

In [2]:

```
from sklearn.linear_model import LogisticRegression
from sklearn.svm import SVC
from sklearn.ensemble import RandomForestClassifier
from sklearn.datasets import load_digits

digits = load_digits()
```

In [3]:

```
from sklearn.model_selection import train_test_split
X_train,X_test,Y_train,Y_test = train_test_split(digits.data,digits.target,test_size=0.3
)
```

In [5]:

```
lr = LogisticRegression()
lr.fit(X_train,Y_train)
lr.score(X_test,Y_test)
```

C:\Users\Rudra\Anaconda3\lib\site-packages\sklearn\linear_model_logistic.py:940: ConvergenceWarning: lbfgs failed to converge (status=1):
STOP: TOTAL NO. of ITERATIONS REACHED LIMIT.

Increase the number of iterations (max_iter) or scale the data as shown in:

<https://scikit-learn.org/stable/modules/preprocessing.html>

Please also refer to the documentation for alternative solver options:

https://scikit-learn.org/stable/modules/linear_model.html#logistic-regression
extra_warning_msg=_LOGISTIC_SOLVER_CONVERGENCE_MSG)

Out[5]:

0.9666666666666667

In [6]:

```
svm = SVC()
svm.fit(X_train,Y_train)
svm.score(X_test,Y_test)
```

Out[6]:

0.9907407407407407

In [7]:

```
rf = RandomForestClassifier()
rf.fit(X_train,Y_train)
rf.score(X_test,Y_test)
```

Out[7]:

0.9833333333333333

In [9]:

```
from sklearn.model_selection import KFold
kf = KFold(n_splits=3)
kf
```

Out[9]:

KFold(n_splits=3, random_state=None, shuffle=False)

In [10]:

```
for train_index,test_index in kf.split([1,2,3,4,5,6,7,8,9]):
    print(train_index,test_index)
```

0 1 2 3 4 5 6 7 8 9

```
[3 4 5 6 7 8] [0 1 2]
[0 1 2 6 7 8] [3 4 5]
[0 1 2 3 4 5] [6 7 8]
```

In [20]:

```
def get_score(model,X_train,X_test,Y_train,Y_test):
    model.fit(X_train,Y_train)
    return model.score(X_test,Y_test)
```

In [12]:

```
get_score(rf,X_train,Y_train,X_test,Y_test)
```

Out[12]:

```
0.9814814814814815
```

In [13]:

```
from sklearn.model_selection import StratifiedKFold
folds = StratifiedKFold(n_splits=3)
```

In [25]:

```
score_l = []
score_svm = []
score_rf = []

for train_index,test_index in kf.split(digits.data):
    X_train,X_test,Y_train,Y_test = digits.data[train_index],digits.data[test_index],dig
its.target[train_index],digits.target[test_index]
    score_l.append(get_score(LogisticRegression(),X_train,X_test,Y_train,Y_test))
    score_svm.append(get_score(SVC(),X_train,X_test,Y_train,Y_test))
    score_rf.append(get_score(RandomForestClassifier(n_estimators=40),X_train,X_test,Y_t
rain,Y_test))
```

C:\Users\Rudra\Anaconda3\lib\site-packages\sklearn\linear_model_logistic.py:940: Converge
nceWarning: lbfgs failed to converge (status=1):
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https://scikit-learn.org/stable/modules/linear_model.html#logistic-regression

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extra_warning_msg=_LOGISTIC_SOLVER_CONVERGENCE_MSG)

In [26]:

```
score_l
```

Out[26]:

```
[0.9232053422370617, 0.9415692821368948, 0.9148580968280468]
```

In [27]:

```
score_svm
```

Out[27]:

```
[0.9666110183639399, 0.9816360601001669, 0.9549248747913188]
```

In [28]:

```
score_rf
```

Out[28]:

```
[0.9248747913188647, 0.9532554257095158, 0.9332220367278798]
```

In [29]:

```
from sklearn.model_selection import cross_val_score
```

In [31]:

```
cross_val_score(RandomForestClassifier(n_estimators=50), digits.data, digits.target)
```

Out[31]:

```
array([0.92777778, 0.88611111, 0.95821727, 0.95821727, 0.91364903])
```

In []: