ISLR Lab

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Lab 8.3.3

[2]:
```
library("randomForest")
library(MASS)
train = sample (1:nrow(Boston), nrow(Boston)/2)
 boston.test=Boston[-train ,"medv"]
```

[3]:
```
set.seed(1)
bag.boston= randomForest(medv~.,data=Boston , subset=train , mtry=13,importance
=TRUE)
```

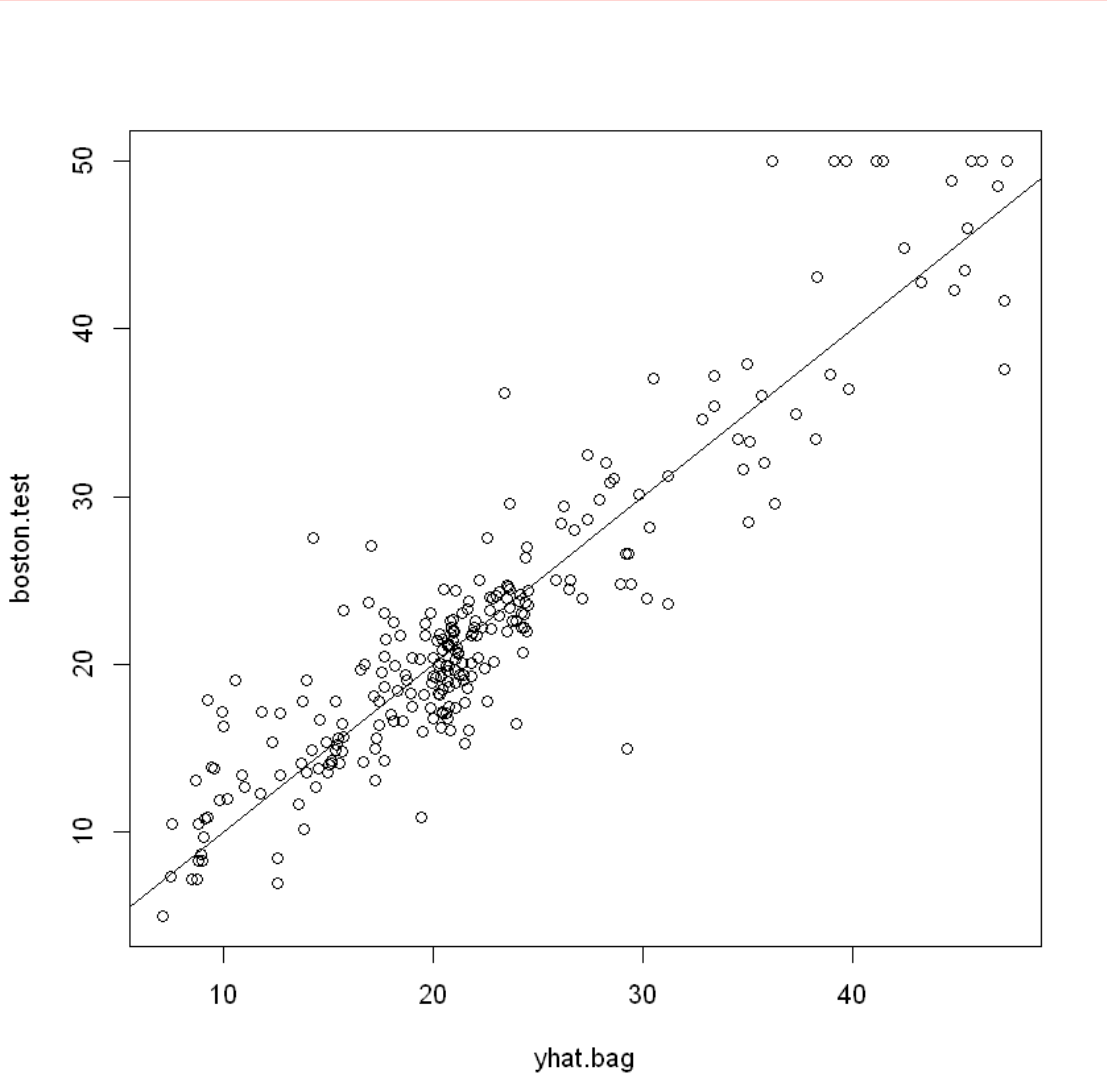
[4]:
```
print(bag.boston)
```

```

Call:
 randomForest(formula = medv ~ ., data = Boston, mtry = 13, importance = TRUE,
subset = train)
               Type of random forest: regression
                     Number of trees: 500
No. of variables tried at each split: 13

          Mean of squared residuals: 15.62848
                    % Var explained: 81.64
```

