CAPSTONE PROJECT REPORT

Gaussian Mixture Models: Bag of Words Representation

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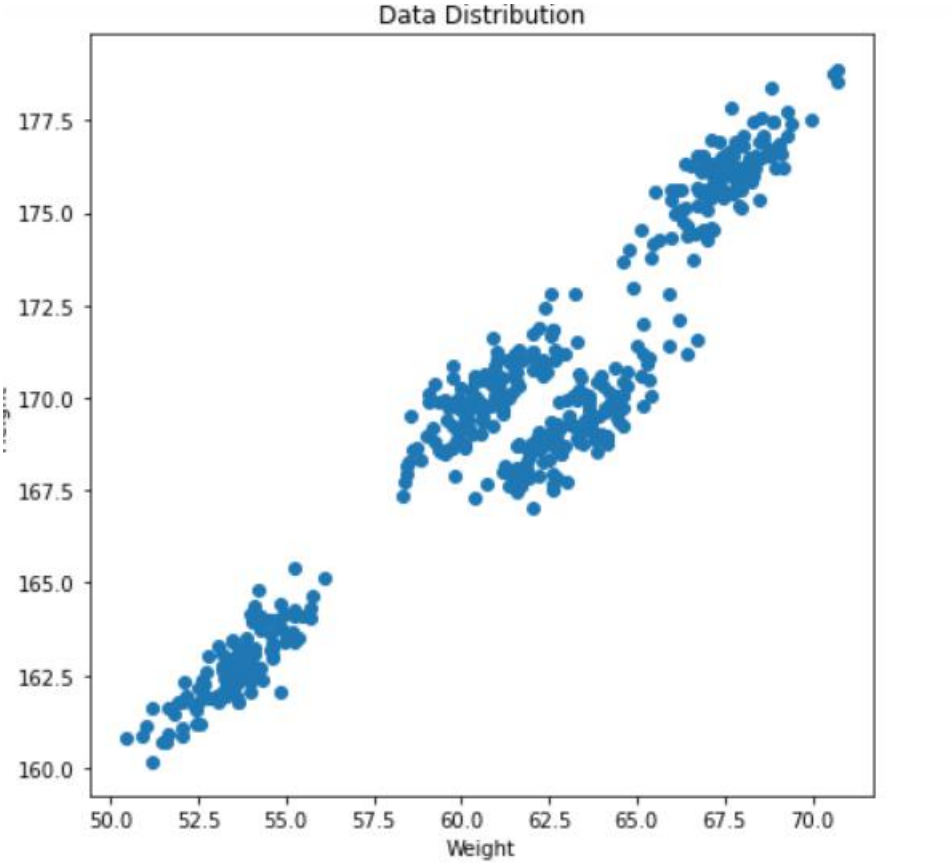
Course - Machine learning and AI
Duration - 24 months
Question - 9

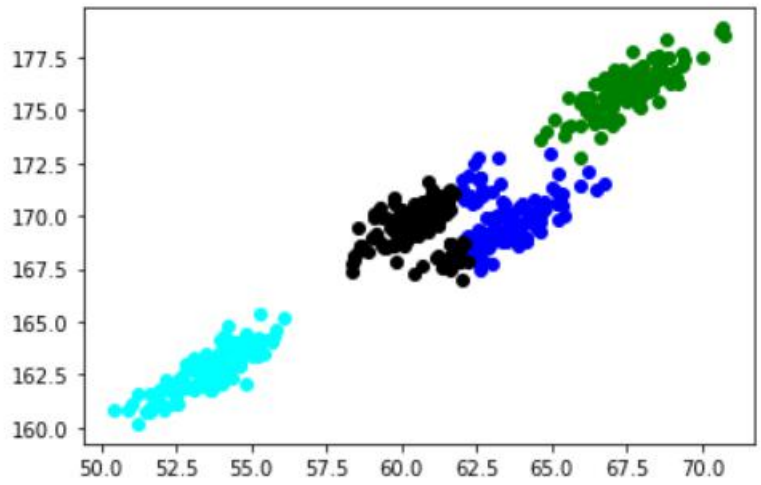
Using a gaussian mixture model, perform a simple clustering on the given 2D Dataset. Try to find the optimal number of clusters using python (you may use any module to implement this). Now implement the same from scratch using python and a dummy dataset generated using scikit learn dataset generating functions such as make blob.

Dataset Link: Clustering_GMM
https://cdn.analyticsvidhya.com/wp-content/uploads/2019/10/Clustering_gmm.csv

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
data = pd.read_csv('Clustering_gmm.csv')

plt.figure(figsize=(7,7))
plt.scatter(data["Weight"],data["Height"])
plt.xlabel('Weight')
plt.ylabel('Height')
plt.title('Data Distribution')
plt.show()
```




```
#training k-means model
from sklearn.cluster import KMeans
kmeans = KMeans(n_clusters=4)
kmeans.fit(data)

#predictions from kmeans
pred = kmeans.predict(data)
frame = pd.DataFrame(data)
frame['cluster'] = pred
frame.columns = ['Weight', 'Height', 'cluster']

#plotting results
color=['blue','green','cyan', 'black']
for k in range(0,4):
    data = frame[frame["cluster"]==k]
    plt.scatter(data["Weight"],data["Height"],c=color[k])
plt.show()
```




```
import pandas as pd
data = pd.read_csv('Clustering_gmm.csv')

# training gaussian mixture model
from sklearn.mixture import GaussianMixture
gmm = GaussianMixture(n_components=4)
gmm.fit(data)

#predictions from gmm
labels = gmm.predict(data)
frame = pd.DataFrame(data)
frame['cluster'] = labels
frame.columns = ['Weight', 'Height', 'cluster']

color=['blue','green','cyan', 'black']
for k in range(0,4):
    data = frame[frame["cluster"]==k]
    plt.scatter(data["Weight"],data["Height"],c=color[k])
plt.show()
```