Project - 4 (DATASET: Breast Cancer Prediction)

In [2]:
```
import pandas as pd
from matplotlib import pyplot as plt
%matplotlib inline
```

In [3]:
```
df=pd.read_csv(r"C:\Users\ubinl\OneDrive\Documents\jupyter\BreastCancerPre
df
```

Out[3]:

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	smooth
0	842302	M	17.99	10.38	122.80	1001.0	
1	842517	M	20.57	17.77	132.90	1326.0	
2	84300903	M	19.69	21.25	130.00	1203.0	
3	84348301	M	11.42	20.38	77.58	386.1	
4	84358402	M	20.29	14.34	135.10	1297.0	
...	...	...	...	...	...	...	...
564	926424	M	21.56	22.39	142.00	1479.0	
565	926682	M	20.13	28.25	131.20	1261.0	
566	926954	M	16.60	28.08	108.30	858.1	
567	927241	M	20.60	29.33	140.10	1265.0	
568	92751	B	7.76	24.54	47.92	181.0	

569 rows × 33 columns

In [4]:
```
df.head()
```

Out[4]:

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	smoothne
0	842302	M	17.99	10.38	122.80	1001.0	
1	842517	M	20.57	17.77	132.90	1326.0	
2	84300903	M	19.69	21.25	130.00	1203.0	
3	84348301	M	11.42	20.38	77.58	386.1	
4	84358402	M	20.29	14.34	135.10	1297.0	

5 rows × 33 columns

In [5]:
```
df.tail()
```

Out[5]:

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	smoothne
564	926424	M	21.56	22.39	142.00	1479.0	
565	926682	M	20.13	28.25	131.20	1261.0	
566	926954	M	16.60	28.08	108.30	858.1	
567	927241	M	20.60	29.33	140.10	1265.0	
568	92751	B	7.76	24.54	47.92	181.0	

5 rows × 33 columns

In [6]:
```
df.drop(['Unnamed: 32'],axis=1)
```

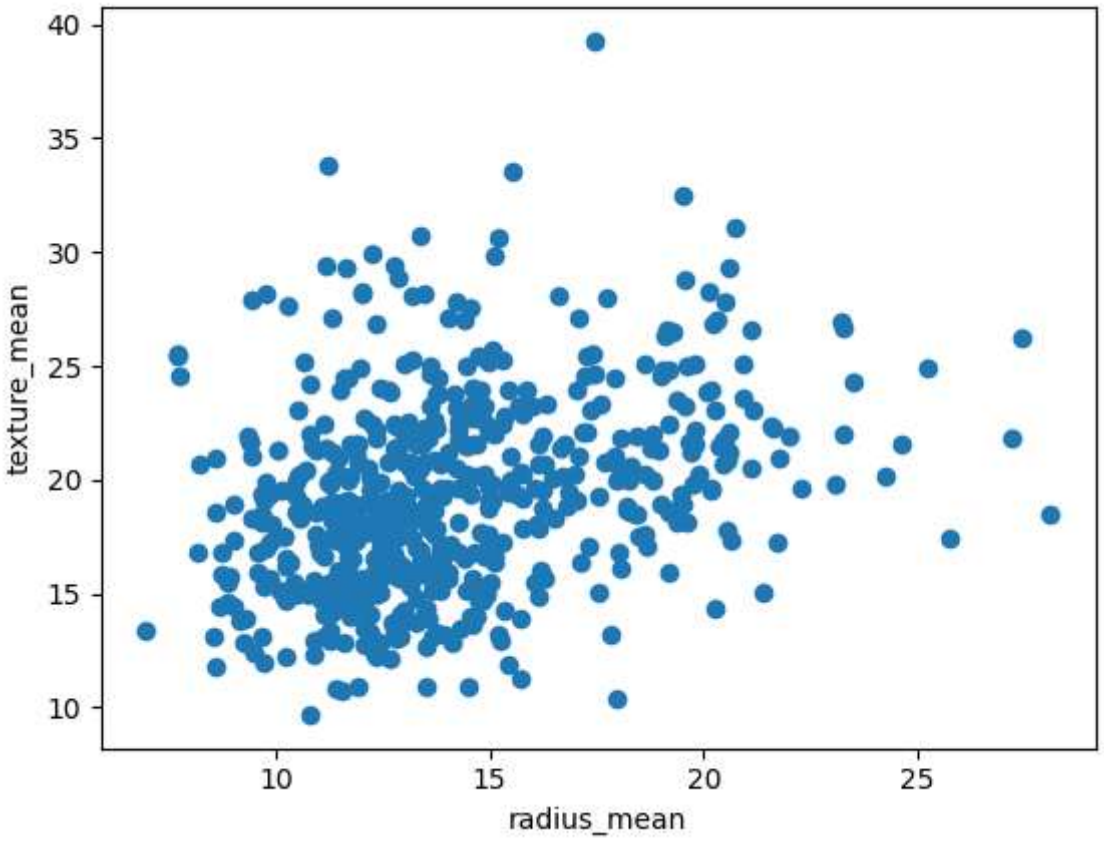
Out[6]:

