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# Cheatsheet - Python & R codes for common Machine Learning Algorithms

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# Introduction

In his famous book - Think and Grow Rich, Napolean Hill narrates story of Darby, who after digging for a gold vein for a few years walks away from it when he was three feet away from it!

Now, I don't know whether the story is true or false. But, I surely know of a few Data Darby around me. These people understand the purpose of machine learning, its execution and use just a set 2 - 3 algorithms on whatever problem they are working on. They don't update themselves with better algorithms or techniques, because they are too tough or they are time consuming.

Like Darby, they are surely missing from a lot of action after reaching this close! In the end, they give up on machine learning by saying it is very computation heavy or it is very difficult or I can't improve my models above a threshold – what's the point? Have you heard them?

Today's cheat sheet aims to change a few Data Darby's to machine learning advocates. Here's a collection of 10 most commonly used machine learning algorithms with their codes in Python and R. Considering the rising usage of machine learning in building models, this cheat sheet is good to act as a code guide to help you bring these machine learning algorithms to use. Good Luck!

For the super lazy Data Darbies, we will make your life even easier. You can download the PDF Version (http://discuss.analyticsvidhya.com/t/download-full-cheatsheet-on-machine-learning-algorithms/4063/1) of the cheat sheet here and copy paste the codes from it directly.



Machine Learning







# **AIGOLITUMS**





( Python and R Codes)

# Types

### **Supervised Learning**

- Decision Tree Random Forest
- · kNN · Logistic Regression

### **Unsupervised Learning**

- · Apriori algorithm · k-means
- · Hierarchical Clustering

#### **Reinforcement Learning**

- · Markov Decision Process
- Q Learning

# Python Code

### R Code

#Import Library

#Import other necessary libraries like pandas, #numpy...

from sklearn import linear\_model

#Load Train and Test datasets

#Identify feature and response variable(s) and #values must be numeric and numpy arrays

x train=input variables values training datasets

y\_train=target\_variables\_values\_training\_datasets

x\_test=input\_variables\_values\_test\_datasets

#Create linear regression object

linear = linear\_model.LinearRegression()

#Train the model using the training sets and

#check score

linear.fit(x\_train, y\_train)

linear.score(x\_train, y\_train)

#Equation coefficient and Intercept

print('Coefficient: \n', linear.coef\_)

print('Intercept: \n', linear.intercept\_)

#Predict Output

predicted= linear.predict(x test)

#Load Train and Test datasets

 $\#Identify\ feature\ and\ response\ variable(s)\ and$ 

#values must be numeric and numpy arrays

x\_train <- input\_variables\_values\_training\_datasets</pre>

y\_train <- target\_variables\_values\_training\_datasets</pre>

x\_test <- input\_variables\_values\_test\_datasets</pre>

x <- cbind(x\_train,y\_train)

 $\mbox{\tt\#Train}$  the model using the training sets and

#check score

linear <-  $lm(y_train \sim ., data = x)$ 

summary(linear)

#Predict Output

predicted= predict(linear,x\_test)

# Linear Regressio

#Import Library

from sklearn.linear\_model import LogisticRegression
#Assumed you have, X (predictor) and Y (target)
#for training data set and x\_test(predictor)

to C toot detect

#of test\_dataset

#Create logistic regression object
model = LogisticRegression()

#Train the model using the training sets

 $x \leftarrow cbind(x_train, y_train)$ 

#Train the model using the training sets and check
#score

logistic <- glm(y\_train  $\sim$  ., data = x,family='binomial')

summary(logistic)

#Predict Output

predicted= predict(logistic,x\_test)

## istic essior

# **Decision Tree**

```
#and check score
model.fit(X, y)
model.score(X, y)
#Equation coefficient and Intercept
print('Coefficient: \n', model.coef_)
print('Intercept: \n', model.intercept_)
#Predict Output
predicted= model.predict(x_test)
```

```
#Import Library
#Import other necessary libraries like pandas, numpy...
from sklearn import tree
#Assumed you have, X (predictor) and Y (target) for
#training data set and x_test(predictor) of
#test dataset
#Create tree object
model = tree.DecisionTreeClassifier(criterion='gini')
#for classification, here you can change the
#algorithm as gini or entropy (information gain) by
#default it is gini
#model = tree.DecisionTreeRegressor() for
#regression
#Train the model using the training sets and check
#score
model.fit(X, y)
model.score(X, y)
#Predict Output
predicted= model.predict(x_test)
```

```
#Import Library
library(rpart)
x <- cbind(x_train,y_train)
#grow tree
fit <- rpart(y_train ~ ., data = x,method="class")</pre>
summary(fit)
#Predict Output
predicted= predict(fit,x_test)
```

