```
# 9 SVM classification on any dataset.
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
```

```
df=pd.read_csv('/content/drive/MyDrive/KRAI/Social_Network_Ads.csv')
```

```
df.head()
```

	User ID	Gender	Age	EstimatedSalary	Purchased
0	15624510	Male	19	19000	0
1	15810944	Male	35	20000	0
2	15668575	Female	26	43000	0
3	15603246	Female	27	57000	0
4	15804002	Male	19	76000	0

+ Code + Text

```
X=df[['Age','EstimatedSalary']]
y=df['Purchased']
print(X)
print(y)
```

```
     Age  EstimatedSalary
0     19            19000
1     35            20000
2     26            43000
3     27            57000
4     19            76000
..   ...              ...
395   46            41000
396   51            23000
397   50            20000
398   36            33000
399   49            36000

[400 rows x 2 columns]
0      0
1      0
2      0
3      0
4      0
      ..
395    1
396    1
397    1
398    0
```

```
399    1
Name: Purchased, Length: 400, dtype: int64
```

```
from sklearn.model_selection import train_test_split
```

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.23, random_state=91)
```

```
from sklearn.preprocessing import MinMaxScaler
scaler=MinMaxScaler()
scaler.fit(X_train)
X_train_scaled=scaler.transform(X_train)
X_test_scaled=scaler.transform(X_test)
```

```
from sklearn.svm import SVC
```

```
model_lin = SVC(kernel='linear')
model_lin.fit(X_train_scaled,y_train)
model_lin.score(X_test_scaled,y_test)
```

```
0.8043478260869565
```

```
model_poly = SVC(kernel='poly')
model_poly.fit(X_train_scaled,y_train)
model_poly.score(X_test_scaled,y_test)
```

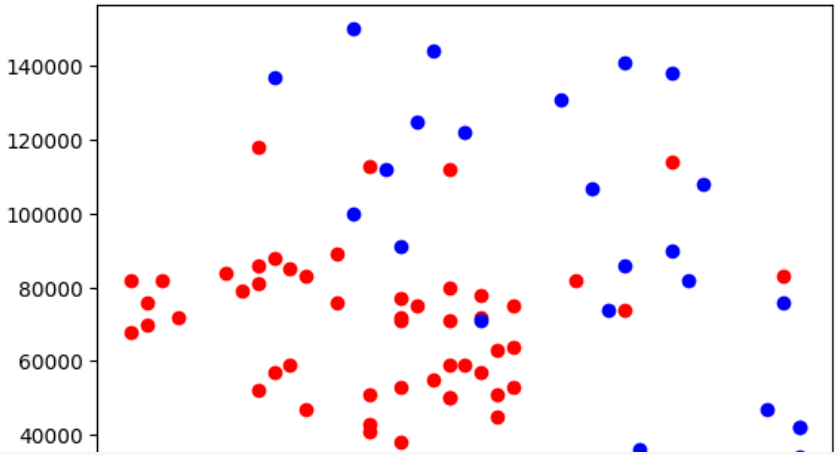
```
0.8913043478260869
```

```
model_rbf = SVC(kernel='rbf')
model_rbf.fit(X_train_scaled,y_train)
model_rbf.score(X_test_scaled,y_test)
```