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	smooth
0	842302	M	17.99	10.38	122.80	1001.0	
1	842517	M	20.57	17.77	132.90	1326.0	
2	84300903	M	19.69	21.25	130.00	1203.0	
3	84348301	M	11.42	20.38	77.58	386.1	
4	84358402	M	20.29	14.34	135.10	1297.0	
...	...	...	...	...	...	...	
564	926424	M	21.56	22.39	142.00	1479.0	
565	926682	M	20.13	28.25	131.20	1261.0	
566	926954	M	16.60	28.08	108.30	858.1	
567	927241	M	20.60	29.33	140.10	1265.0	
568	92751	B	7.76	24.54	47.92	181.0	

569 rows × 32 columns

In [7]:
```
plt.scatter(df["radius_mean"],df["texture_mean"])
plt.xlabel("radius_mean")
plt.ylabel("texture_mean")
```

Out[7]:
```
Text(0, 0.5, 'texture_mean')
```



In [8]:
```
from sklearn.cluster import KMeans
km=KMeans()
km
```

Out[8]:
```
KMeans()
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

In [9]:
```
y_predicted=km.fit_predict(df[["radius_mean","texture_mean"]])
y_predicted
```

```
C:\Users\jangidi veena\AppData\Local\Programs\Python\Python311\Lib\site-p
ackages\sklearn\cluster\_kmeans.py:870: FutureWarning: The default value
of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_ini
t` explicitly to suppress the warning
  warnings.warn(
```

Out[9]:
```
array([7, 6, 6, 3, 6, 7, 6, 0, 5, 5, 0, 0, 4, 5, 5, 2, 0, 0, 6, 7, 7, 1,
       7, 4, 0, 7, 0, 6, 5, 7, 4, 3, 4, 4, 0, 0, 0, 3, 5, 0, 5, 5, 4, 0,
       5, 6, 3, 3, 1, 5, 5, 7, 3, 6, 0, 3, 6, 0, 3, 1, 1, 3, 5, 1, 5, 5,
       3, 3, 3, 7, 6, 1, 4, 7, 3, 0, 1, 7, 4, 3, 5, 7, 4, 4, 1, 6, 0, 4,
       5, 7, 5, 0, 7, 3, 0, 4, 3, 3, 1, 0, 5, 1, 3, 3, 3, 7, 3, 3, 6, 5,
       3, 5, 0, 3, 1, 5, 1, 7, 0, 6, 1, 6, 6, 7, 7, 7, 5, 6, 7, 4, 1, 0,
       0, 7, 6, 5, 3, 1, 7, 1, 1, 0, 3, 7, 1, 1, 3, 0, 7, 3, 5, 3, 1, 1,
       7, 3, 0, 0, 1, 1, 3, 6, 6, 5, 6, 0, 1, 0, 4, 7, 1, 0, 7, 1, 1, 1,
       3, 0, 5, 1, 6, 4, 0, 1, 0, 1, 6, 3, 3, 7, 5, 5, 3, 2, 5, 7, 5, 6,
       6, 0, 3, 0, 4, 5, 3, 7, 3, 0, 5, 7, 6, 3, 6, 4, 5, 7, 3, 3, 6, 4,
       7, 7, 3, 0, 7, 7, 1, 7, 5, 5, 0, 2, 2, 4, 1, 0, 4, 6, 2, 2, 7, 1,
       3, 5, 4, 3, 3, 1, 5, 1, 4, 3, 6, 7, 6, 7, 4, 7, 0, 2, 4, 0, 0, 0,
       0, 4, 3, 5, 7, 3, 7, 1, 6, 1, 4, 3, 1, 6, 3, 7, 4, 1, 6, 0, 7, 3,
       5, 1, 3, 3, 0, 0, 7, 3, 1, 7, 1, 3, 0, 5, 6, 3, 4, 3, 3, 5, 7, 1,
       1, 1, 3, 7, 1, 1, 3, 3, 1, 6, 3, 3, 1, 6, 1, 6, 1, 3, 7, 3, 0, 0,
       7, 3, 3, 1, 3, 0, 7, 6, 3, 4, 7, 3, 1, 6, 1, 1, 3, 7, 1, 1, 3, 0,
       6, 5, 1, 3, 3, 7, 1, 3, 3, 5, 3, 0, 7, 6, 4, 3, 6, 6, 0, 7, 6, 6,
       7, 7, 3, 2, 7, 3, 1, 1, 5, 3, 7, 5, 1, 7, 1, 4, 1, 3, 0, 6, 3, 7,
       3, 3, 1, 3, 6, 1, 3, 7, 1, 3, 7, 5, 6, 3, 3, 3, 5, 0, 2, 5, 5, 0,
       1, 5, 3, 7, 1, 0, 3, 5, 1, 5, 3, 3, 0, 3, 6, 6, 7, 0, 3, 7, 0, 7,
       3, 4, 7, 3, 6, 5, 4, 7, 0, 6, 5, 4, 2, 7, 3, 2, 2, 5, 5, 2, 4, 4,
       2, 3, 3, 0, 0, 3, 4, 3, 3, 2, 7, 2, 1, 7, 0, 7, 1, 0, 3, 0, 7, 3,
       7, 3, 7, 6, 3, 0, 5, 7, 6, 1, 0, 0, 3, 3, 6, 6, 7, 5, 7, 6, 1, 1,
       3, 3, 7, 5, 1, 7, 0, 7, 0, 3, 6, 6, 3, 3, 1, 6, 3, 3, 1, 1, 3, 1,
       7, 1, 3, 3, 7, 6, 3, 6, 5, 5, 5, 5, 1, 5, 5, 2, 0, 5, 3, 3, 3, 5,
       5, 5, 2, 5, 2, 2, 3, 2, 5, 5, 2, 2, 2, 4, 6, 4, 2, 4, 5])
```

In [10]:
```
df["cluster"]=y_predicted
df.head()
```

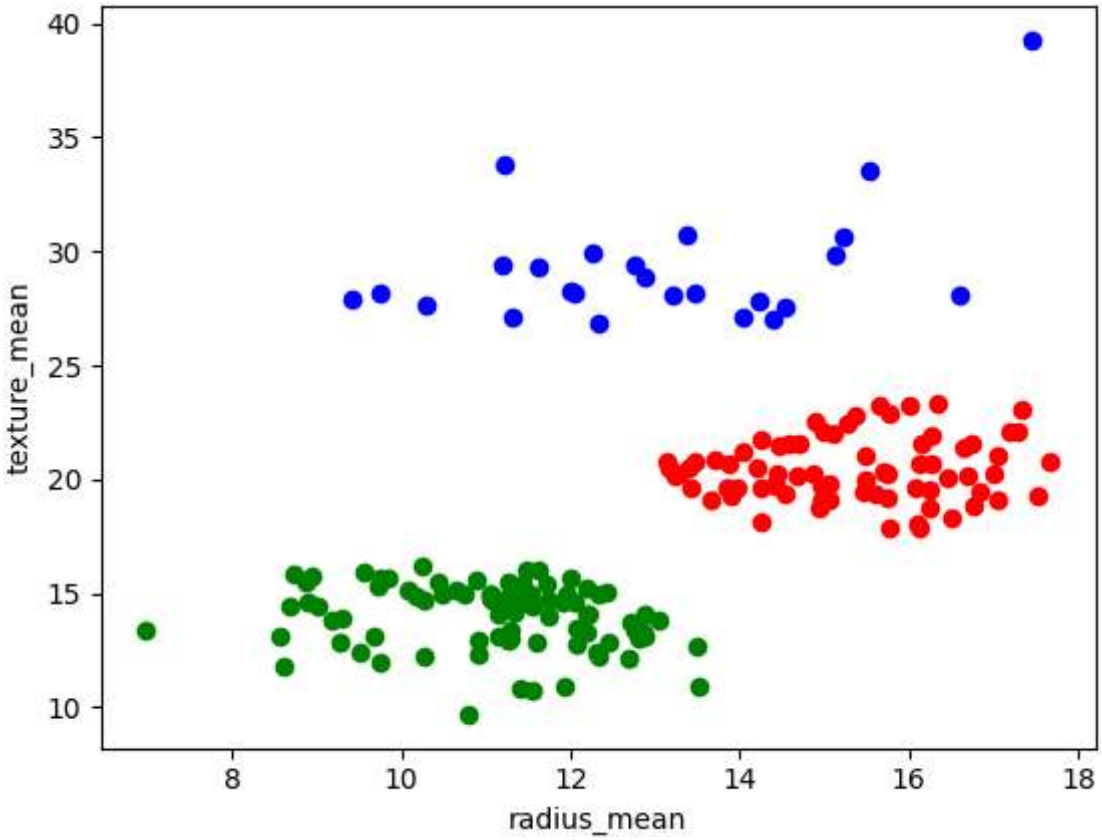
Out[10]:

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	smoothne
0	842302	M	17.99	10.38	122.80	1001.0	
1	842517	M	20.57	17.77	132.90	1326.0	
2	84300903	M	19.69	21.25	130.00	1203.0	
3	84348301	M	11.42	20.38	77.58	386.1	
4	84358402	M	20.29	14.34	135.10	1297.0	

5 rows × 34 columns

In [11]:
```
df1=df[df.cluster==0]
df2=df[df.cluster==1]
df3=df[df.cluster==2]
plt.scatter(df1["radius_mean"],df1["texture_mean"],color="red")
plt.scatter(df2["radius_mean"],df2["texture_mean"],color="green")
plt.scatter(df3["radius_mean"],df3["texture_mean"],color="blue")
plt.xlabel("radius_mean")
plt.ylabel("texture_mean")
```

Out[11]:
```
Text(0, 0.5, 'texture_mean')
```



In [12]:
```
from sklearn.preprocessing import MinMaxScaler
scaler=MinMaxScaler()
scaler.fit(df[["texture_mean"]])
df["texture_mean"]=scaler.transform(df[["texture_mean"]])
df.head()
```

Out[12]:

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	smoothne
0	842302	M	17.99	0.022658	122.80	1001.0	
1	842517	M	20.57	0.272574	132.90	1326.0	
2	84300903	M	19.69	0.390260	130.00	1203.0	
3	84348301	M	11.42	0.360839	77.58	386.1	
4	84358402	M	20.29	0.156578	135.10	1297.0	

5 rows × 34 columns

In [13]:
```
scaler.fit(df[["radius_mean"]])
df["radius_mean"]=scaler.transform(df[["radius_mean"]])
df.head()
```

Out[13]:

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	smoothne
0	842302	M	0.521037	0.022658	122.80	1001.0	
1	842517	M	0.643144	0.272574	132.90	1326.0	
2	84300903	M	0.601496	0.390260	130.00	1203.0	
3	84348301	M	0.210090	0.360839	77.58	386.1	
4	84358402	M	0.629893	0.156578	135.10	1297.0	

5 rows × 34 columns

In [14]:
```
y_predicted=km.fit_predict(df[["radius_mean","texture_mean"]])
y_predicted
```