# SVM (Support Vector Machine)

```
#Import Library
from sklearn import svm
#Assumed you have, X (predictor) and Y (target) for
#training data set and x_test(predictor) of test_dataset
#Create SVM classification object
model = svm.svc()
#there are various options associated
with it, this is simple for classification.
#Train the model using the training sets and check
#score
model.fit(X, y)
model.score(X, y)
#Predict Output
predicted= model.predict(x_test)
```

```
#Import Library
library(e1071)
x <- cbind(x_train,y_train)
#Fitting model
fit <-svm(y_train \sim ., data = x)
summary(fit)
#Predict Output
predicted= predict(fit,x test)
```

#Import Library from sklearn.naive\_bayes import GaussianNB #Assumed you have, X (predictor) and Y (target) for #training data set and x test(predictor) of test dataset #Create SVM classification object model = GaussianNB()

```
#Import Library
library(e1071)
x <- cbind(x_train,y_train)
#Fitting model
fit <-naiveBayes(y_train ~ ., data = x)</pre>
```

# **Naive B**

```
#there is other distribution for multinomial classes
like Bernoulli Naive Bayes
#Train the model using the training sets and check
#score
model.fit(X, y)
#Predict Output
predicted= model.predict(x_test)
```

```
summary(fit)
#Predict Output
predicted= predict(fit,x_test)
```

# N (k- Nearest Neighbors)

#Import Library
from sklearn.neighbors import KNeighborsClassifier
#Assumed you have, X (predictor) and Y (target) for
#training data set and x\_test(predictor) of test\_dataset
#Create KNeighbors classifier object model
KNeighborsClassifier(n\_neighbors=6)
#default value for n\_neighbors is 5
#Train the model using the training sets and check score
model.fit(X, y)
#Predict Output

#Import Library
library(knn)
x <- cbind(x\_train,y\_train)
#Fitting model
fit <-knn(y\_train ~ ., data = x,k=5)
summary(fit)
#Predict Output
predicted= predict(fit,x\_test)</pre>



predicted= model.predict(x test)

#Import Library
library(cluster)
fit <- kmeans(X, 3)
#5 cluster solution</pre>





### (http://www.analyticsvidhya.com/blog/2016/02/quick-

#### insights-amalytics-big-data-salary-

reposition Formation

from sklearn.ensemble import RandomForestClassifier

#Assumed you have, X (predictor) and Y (target) for

#training data set and x\_test(predictor) of test\_dataset

#Create Random Forest object

model= RandomForestClassifier()

#Train the model using the training sets and check score

model.fit(X, y)

#Predict Output

predicted= model.predict(x\_test)

#Import Library
library(randomForest)
x <- cbind(x\_train,y\_train)
#Fitting model
fit <- randomForest(Species ~ ., x,ntree=500)
summary(fit)
#Predict Output
predicted= predict(fit,x\_test)</pre>

# Algorithms

#Import Library
from sklearn import decomposition
#Assumed you have training and test data set as train and
#test

#Import Library
library(stats)
pca <- princomp(train, cor = TRUE)
train\_reduced <- predict(pca,train)</pre>

Dimensionality Reducti

```
#create PCA object pca= decomposition.PCA(n_components=k)
#default value of k =min(n_sample, n_features)
#For Factor analysis
#fa= decomposition.FactorAnalysis()
#Reduced the dimension of training dataset using PCA
train_reduced = pca.fit_transform(train)
#Reduced the dimension of test dataset
test_reduced = pca.transform(test)
```

test\_reduced <- predict(pca,test)

# Gradient Boosting & AdaBoost

```
#Import Library
library(caret)
x <- cbind(x_train,y_train)
#Fitting model
fitControl <- trainControl( method = "repeatedcv",
+ number = 4, repeats = 4)
fit <- train(y ~ ., data = x, method = "gbm",
+ trControl = fitControl,verbose = FALSE)
predicted= predict(fit,x_test,type= "prob")[,2]</pre>
```

To view complete guide on Machine Learning Algorithms, visit here:



(http://discuss.analyticsvidhya.com/t/download-full-cheatsheet-on-machine-learning-algorithms/4063/1)

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Good Compilation...



REPORT RE

Thanks for sharing this in both R and Python. Very helpful. It would be nice to have datasets to accompany this code for those who are just starting out....



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For kNN in R, the package knn is no longer available. The function knn can be found in the "class" package, but I don't think it takes the arguments the way you specified. I guess you can also use caret for that.



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Thx for sharing.

In R we can implement stepwise regression. whats the equivalent in python.



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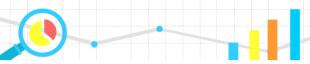
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