In [5]:

```python
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
```

In [4]:

```python
dataset = pd.read_csv("C:/Users/Sampath/Downloads/voice.csv")
dataset=dataset.replace(to_replace="male",value=1)
dataset=dataset.replace(to_replace="female",value=0)
dataset.head()
```

Out[4]:

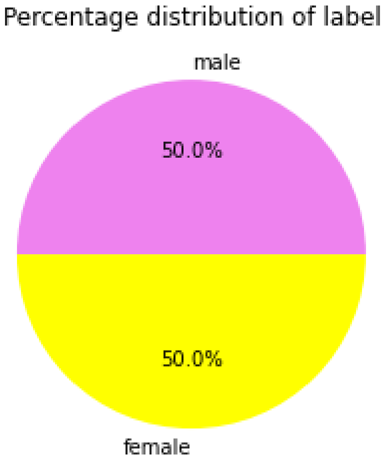
	meanfreq	sd	median	Q25	Q75	IQR	skew	kurt	sp.e
0	0.059781	0.064241	0.032027	0.015071	0.090193	0.075122	12.863462	274.402906	0.8933
1	0.066009	0.067310	0.040229	0.019414	0.092666	0.073252	22.423285	634.613855	0.8921
2	0.077316	0.083829	0.036718	0.008701	0.131908	0.123207	30.757155	1024.927705	0.8463
3	0.151228	0.072111	0.158011	0.096582	0.207955	0.111374	1.232831	4.177296	0.9633
4	0.135120	0.079146	0.124656	0.078720	0.206045	0.127325	1.101174	4.333713	0.9719

5 rows × 21 columns

PERCENTAGE DISTRIBUTION PIE CHART

In [10]:

```
count = dataset.pivot_table(columns=['label'], aggfunc='size')
gender = [count[0], count[1]]
pie_labels = ["male", "female"]
colors = ['VIOLET', 'YELLOW']
plt.pie(gender, labels=pie_labels, autopct="%1.1f%%", colors=colors)
plt.title("Percentage distribution of label")
plt.show()
```



In [11]:

```
X = dataset.iloc[:, :-1].values
y = dataset.iloc[:, -1].values
dataset.head()
```

Out[11]:

	meanfreq	sd	median	Q25	Q75	IQR	skew	kurt	sp.e
0	0.059781	0.064241	0.032027	0.015071	0.090193	0.075122	12.863462	274.402906	0.8933
1	0.066009	0.067310	0.040229	0.019414	0.092666	0.073252	22.423285	634.613855	0.8921
2	0.077316	0.083829	0.036718	0.008701	0.131908	0.123207	30.757155	1024.927705	0.8463
3	0.151228	0.072111	0.158011	0.096582	0.207955	0.111374	1.232831	4.177296	0.9633
4	0.135120	0.079146	0.124656	0.078720	0.206045	0.127325	1.101174	4.333713	0.9719

5 rows × 21 columns

In [14]:

```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.25, random_state =
```

In [15]:

```
print(y_train)
```

```
[1 1 1 ... 0 0 0]
```

In [16]:

```
print(y_train)
```

```
[1 1 1 ... 0 0 0]
```

In [17]:

```
print(X_test)
```

```
[[ 0.19528383  0.03766286  0.19572816 ...  7.4296875   7.2890625
   0.09409376]
 [ 0.17948993  0.06042679  0.1815235  ...  4.546875    4.5234375
   0.11371693]
 [ 0.22159779  0.02752513  0.22067797 ...  4.125       3.9140625
   0.10689732]
 ...
 [ 0.20845323  0.03525388  0.2039604  ... 15.234375   15.0703125
   0.07029549]
 [ 0.16565888  0.06026657  0.17485597 ...  4.3203125   4.25
   0.08555453]
 [ 0.19145471  0.03762533  0.19155624 ...  9.0234375   9.
   0.13564645]]
```

In [18]:

```
from sklearn.preprocessing import StandardScaler
sc = StandardScaler()
X_train = sc.fit_transform(X_train)
X_test = sc.transform(X_test)
```