```
C:\Users\jangidi veena\AppData\Local\Programs\Python\Python311\Lib\site-p
ackages\sklearn\cluster\_kmeans.py:870: FutureWarning: The default value
of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_ini
t` explicitly to suppress the warning
  warnings.warn(
```

Out[14]:
```
array([5, 3, 3, 6, 3, 5, 3, 0, 0, 4, 0, 5, 7, 0, 0, 4, 0, 0, 3, 5, 5, 1,
       5, 2, 0, 3, 0, 3, 0, 3, 7, 6, 7, 7, 5, 0, 0, 6, 0, 0, 0, 6, 7, 0,
       0, 3, 1, 6, 1, 0, 6, 5, 6, 3, 0, 6, 3, 0, 6, 1, 1, 6, 0, 1, 0, 0,
       6, 6, 1, 5, 3, 1, 7, 5, 6, 0, 5, 3, 7, 6, 6, 5, 2, 7, 1, 3, 0, 7,
       0, 5, 0, 0, 5, 6, 0, 7, 6, 6, 1, 0, 4, 1, 6, 6, 6, 5, 6, 6, 2, 6,
       1, 6, 0, 6, 1, 6, 1, 5, 0, 3, 1, 3, 2, 5, 5, 5, 0, 3, 5, 7, 1, 0,
       0, 5, 3, 0, 6, 1, 5, 1, 1, 3, 6, 5, 1, 1, 6, 0, 5, 5, 0, 6, 1, 1,
       5, 6, 3, 3, 1, 1, 6, 3, 3, 0, 2, 0, 1, 3, 7, 5, 1, 0, 5, 1, 1, 1,
       6, 3, 0, 5, 2, 7, 0, 1, 0, 1, 3, 6, 6, 5, 0, 0, 6, 4, 0, 5, 0, 3,
       3, 0, 6, 3, 2, 0, 6, 5, 6, 3, 0, 5, 3, 6, 2, 7, 0, 5, 6, 6, 3, 7,
       5, 5, 6, 0, 5, 5, 1, 5, 0, 0, 3, 4, 4, 7, 1, 0, 2, 3, 4, 7, 5, 5,
       6, 0, 7, 6, 5, 5, 4, 1, 7, 6, 3, 3, 3, 5, 7, 5, 0, 4, 7, 3, 3, 0,
       3, 7, 6, 0, 5, 6, 5, 1, 2, 1, 7, 6, 1, 3, 5, 5, 7, 1, 3, 3, 5, 6,
       6, 5, 6, 6, 0, 0, 5, 6, 5, 5, 1, 6, 5, 6, 3, 6, 7, 6, 6, 4, 5, 1,
       5, 5, 6, 5, 5, 1, 6, 6, 1, 3, 6, 6, 1, 3, 5, 3, 1, 6, 5, 6, 0, 0,
       5, 6, 6, 1, 6, 3, 5, 3, 6, 2, 5, 1, 1, 3, 1, 1, 6, 5, 1, 1, 6, 0,
       2, 0, 1, 6, 6, 5, 1, 6, 6, 0, 6, 3, 5, 3, 7, 6, 3, 2, 0, 5, 3, 3,
       5, 5, 6, 4, 5, 6, 1, 1, 0, 6, 5, 0, 1, 5, 1, 7, 1, 1, 0, 2, 6, 5,
       6, 6, 1, 6, 3, 1, 6, 5, 1, 6, 5, 0, 3, 6, 6, 6, 6, 0, 4, 6, 6, 0,
       1, 6, 6, 5, 1, 0, 6, 6, 1, 6, 1, 6, 0, 6, 3, 3, 5, 0, 6, 5, 0, 5,
       6, 7, 5, 6, 3, 4, 7, 5, 0, 3, 6, 7, 4, 5, 6, 4, 4, 4, 4, 4, 7, 2,
       4, 6, 6, 0, 0, 6, 7, 6, 6, 4, 5, 4, 1, 5, 0, 5, 1, 3, 6, 0, 5, 5,
       5, 5, 5, 3, 1, 3, 0, 5, 3, 1, 0, 0, 6, 6, 3, 3, 5, 0, 5, 2, 1, 1,
       6, 6, 5, 0, 1, 5, 0, 5, 0, 6, 3, 3, 6, 5, 1, 2, 6, 6, 1, 1, 6, 1,
       5, 1, 6, 6, 5, 3, 6, 3, 0, 4, 4, 4, 1, 0, 0, 4, 0, 0, 1, 1, 6, 4,