[5]:
```
yhat.bag = predict (bag.boston , newdata=Boston[-train ,])
plot(yhat.bag , boston.test)
abline (0,1)
```



[6]:
```
mean((yhat.bag -boston.test)^2)
```

13.3600790747865

[7]:
```
bag.boston= randomForest( medv~.,data=Boston , subset=train , mtry=13,ntree=25)
yhat.bag = predict (bag.boston , newdata=Boston[-train ,])
mean((yhat.bag -boston.test)^2)
```

13.5082101670092

[8]:
```
set.seed(1)
rf.boston= randomForest(medv~.,data=Boston , subset=train , mtry=6, importance
=TRUE)
yhat.rf = predict(rf.boston ,newdata=Boston[- train ,])
```

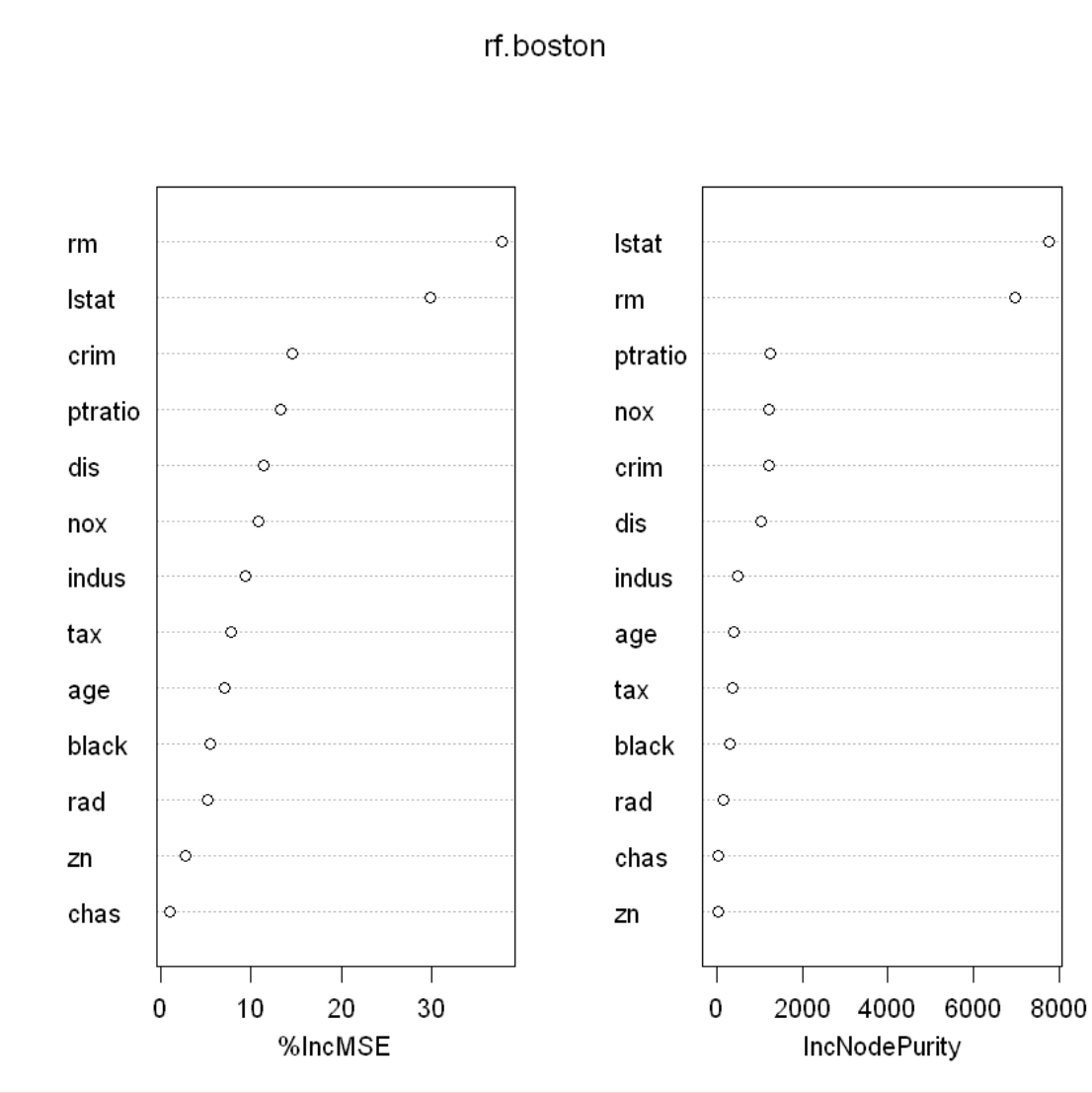
```
mean((yhat.rf-boston.test)^2)
```

```
12.5504698067427
```