```
0.8913043478260869
```

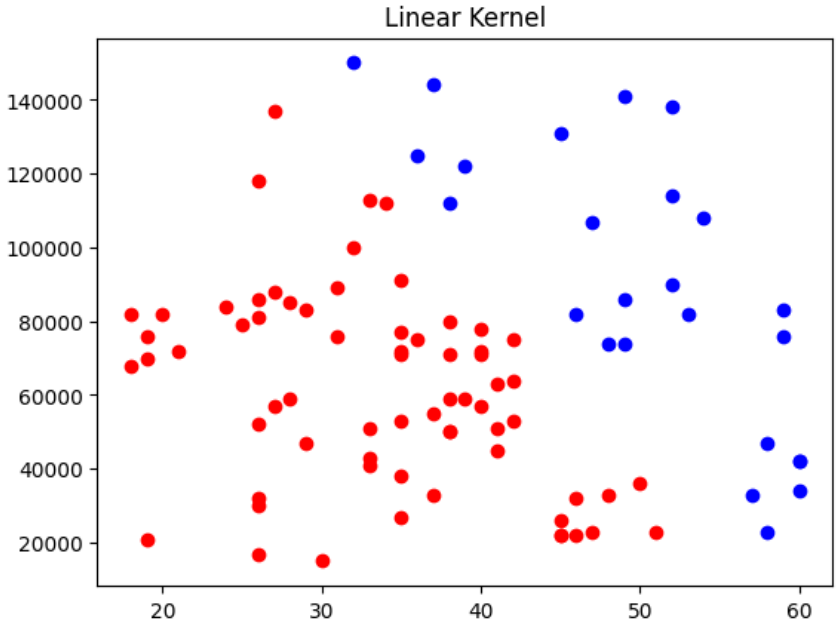
```
#Actual data
class_0_act = X_test[y_test==0]
class_1_act = X_test[y_test==1]
plt.scatter(class_0_act['Age'],class_0_act['EstimatedSalary'],c='red')
plt.scatter(class_1_act['Age'],class_1_act['EstimatedSalary'],c='blue')
```

```
<matplotlib.collections.PathCollection at 0x78b89920b5b0>
```



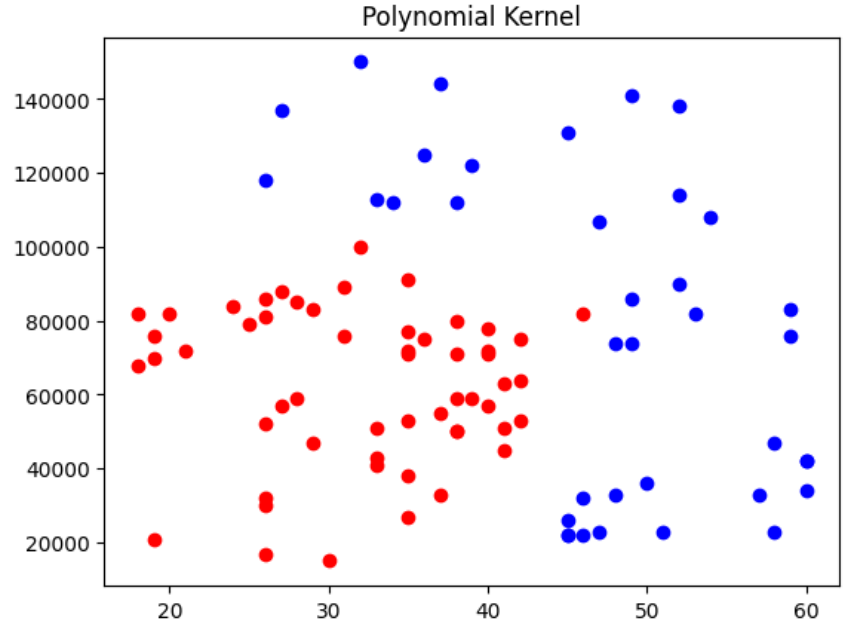

```
#Plot points according to predicted values of linear kernel
y_pre = model_lin.predict(X_test_scaled)
class_0_pre = X_test[y_pre==0]
class_1_pre = X_test[y_pre==1]
plt.scatter(class_0_pre['Age'],class_0_pre['EstimatedSalary'],c='red')
plt.scatter(class_1_pre['Age'],class_1_pre['EstimatedSalary'],c='blue')
plt.title('Linear Kernel')
```

```
Text(0.5, 1.0, 'Linear Kernel')
```



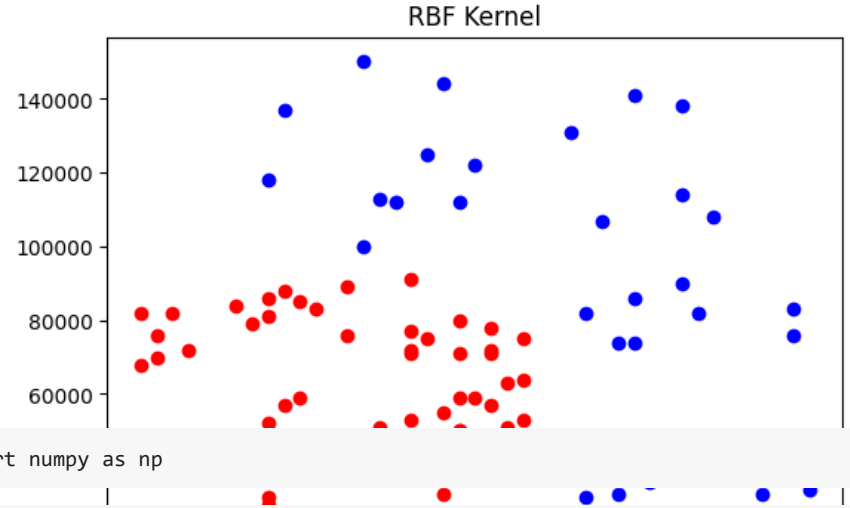
```
#Plot points according to predicted values of polynomial kernel
y_pre = model_poly.predict(X_test_scaled)
class_0_pre = X_test[y_pre==0]
class_1_pre = X_test[y_pre==1]
plt.scatter(class_0_pre['Age'],class_0_pre['EstimatedSalary'],c='red')
plt.scatter(class_1_pre['Age'],class_1_pre['EstimatedSalary'],c='blue')
plt.title('Polynomial Kernel')
```

```
Text(0.5, 1.0, 'Polynomial Kernel')
```




```
#Plot points according to predicted values of rbf kernel
y_pre = model_rbf.predict(X_test_scaled)
class_0_pre = X_test[y_pre==0]
class_1_pre = X_test[y_pre==1]
plt.scatter(class_0_pre['Age'],class_0_pre['EstimatedSalary'],c='red')
plt.scatter(class_1_pre['Age'],class_1_pre['EstimatedSalary'],c='blue')
plt.title('RBF Kernel')
```

```
Text(0.5, 1.0, 'RBF Kernel')
```




```
import numpy as np
```

```
#usingarray
plot_data = []
for x in range(0,100,1):
    for y in range(0,100,1):
        plot_data.append([x,y])
plot_data=np.array(plot_data)/100
```

```
plot_data
```

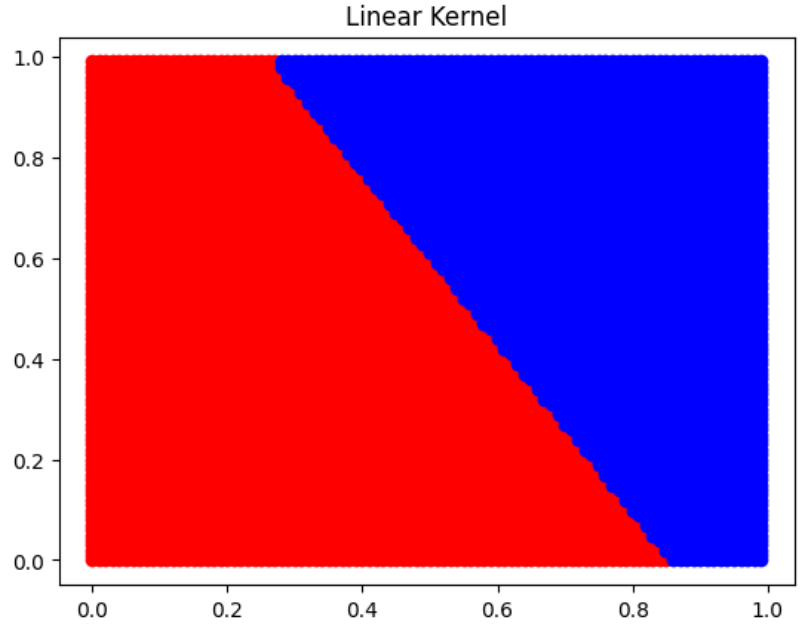
```
array([[0.  , 0.  ],
       [0.  , 0.01],
       [0.  , 0.02],
       ...,
       [0.99, 0.97],
       [0.99, 0.98],
       [0.99, 0.99]])
```

```
plot_data.shape
```

```
(10000, 2)
```

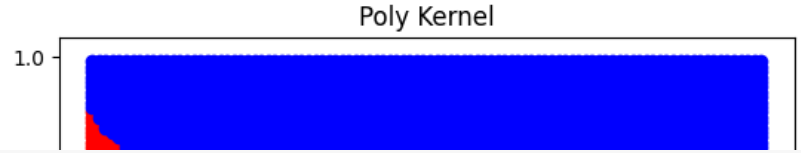
```
y_plot = model_lin.predict(plot_data)
class_0 = plot_data[y_plot==0]
class_1 = plot_data[y_plot==1]
plt.scatter(class_0[:,0],class_0[:,1],c='red')
plt.scatter(class_1[:,0],class_1[:,1],c='blue')
plt.title('Linear Kernel')
```

```
Text(0.5, 1.0, 'Linear Kernel')
```



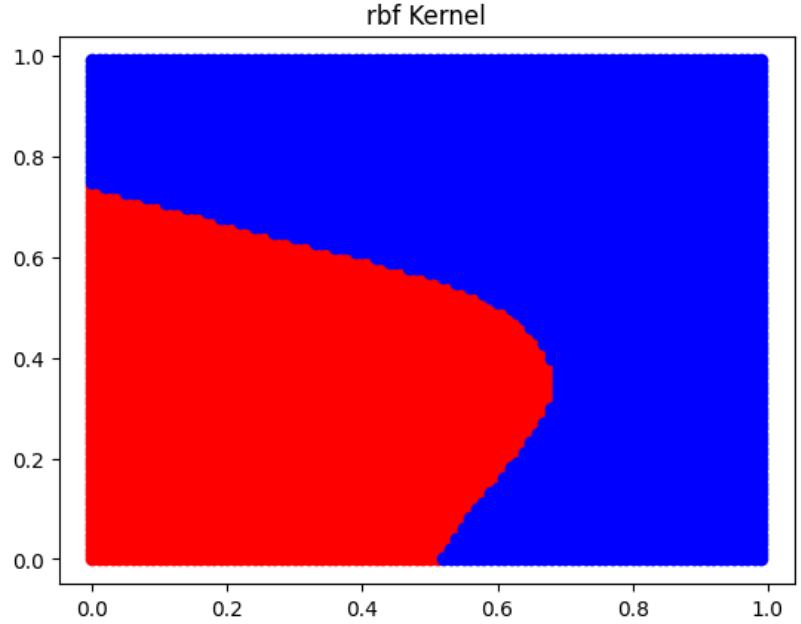

```
y_plot = model_poly.predict(plot_data)
class_0 = plot_data[y_plot==0]
class_1 = plot_data[y_plot==1]
plt.scatter(class_0[:,0],class_0[:,1],c='red')
plt.scatter(class_1[:,0],class_1[:,1],c='blue')
plt.title('Poly Kernel')
```

```
Text(0.5, 1.0, 'Poly Kernel')
```




```
y_plot = model_rbf.predict(plot_data)
class_0 = plot_data[y_plot==0]
class_1 = plot_data[y_plot==1]
plt.scatter(class_0[:,0],class_0[:,1],c='red')
plt.scatter(class_1[:,0],class_1[:,1],c='blue')
plt.title('rbf Kernel')
```

```
Text(0.5, 1.0, 'rbf Kernel')
```




```
pts = np.array([[25,60000],[50,120000]])
pts_scaled = scaler.transform(pts)
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/base.py:439: UserWarning: X does not have valid feature names, but MinMaxScaler was fitted with feature names
  warnings.warn(
```

```
pts_scaled
```

```
array([[0.16666667, 0.33333333],
       [0.76190476, 0.77777778]])
```

```
y = model_rbf.predict(pts_scaled)
y
```

```
array([0, 1])
```