       6, 6, 4, 6, 4, 4, 6, 4, 0, 4, 4, 4, 4, 7, 2, 7, 7, 7, 4])
```

In [15]:
```
df["New Cluster"]=y_predicted
df.head()
```

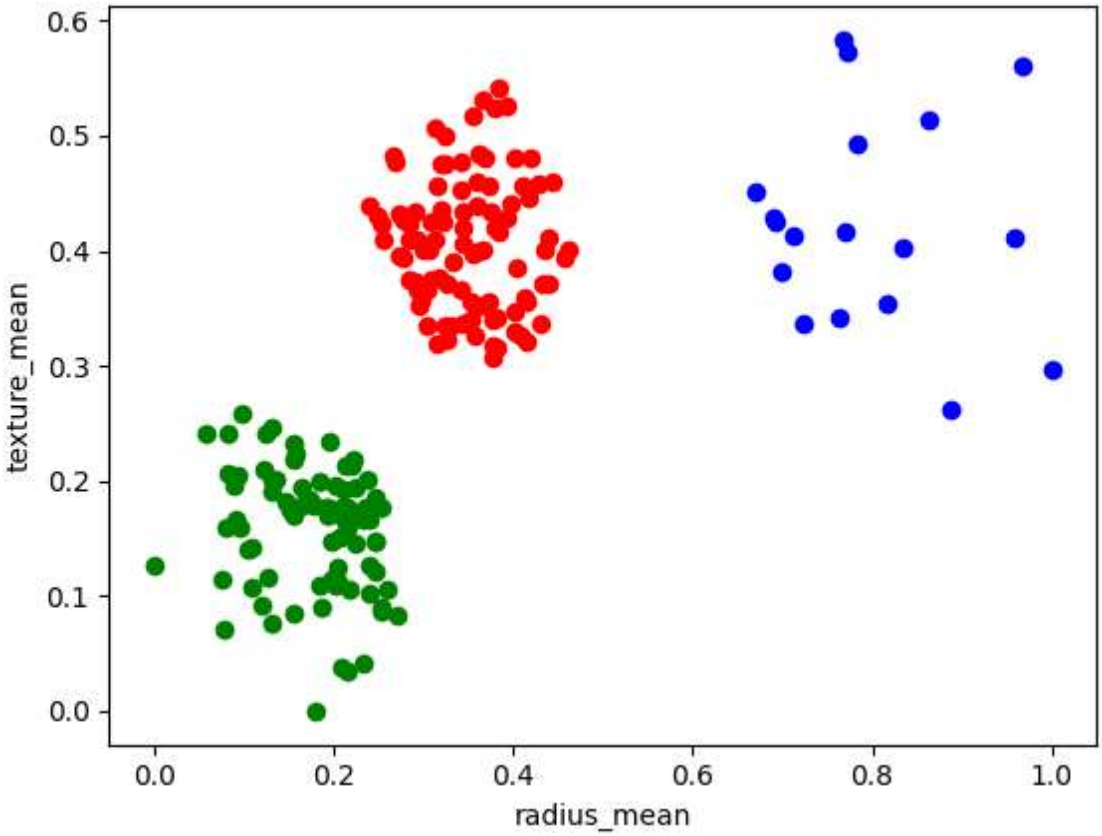
Out[15]:

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	smoothne
0	842302	M	0.521037	0.022658	122.80	1001.0	
1	842517	M	0.643144	0.272574	132.90	1326.0	
2	84300903	M	0.601496	0.390260	130.00	1203.0	
3	84348301	M	0.210090	0.360839	77.58	386.1	
4	84358402	M	0.629893	0.156578	135.10	1297.0	

5 rows × 35 columns

In [16]:
```
df1=df[df["New Cluster"]==0]
df2=df[df["New Cluster"]==1]
df3=df[df["New Cluster"]==2]
plt.scatter(df1["radius_mean"],df1["texture_mean"],color="red")
plt.scatter(df2["radius_mean"],df2["texture_mean"],color="green")
plt.scatter(df3["radius_mean"],df3["texture_mean"],color="blue")
plt.xlabel("radius_mean")
plt.ylabel("texture_mean")
```

Out[16]:
```
Text(0, 0.5, 'texture_mean')
```

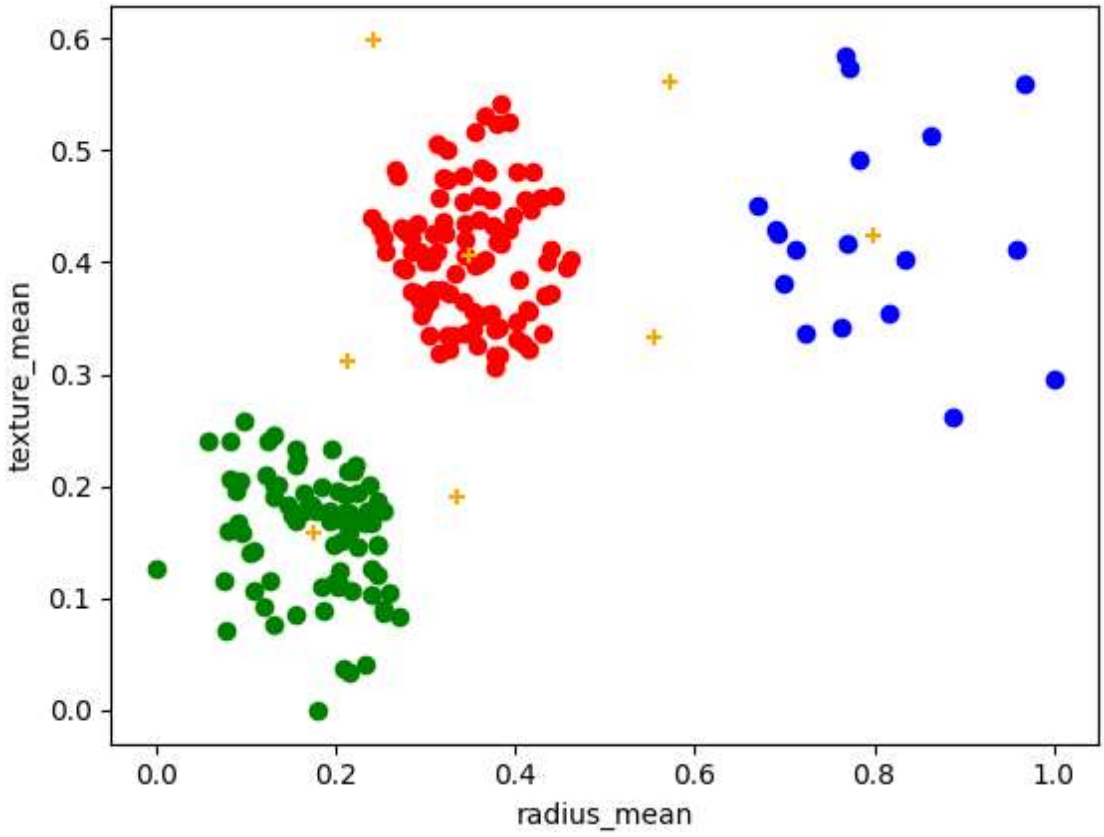


In [17]:
```
km.cluster_centers_
```

Out[17]:
```
array([[0.34943285, 0.40652829],
       [0.17620217, 0.15747668],
       [0.79840767, 0.42469846],
       [0.55490718, 0.33274112],
       [0.24279689, 0.59913388],
       [0.33475131, 0.18972601],
       [0.21306768, 0.31137257],
       [0.57355872, 0.56191523]])
```

In [18]:
```
df1=df[df["New Cluster"]==0]
df2=df[df["New Cluster"]==1]
df3=df[df["New Cluster"]==2]
plt.scatter(df1["radius_mean"],df1["texture_mean"],color="red")
plt.scatter(df2["radius_mean"],df2["texture_mean"],color="green")
plt.scatter(df3["radius_mean"],df3["texture_mean"],color="blue")
plt.scatter(km.cluster_centers_[:,0],km.cluster_centers_[:,1],color="orang
plt.xlabel("radius_mean")
plt.ylabel("texture_mean")
```

Out[18]:
```
Text(0, 0.5, 'texture_mean')
```



In [19]:
```
k_rng=range(1,10)
sse=[]
```

In [20]:

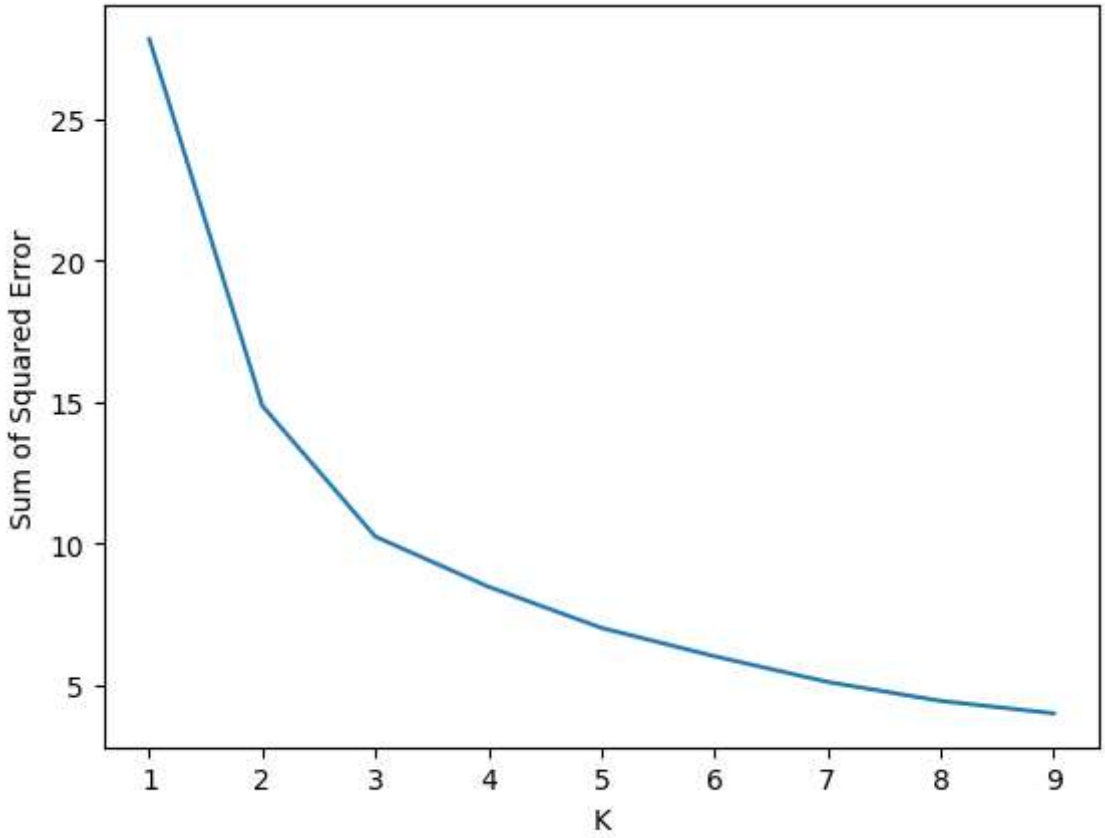
```
for k in k_rng:
 km=KMeans(n_clusters=k)
 km.fit(df[["radius_mean","texture_mean"]])
 sse.append(km.inertia_)
#km.inertia_ will give you the value of sum of square error
print(sse)
plt.plot(k_rng,sse)
plt.xlabel("K")
plt.ylabel("Sum of Squared Error")
```