[9]:
```
importance (rf.boston)
```

	%IncMSE	IncNodePurity
crim	14.632563	1233.61605
zn	2.785134	34.23654
indus	9.420813	492.85445
chas	1.035081	36.45133
nox	10.848379	1236.60646
rm	37.778296	6979.18254
age	7.057641	398.38388
dis	11.446069	1034.99692
rad	5.184584	153.45960
tax	7.821295	374.24169
ptratio	13.274085	1266.10271
black	5.514161	307.07439
lstat	29.795968	7763.80348

[10]:
```
varImpPlot (rf.boston)
```

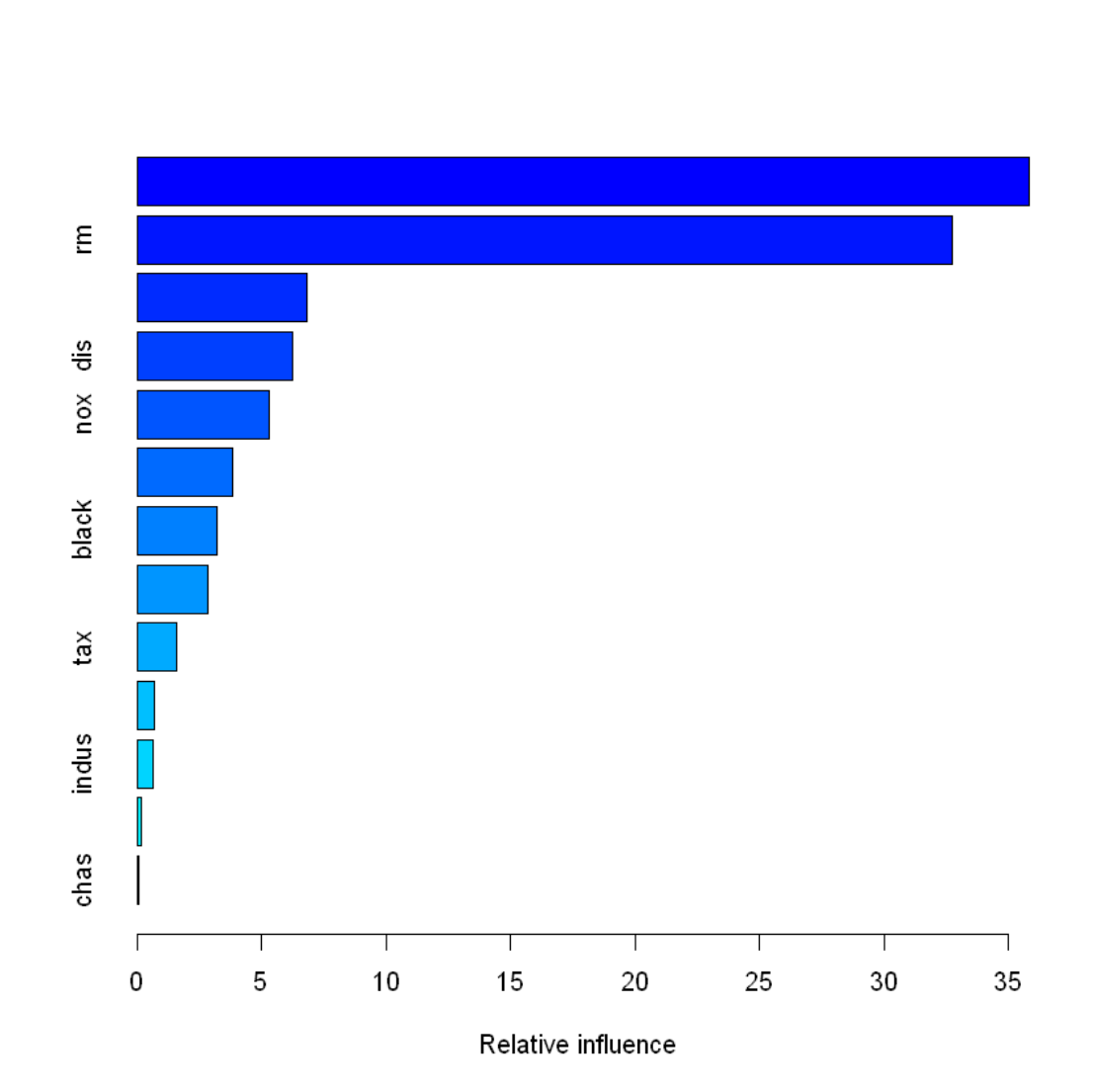


Lab 8.3.4

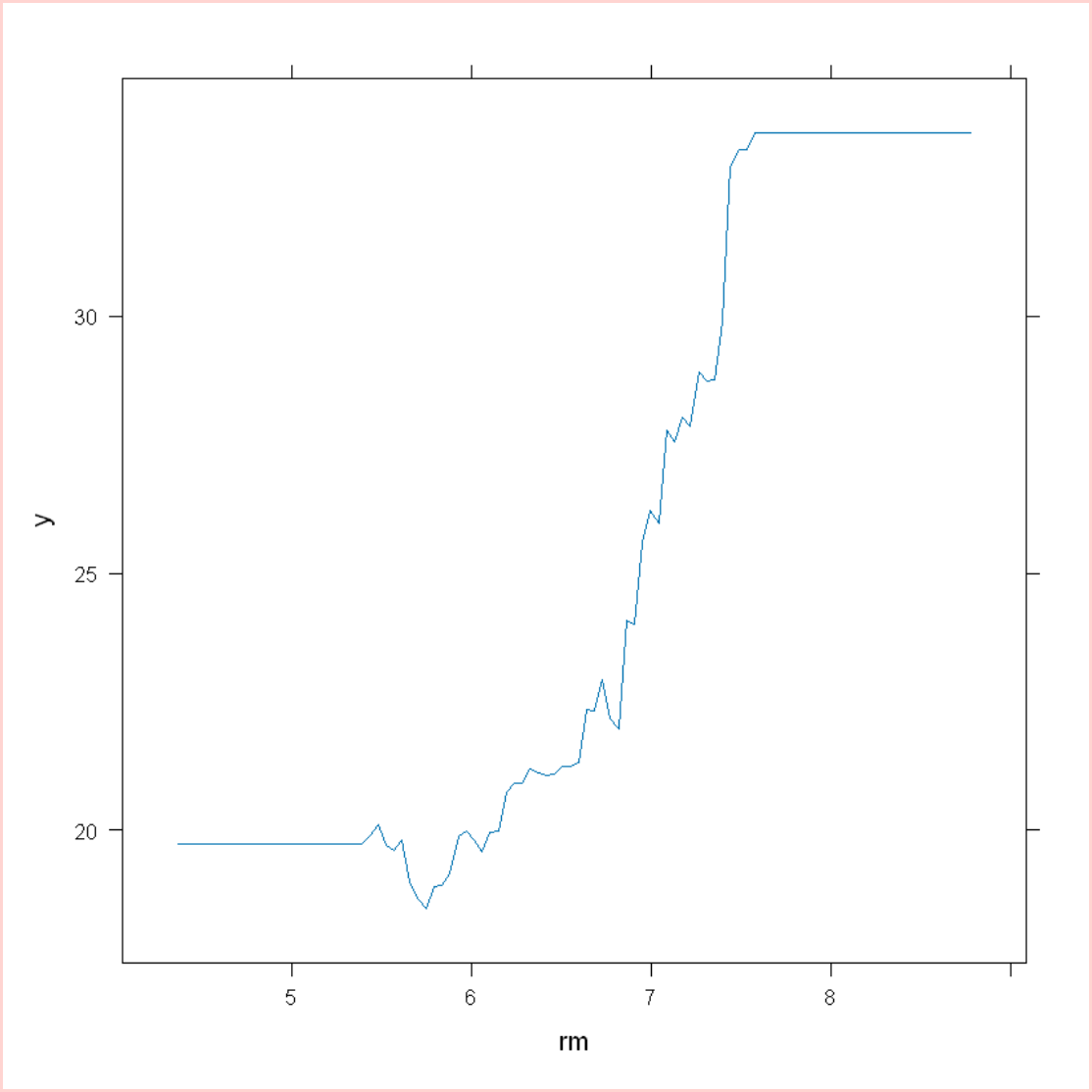
[12]:
```
library("gbm")
set.seed(1)
boost.boston=gbm(medv~.,data=Boston[train ,], distribution="gaussian",n.
  ↪trees=5000, interaction.depth=4)
```