In [19]:

```
print(X_train)
```

```
[[ 0.09767467  0.09509476  0.42032103 ... -0.13286286 -0.12451985
  -0.26334622]
 [-0.35848485  1.11527934 -0.45159498 ...  0.54459212  0.55742084
  -0.02287791]
 [-0.70387362  0.11485901 -0.58556765 ... -0.42161417 -0.43105996
   1.10093954]
 ...
 [-1.5719578   1.50482645 -1.23038323 ... -0.34387343 -0.33554384
  -0.16422602]
 [ 1.90149339 -1.64978028  1.57609724 ...  1.3197783   1.32821373
  -0.43030433]
 [ 0.19254193 -1.39349351  0.14702    ...  1.19317196  1.20159934
  -0.32447473]]
```

In [20]:

```
print(X_test)
```

```
[[ 0.48573123 -1.16480237  0.27789201 ...  0.66675613  0.64183044
  -0.68342998]
 [-0.05145399  0.20523552 -0.12125809 ... -0.15285334 -0.1445116
  -0.51270684]
 [ 1.38072692 -1.7749372   0.97898046 ... -0.27279619 -0.3177734
  -0.57203803]
 ...
 [ 0.93365157 -1.30978597  0.50921757 ...  2.88569883  2.85425039
  -0.89047669]
 [-0.52187848  0.19559243 -0.30861546 ... -0.21726709 -0.22225728
  -0.75772185]
 [ 0.35549465 -1.16706089  0.1606614  ...  1.11987356  1.12829627
  -0.32191843]]
```

LOGISTIC REGRESSION

In [21]:

```
from sklearn.linear_model import LogisticRegression
classifier = LogisticRegression(random_state = 0)
classifier.fit(X_train, y_train)
```

Out[21]:

```
LogisticRegression(random_state=0)
```

In [22]:

```
print(classifier.predict(sc.transform(X_train)))
```

```
[1 1 1 ... 0 0 0]
```

In [23]:

```
y_pred = classifier.predict(X_test)
print(np.concatenate((y_pred.reshape(len(y_pred),1), y_test.reshape(len(y_test),1)),1))
```

```
[[0 0]
 [1 1]
 [0 0]
 ...
 [0 0]
 [1 1]
 [0 0]]
```

In [24]:

```
from sklearn.metrics import confusion_matrix, accuracy_score,classification_report
cm = confusion_matrix(y_test, y_pred)
print(cm)
L0GISTIC_CLASSIFIER_ACCURACY=accuracy_score(y_test, y_pred)
print(classification_report(y_test, y_pred))
```

```
[[361  12]
 [  5 414]]
              precision    recall  f1-score   support

           0       0.99      0.97      0.98       373
           1       0.97      0.99      0.98       419

    accuracy                           0.98       792
   macro avg       0.98      0.98      0.98       792
weighted avg       0.98      0.98      0.98       792
```

DECISION TREE CLASSIFIER

In [25]:

```
from sklearn.tree import DecisionTreeClassifier
classifier = DecisionTreeClassifier(criterion = 'entropy', random_state = 0)
classifier.fit(X_train, y_train)
```

Out[25]:

```
DecisionTreeClassifier(criterion='entropy', random_state=0)
```

In [26]:

```
print(classifier.predict(sc.transform(X_train)))
```

```
[1 1 1 ... 0 0 0]
```

In [27]:

```
y_pred = classifier.predict(X_test)
print(np.concatenate((y_pred.reshape(len(y_pred),1), y_test.reshape(len(y_test),1)),1))
```

```
[[0 0]
 [1 1]
 [0 0]
 ...
 [0 0]
 [1 1]
 [0 0]]
```

In [28]:

```
from sklearn.metrics import confusion_matrix, accuracy_score,classification_report
cm = confusion_matrix(y_test, y_pred)
print(cm)
DECICION_TREE_CLASSIFIER_ACCURACY=accuracy_score(y_test, y_pred)
print(classification_report(y_test, y_pred))
```

```
[[360  13]
 [ 13 406]]
              precision    recall  f1-score   support

           0       0.97      0.97      0.97       373
           1       0.97      0.97      0.97       419

    accuracy                           0.97       792
   macro avg       0.97      0.97      0.97       792
weighted avg       0.97      0.97      0.97       792
```

In [29]:

```
from sklearn.svm import SVC
classifier = SVC(kernel = 'linear', random_state = 0)
classifier.fit(X_train, y_train)
```

Out[29]:

```
SVC(kernel='linear', random_state=0)
```

In [30]:

```
print(classifier.predict(sc.transform(X_train)))
```

```
[1 1 1 ... 0 0 0]
```

In [31]:

```
y_pred = classifier.predict(X_test)
print(np.concatenate((y_pred.reshape(len(y_pred),1), y_test.reshape(len(y_test),1)),1))
```

```
[[0 0]
 [1 1]
 [0 0]
 ...
 [0 0]
 [1 1]
 [0 0]]
```

In [32]:

```
from sklearn.metrics import confusion_matrix, accuracy_score,classification_report
cm = confusion_matrix(y_test, y_pred)
print(cm)
SVM_CLASSIFIER_ACCURACY=accuracy_score(y_test, y_pred)
print(classification_report(y_test, y_pred))
```

```
[[363  10]
 [  6 413]]
              precision    recall  f1-score   support

           0       0.98      0.97      0.98       373
           1       0.98      0.99      0.98       419

    accuracy                           0.98       792
   macro avg       0.98      0.98      0.98       792
weighted avg       0.98      0.98      0.98       792
```

RANDOM FOREST CLASSIFIER

In [33]:

```
from sklearn.ensemble import RandomForestClassifier
classifier = RandomForestClassifier(n_estimators = 10, criterion = 'entropy', random_state
classifier.fit(X_train, y_train)
```

Out[33]:

```
RandomForestClassifier(criterion='entropy', n_estimators=10, random_state=0)
```

In [34]:

```
print(classifier.predict(sc.transform(X_train)))
```

```
[1 1 1 ... 0 0 0]
```

In [35]:

```
y_pred = classifier.predict(X_test)
print(np.concatenate((y_pred.reshape(len(y_pred),1), y_test.reshape(len(y_test),1)),1))
```

```
[[0 0]
 [1 1]
 [0 0]
 ...
 [0 0]
 [1 1]
 [0 0]]
```

In [36]:

```
from sklearn.metrics import confusion_matrix, accuracy_score,classification_report
cm = confusion_matrix(y_test, y_pred)
print(cm)
RANDOM_FOREST_CLASSIFIER_ACCURACY=accuracy_score(y_test, y_pred)
print(classification_report(y_test, y_pred))
```

```
[[367   6]
 [ 13 406]]
              precision    recall  f1-score   support

           0       0.97      0.98      0.97       373
           1       0.99      0.97      0.98       419

    accuracy                           0.98       792
   macro avg       0.98      0.98      0.98       792
weighted avg       0.98      0.98      0.98       792
```

KNN CLASSIFIER

In [37]:

```
from sklearn.neighbors import KNeighborsClassifier
classifier = KNeighborsClassifier(n_neighbors = 5, metric = 'minkowski', p = 2)
classifier.fit(X_train, y_train)
```

Out[37]:

```
KNeighborsClassifier()
```

In [38]:

```
print(classifier.predict(sc.transform(X_train)))
```

```
[0 1 1 ... 1 0 0]
```

In [39]:

```
y_pred = classifier.predict(X_test)
print(np.concatenate((y_pred.reshape(len(y_pred),1), y_test.reshape(len(y_test),1)),1))
```

```
[[0 0]
 [1 1]
 [0 0]
 ...
 [0 0]
 [1 1]
 [0 0]]
```

In [40]:

```
from sklearn.metrics import confusion_matrix, accuracy_score,classification_report
cm = confusion_matrix(y_test, y_pred)
print(cm)
KNN_CLASSIFIER_ACCURACY = accuracy_score(y_test, y_pred)
print(classification_report(y_test, y_pred))
```

```
[[362  11]
 [  7 412]]
              precision    recall  f1-score   support

           0       0.98      0.97      0.98       373
           1       0.97      0.98      0.98       419

    accuracy                           0.98       792
   macro avg       0.98      0.98      0.98       792
weighted avg       0.98      0.98      0.98       792
```

BEST ACCURACY

In [ ]:

```
print("LOGISTIC REGRESSION CLASSIFIER = ",L0GISTIC_CLASSIFIER_ACCURACY)
print("DECISION TREE CLASSIFIER = ",DECICION_TREE_CLASSIFIER_ACCURACY)
print("SVM CLASSIFIER = ",SVM_CLASSIFIER_ACCURACY)
print("RANDOM FOREST CLASSIFIER = ",RANDOM_FOREST_CLASSIFIER_ACCURACY)
print("KNN CLASSIFIER = ",KNN_CLASSIFIER_ACCURACY)
```

BEST ACCURACY IS OF SVM CLASSIFIER

In [ ]:

```

```