```
C:\Users\jangidi veena\AppData\Local\Programs\Python\Python311\Lib\site-packages\sklearn\cluster\_kmeans.py:870: FutureWarning: The default value of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_init` explicitly to suppress the warning
  warnings.warn(
C:\Users\jangidi veena\AppData\Local\Programs\Python\Python311\Lib\site-packages\sklearn\cluster\_kmeans.py:870: FutureWarning: The default value of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_init` explicitly to suppress the warning
  warnings.warn(
C:\Users\jangidi veena\AppData\Local\Programs\Python\Python311\Lib\site-packages\sklearn\cluster\_kmeans.py:870: FutureWarning: The default value of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_init` explicitly to suppress the warning
  warnings.warn(
C:\Users\jangidi veena\AppData\Local\Programs\Python\Python311\Lib\site-packages\sklearn\cluster\_kmeans.py:870: FutureWarning: The default value of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_init` explicitly to suppress the warning
  warnings.warn(
C:\Users\jangidi veena\AppData\Local\Programs\Python\Python311\Lib\site-packages\sklearn\cluster\_kmeans.py:870: FutureWarning: The default value of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_init` explicitly to suppress the warning
  warnings.warn(
C:\Users\jangidi veena\AppData\Local\Programs\Python\Python311\Lib\site-packages\sklearn\cluster\_kmeans.py:870: FutureWarning: The default value of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_init` explicitly to suppress the warning
  warnings.warn(
C:\Users\jangidi veena\AppData\Local\Programs\Python\Python311\Lib\site-packages\sklearn\cluster\_kmeans.py:870: FutureWarning: The default value of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_init` explicitly to suppress the warning
  warnings.warn(

[27.817507595043075, 14.87203295827117, 10.252751496105198, 8.484357233864701, 7.030381714568711, 6.0299577318793585, 5.124065737169532, 4.45358770439915, 4.013605150391482]
```

```
C:\Users\jangidi veena\AppData\Local\Programs\Python\Python311\Lib\site-p
ackages\sklearn\cluster\_kmeans.py:870: FutureWarning: The default value
of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_ini
t` explicitly to suppress the warning
  warnings.warn(
C:\Users\jangidi veena\AppData\Local\Programs\Python\Python311\Lib\site-p
ackages\sklearn\cluster\_kmeans.py:870: FutureWarning: The default value
of `n_init` will change from 10 to 'auto' in 1.4. Set the value of `n_ini
t` explicitly to suppress the warning
  warnings.warn(
```

Out[20]: Text(0, 0.5, 'Sum of Squared Error')



CONCLUSION

for the given dataset we can use multiple models,for that models we get different types of accuracies but that accurancies is not good so,that's why we will take it as a clustering and done with k-means Clustering

In [ ]: