Music Genre Based Playlist Generator

Machine Learning Project-Phase1

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Problem Definition:

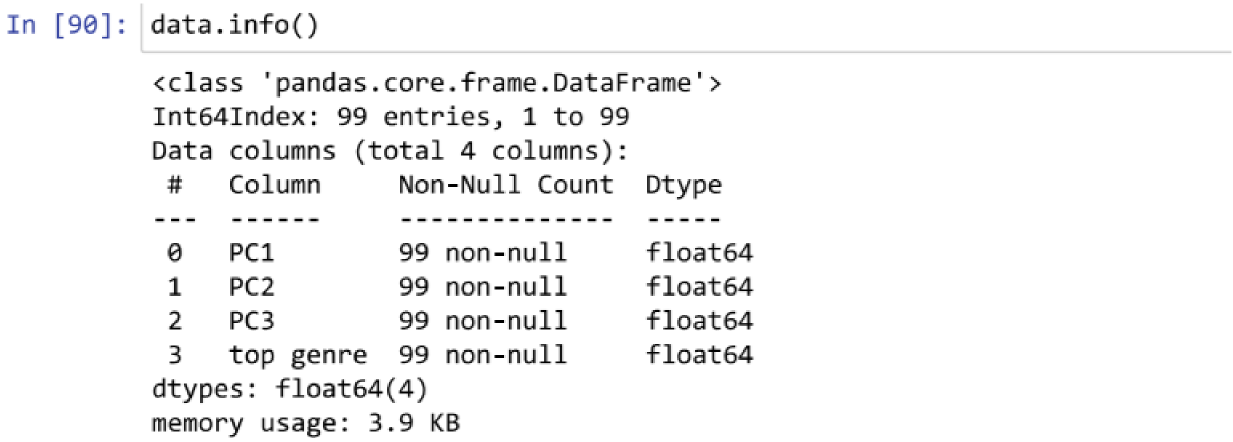
Creating an algorithm to sort and create a song playlist based on our mood at a point of time or a playlist classified based on different genres made by analysing various mood factors like danceability, loudness etc in a song.

Dataset:

The datasets used in the project are the data derived from the spotify API derived from various sources like Kaggle. The datasets contain details about various moods that a song possesses based on which the songs are classified to different Genres.

We drop unnamed and null values.

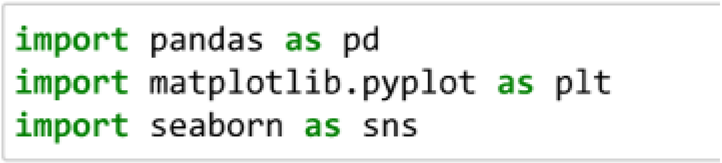
Data has 99 values:



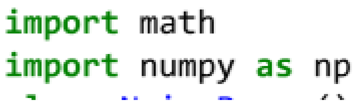
```
In [90]: data.info()

<class 'pandas.core.frame.DataFrame'>
Int64Index: 99 entries, 1 to 99
Data columns (total 4 columns):
 #   Column     Non-Null Count  Dtype  
---  ------     --------------  -----  
 0   PC1        99 non-null     float64
 1   PC2        99 non-null     float64
 2   PC3        99 non-null     float64
 3   top genre  99 non-null     float64
dtypes: float64(4)
memory usage: 3.9 KB
```