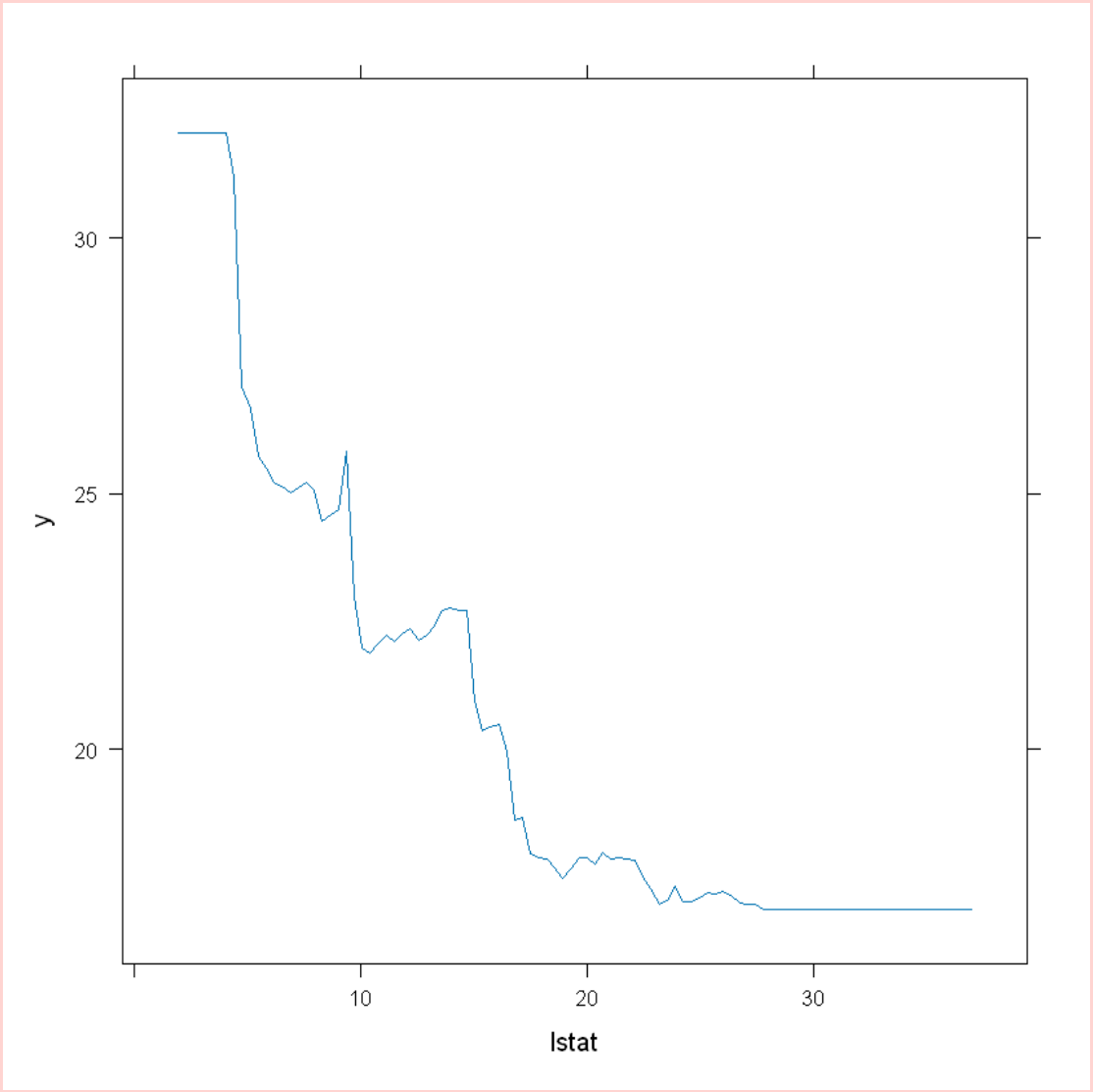
[13]:
```
summary(boost.boston)
```

	var	rel.inf
	<chr>	<dbl>
lstat	lstat	35.83220355
rm	rm	32.74078708
crim	crim	6.81200294
dis	dis	6.24804230
nox	nox	5.29527883
age	age	3.82878797
black	black	3.21355065
ptratio	ptratio	2.85720536
tax	tax	1.59537666
rad	rad	0.66928548
indus	indus	0.65726254
zn	zn	0.16203200
chas	chas	0.08818464



[14]:
```
par(mfrow=c(1,2))
plot(boost.boston ,i="rm")
plot(boost.boston ,i="lstat")
```





[15]:
```
yhat.boost=predict (boost.boston ,newdata =Boston[-train ,], n.trees=5000)
mean((yhat.boost - boston.test)^2)
```

11.5790595817365

[16]:
```
boost.boston=gbm(medv~.,data=Boston[train ,], distribution= "gaussian" ,n.trees
=5000, interaction.depth =4, shrinkage =0.2, verbose=F)
yhat.boost=predict (boost.boston ,newdata =Boston[-train ,], n.trees=5000)
mean((yhat.boost - boston.test)^2)
```

11.6782345144199