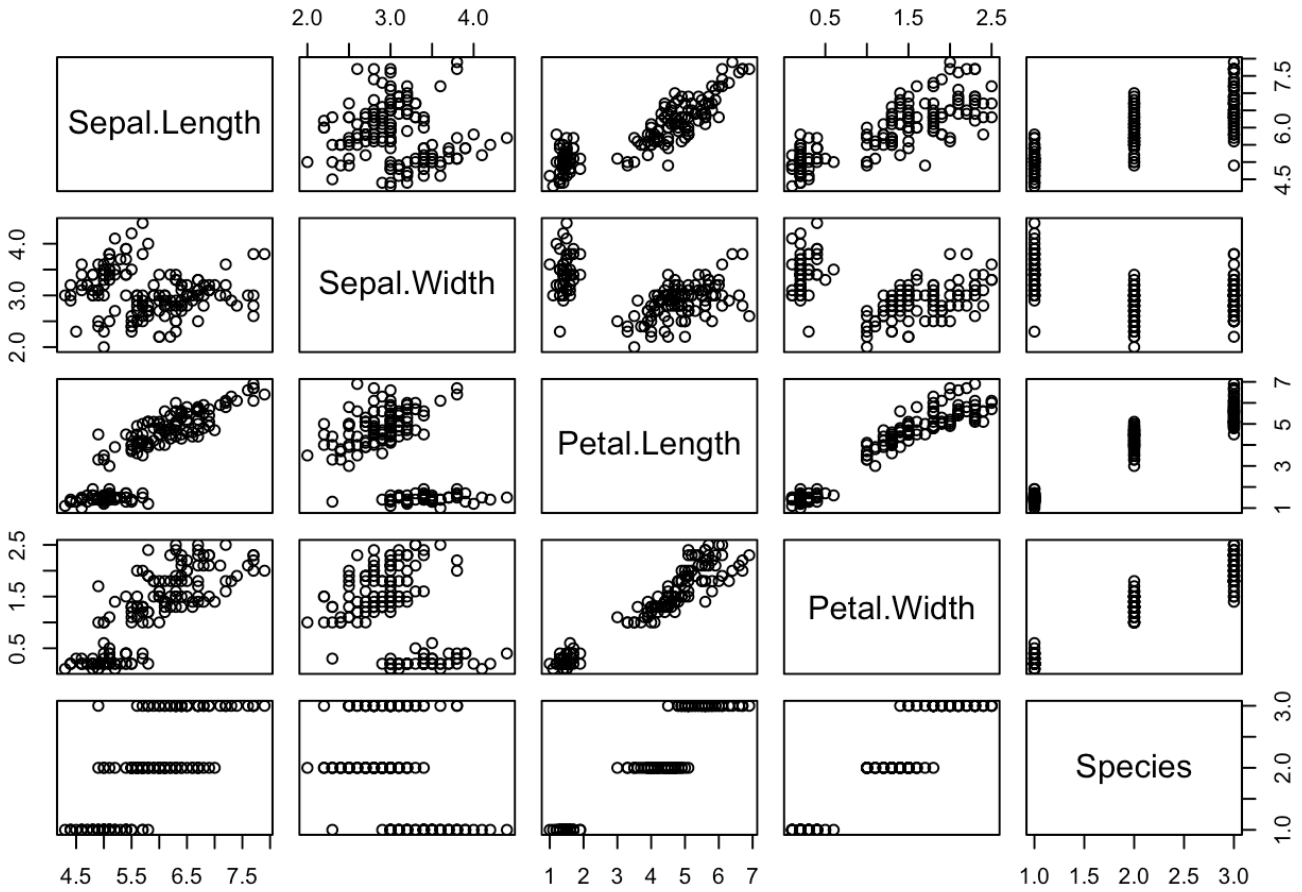
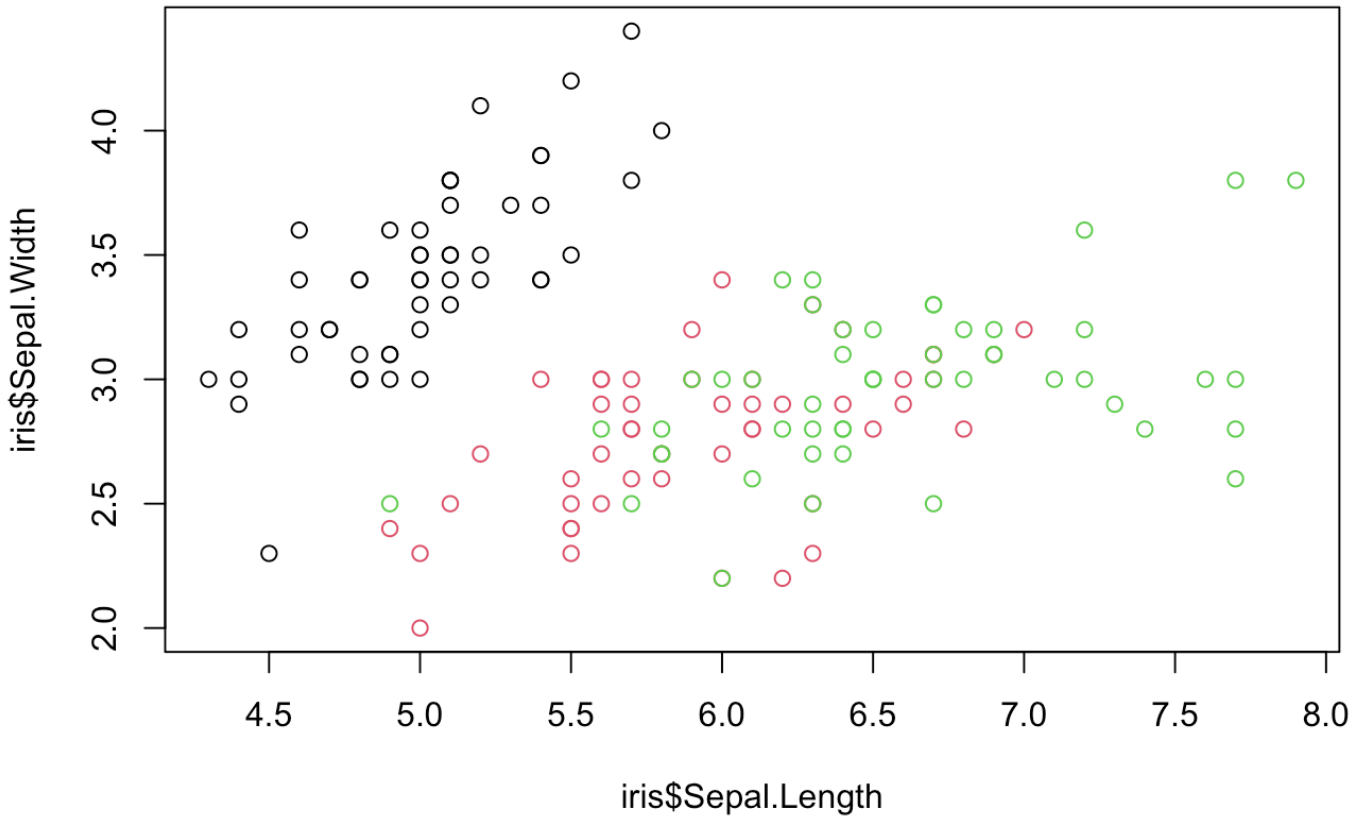
Dataset: iris Design a Support Vector Machine (for the given Dataset) - Binary Classifier using Linear and Radial Kernel and Cross validation to determine optimized values for the hyper-parameters of the model.

The task is to develop a binary classifier to predict each of the severity levels of i) mild ii) moderate iii) severe

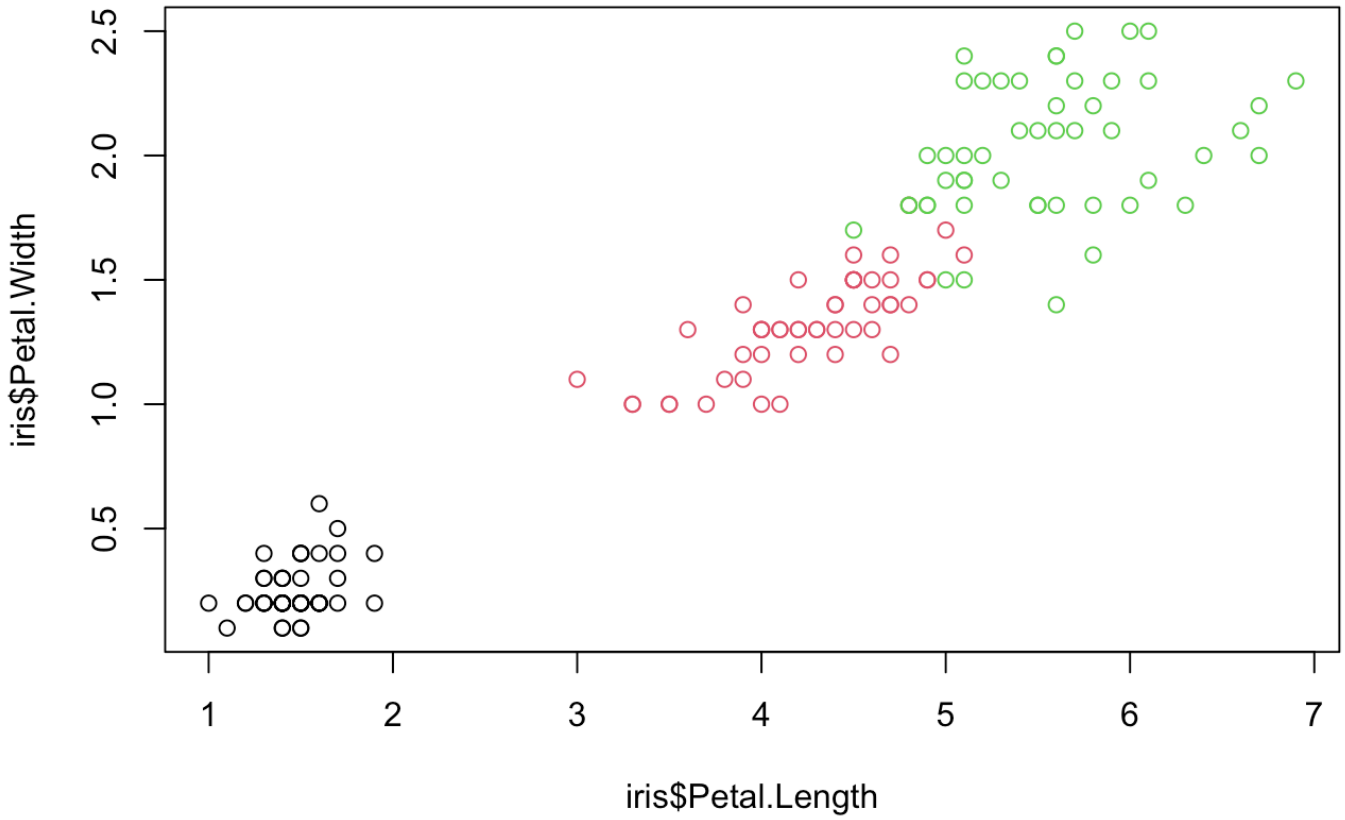
```
library("e1071")
plot(iris)
```




```
plot(iris$Sepal.Length, iris$Sepal.Width, col=iris$Species)
```




```
plot(iris$Petal.Length, iris$Petal.Width, col=iris$Species)
```

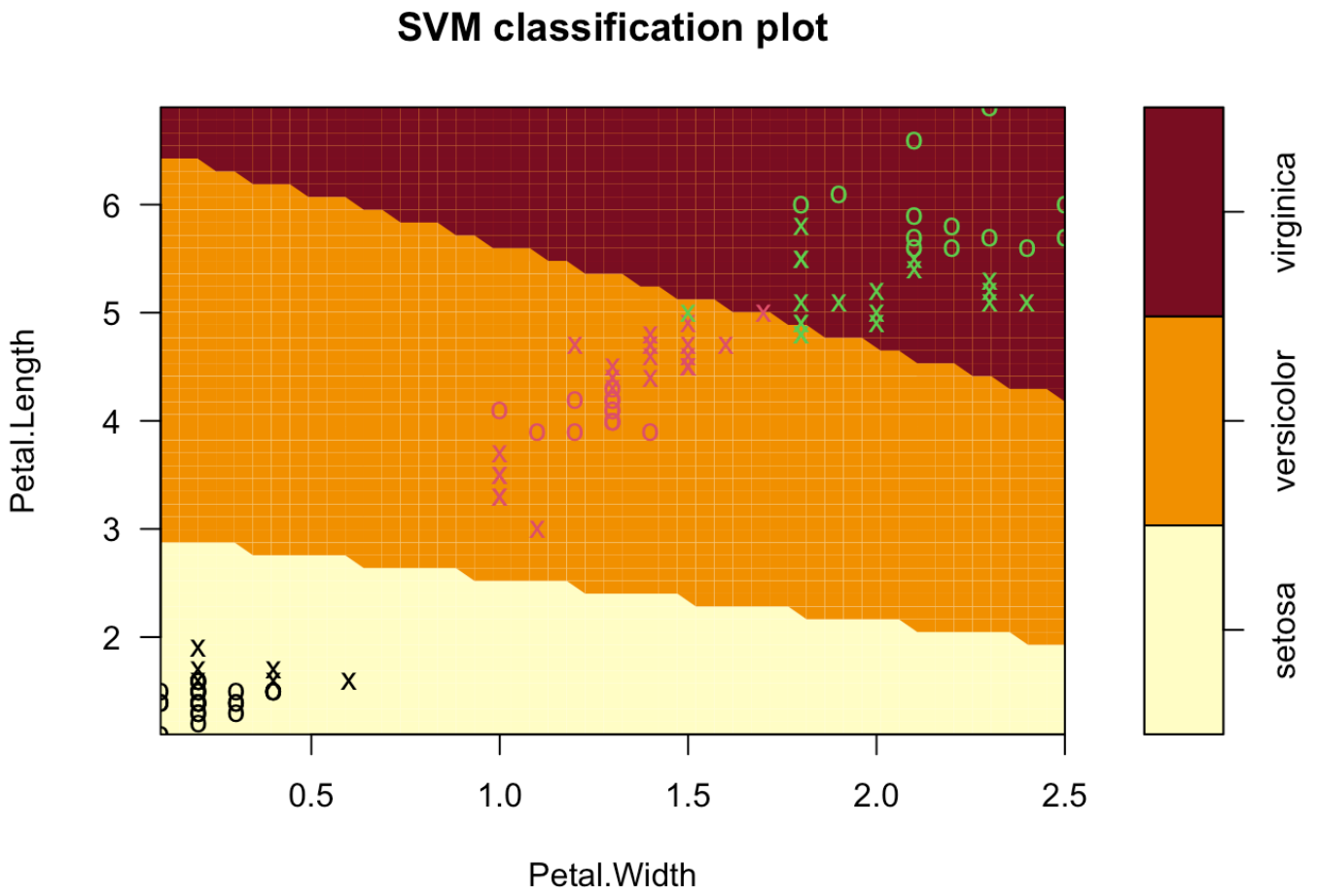



```
s<-sample(150, 100)
col<-c("Petal.Length", "Petal.Width", "Species")
iris_train<-iris[s,col]
iris_test<-iris[-s,col]

svmfit <- svm(Species ~., data = iris_train, kernel = "linear", cost = .1, scale =
FALSE)
print(svmfit)
```

```
##
## Call:
## svm(formula = Species ~ ., data = iris_train, kernel = "linear",
##     cost = 0.1, scale = FALSE)
##
##
## Parameters:
##    SVM-Type:  C-classification
##  SVM-Kernel:  linear
##        cost:  0.1
##
## Number of Support Vectors:  50
```

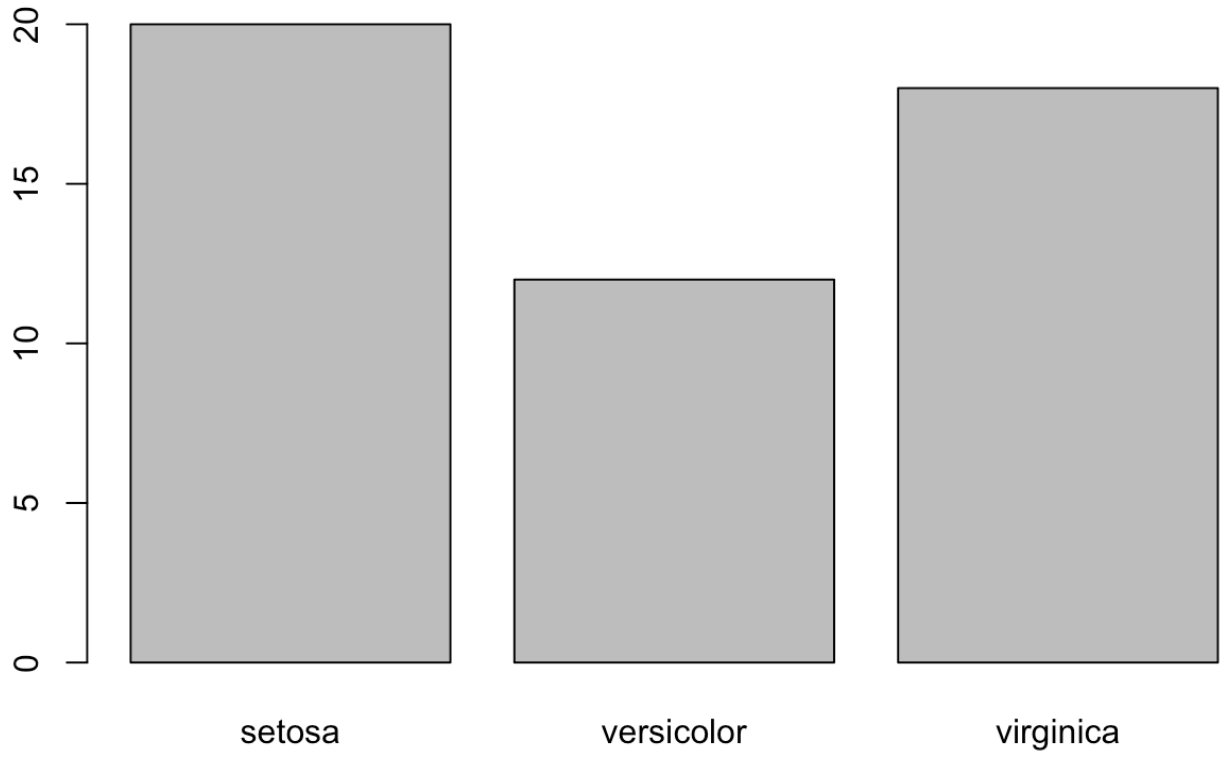
```
plot(svmfit, iris_train[,col])
```




```
tuned <- tune(svm, Species ~., data = iris_train, kernel = "linear", ranges = list
(cost=c(0.001,0.01,.1,1,10,100)))
# Will show the optimal cost parameter
summary(tuned)
```

```
##
## Parameter tuning of 'svm':
##
## - sampling method: 10-fold cross validation
##
## - best parameters:
##  cost
##   0.1
##
## - best performance: 0.03
##
## - Detailed performance results:
##    cost error dispersion
## 1 1e-03  0.62 0.15491933
## 2 1e-02  0.32 0.12292726
## 3 1e-01  0.03 0.04830459
## 4 1e+00  0.03 0.04830459
## 5 1e+01  0.03 0.04830459
## 6 1e+02  0.04 0.06992059
```

```
p <- predict(svmfit, iris_test[,col], type="class")
plot(p)
```



```
table(p, iris_test[,3])
```

```
##
## p            setosa versicolor virginica
##   setosa         20          0         0
##   versicolor      0         11         1
##   virginica       0          1        17
```

```
mean(p== iris_test[,3])
```

```
## [1] 0.96
```