Python packages:



```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

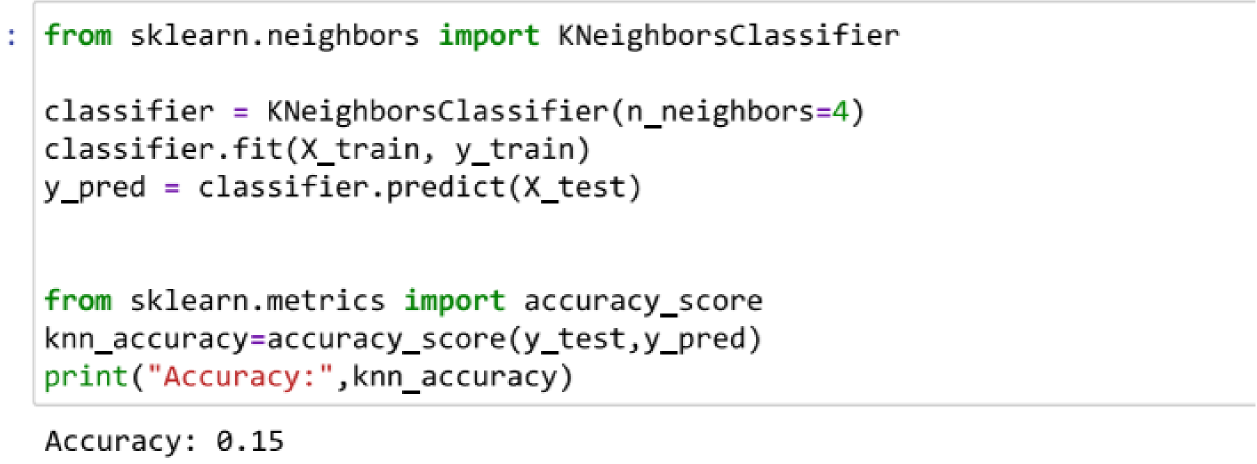


```
import math
import numpy as np
```

Different Algorithms:

Supervised:

KNN:



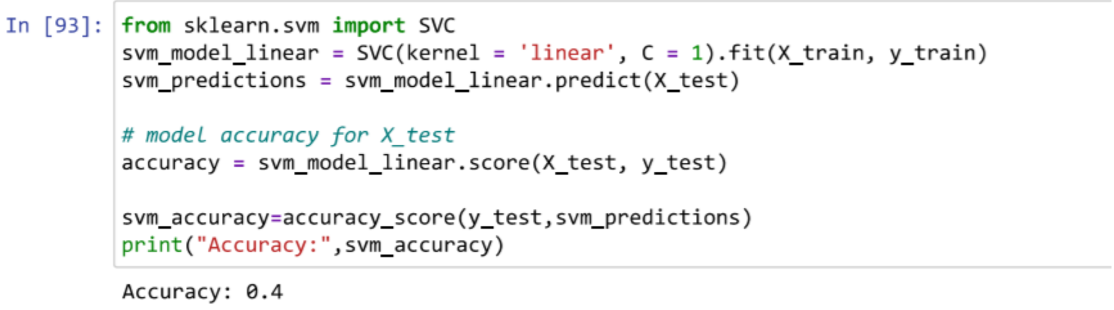
```
: from sklearn.neighbors import KNeighborsClassifier

  classifier = KNeighborsClassifier(n_neighbors=4)
  classifier.fit(X_train, y_train)
  y_pred = classifier.predict(X_test)


  from sklearn.metrics import accuracy_score
  knn_accuracy=accuracy_score(y_test,y_pred)
  print("Accuracy:",knn_accuracy)
```

```
Accuracy: 0.15
```

SVM:



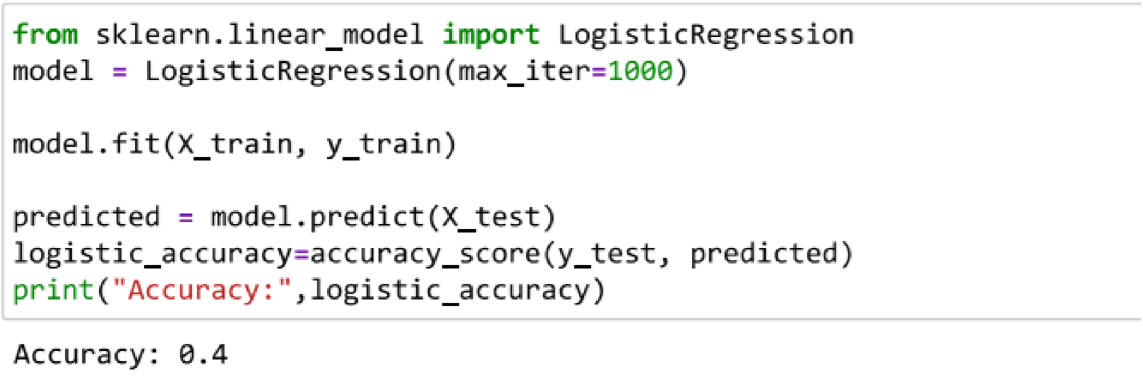
```
In [93]: from sklearn.svm import SVC
         svm_model_linear = SVC(kernel = 'linear', C = 1).fit(X_train, y_train)
         svm_predictions = svm_model_linear.predict(X_test)

         # model accuracy for X_test
         accuracy = svm_model_linear.score(X_test, y_test)

         svm_accuracy=accuracy_score(y_test,svm_predictions)
         print("Accuracy:",svm_accuracy)
```

```
Accuracy: 0.4
```

Logistic Regression:



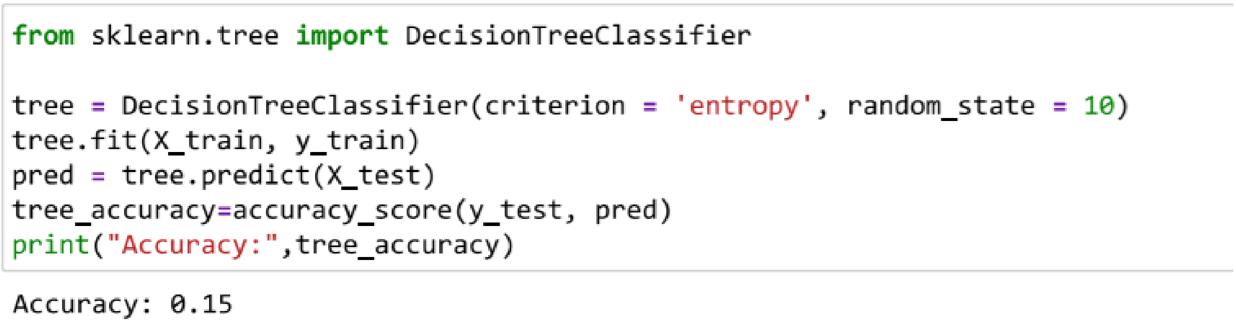
```
from sklearn.linear_model import LogisticRegression
model = LogisticRegression(max_iter=1000)

model.fit(X_train, y_train)

predicted = model.predict(X_test)
logistic_accuracy=accuracy_score(y_test, predicted)
print("Accuracy:",logistic_accuracy)
```

```
Accuracy: 0.4
```

Decision Tree:

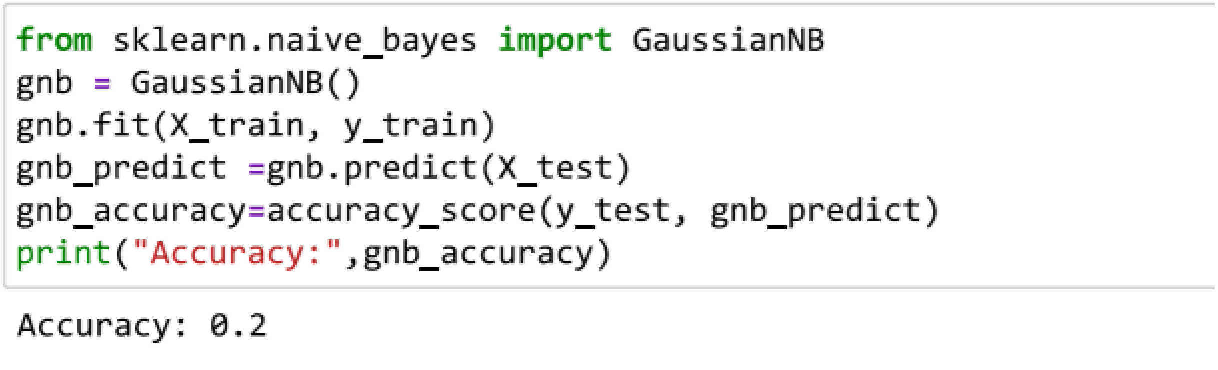


```
from sklearn.tree import DecisionTreeClassifier

tree = DecisionTreeClassifier(criterion = 'entropy', random_state = 10)
tree.fit(X_train, y_train)
pred = tree.predict(X_test)
tree_accuracy=accuracy_score(y_test, pred)
print("Accuracy:",tree_accuracy)
```

```
Accuracy: 0.15
```

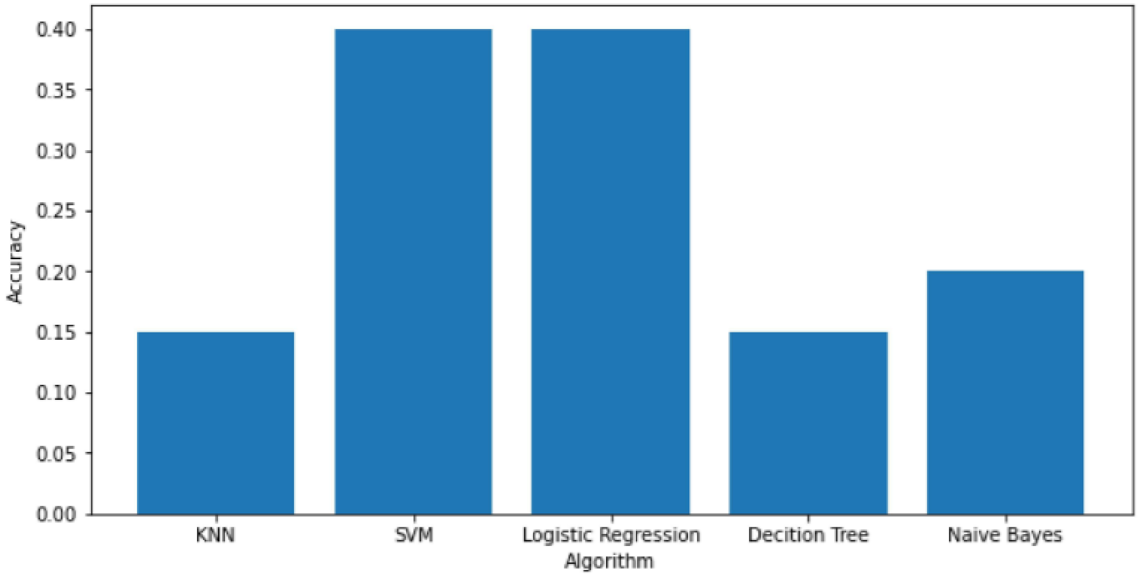
Naive Bayes:



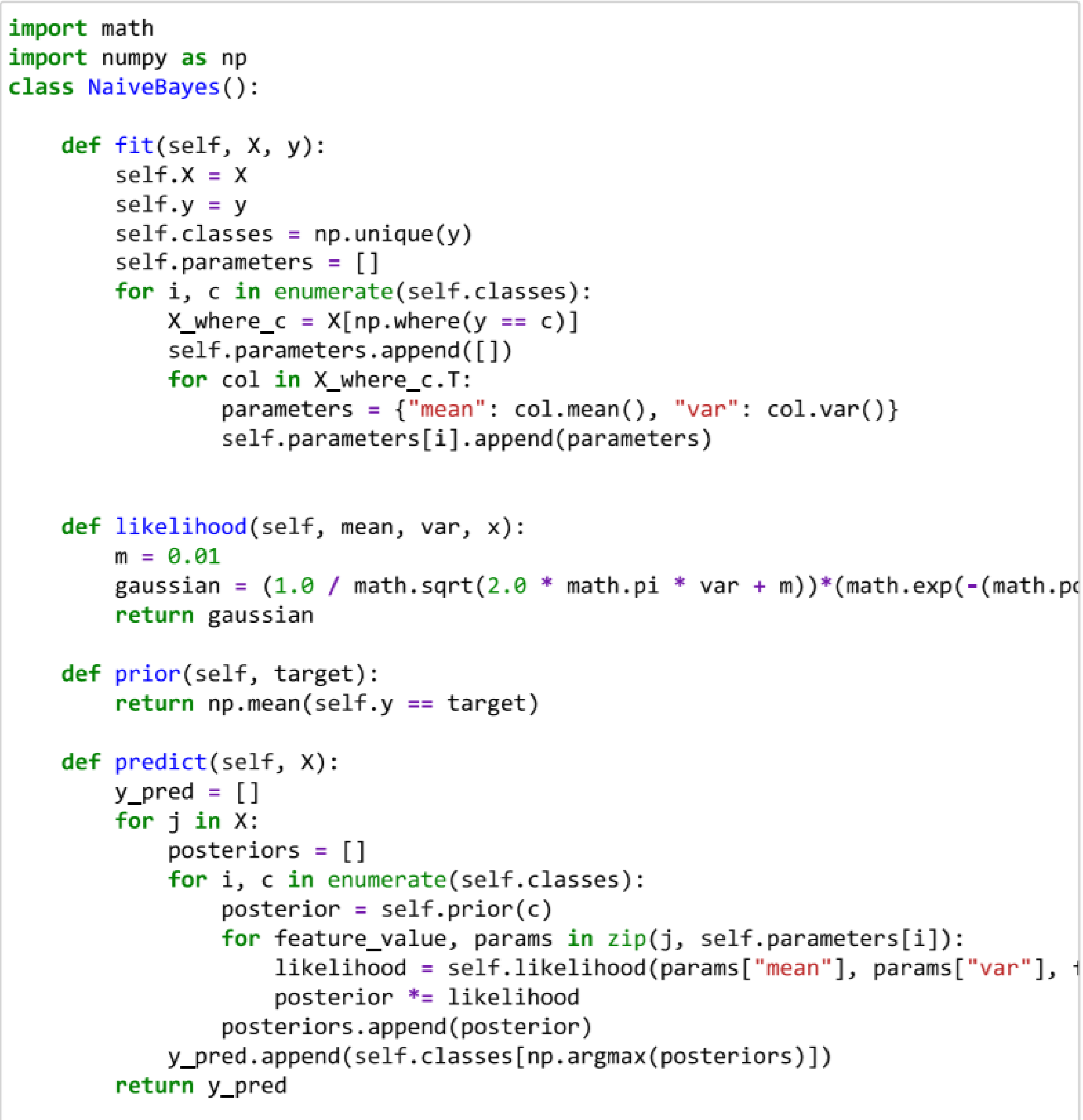
```
from sklearn.naive_bayes import GaussianNB
gnb = GaussianNB()
gnb.fit(X_train, y_train)
gnb_predict =gnb.predict(X_test)
gnb_accuracy=accuracy_score(y_test, gnb_predict)
print("Accuracy:",gnb_accuracy)
```

```
Accuracy: 0.2
```

Comparing Accuracies:



Unsupervised:



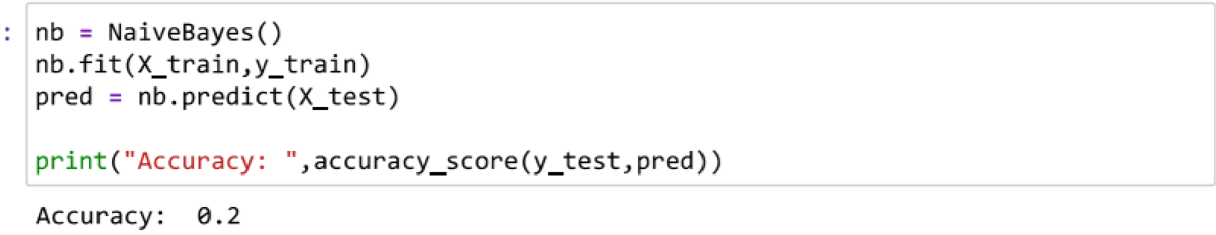
```
import math
import numpy as np
class NaiveBayes():

    def fit(self, X, y):
        self.X = X
        self.y = y
        self.classes = np.unique(y)
        self.parameters = []
        for i, c in enumerate(self.classes):
            X_where_c = X[np.where(y == c)]
            self.parameters.append([])
            for col in X_where_c.T:
                parameters = {"mean": col.mean(), "var": col.var()}
                self.parameters[i].append(parameters)


    def likelihood(self, mean, var, x):
        m = 0.01
        gaussian = (1.0 / math.sqrt(2.0 * math.pi * var + m))*(math.exp(-(math.po
        return gaussian

    def prior(self, target):
        return np.mean(self.y == target)

    def predict(self, X):
        y_pred = []
        for j in X:
            posteriors = []
            for i, c in enumerate(self.classes):
                posterior = self.prior(c)
                for feature_value, params in zip(j, self.parameters[i]):
                    likelihood = self.likelihood(params["mean"], params["var"], f
                    posterior *= likelihood
                posteriors.append(posterior)
            y_pred.append(self.classes[np.argmax(posteriors)])
        return y_pred
```



```
nb = NaiveBayes()
nb.fit(X_train,y_train)
pred = nb.predict(X_test)

print("Accuracy: ",accuracy_score(y_test,pred))
```

```
Accuracy:  0.2
```

Same accuracy as supervised.