

In [1]:

```
import matplotlib.pyplot as plt
from sklearn import datasets
from sklearn.cluster import KMeans
import sklearn.metrics as sm
import pandas as pd
import numpy as np
```

In [2]:

```
iris = datasets.load_iris()

X = pd.DataFrame(iris.data)
X.columns = ['Sepal_Length', 'Sepal_Width', 'Petal_Length', 'Petal_Width']

y = pd.DataFrame(iris.target)
y.columns = ['Targets']
```

In [3]:

```
model = KMeans(n_clusters=3)
model.fit(X)

plt.figure(figsize=(14,7))

colormap = np.array(['red', 'lime', 'black'])
```

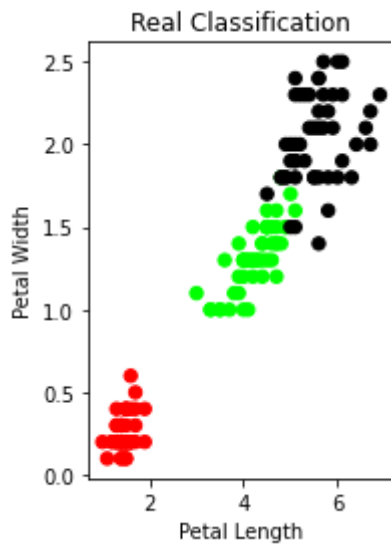
<Figure size 1008x504 with 0 Axes>

In [4]:

```
# Plot the Original Classifications
plt.subplot(1, 2, 1)
plt.scatter(X.Petal_Length, X.Petal_Width, c=colormap[y.Targets], s=40)
plt.title('Real Classification')
plt.xlabel('Petal Length')
plt.ylabel('Petal Width')
```

Out[4]:

Text(0, 0.5, 'Petal Width')

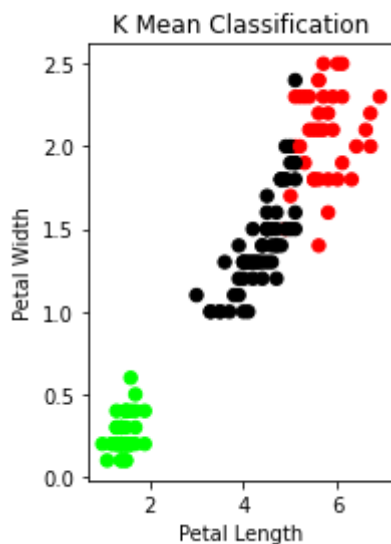


In [5]:

```
# Plot the Models Classifications
plt.subplot(1, 2, 2)
plt.scatter(X.Petal_Length, X.Petal_Width, c=colormap[model.labels_], s=40)
plt.title('K Mean Classification')
plt.xlabel('Petal Length')
plt.ylabel('Petal Width')
```

Out[5]:

Text(0, 0.5, 'Petal Width')



In [6]:

```
print('The accuracy score of K-Mean: ',sm.accuracy_score(y, model.labels_))
print('The Confusion matrixof K-Mean:\n',sm.confusion_matrix(y, model.labels_))
```

The accuracy score of K-Mean: 0.09333333333333334

The Confusion matrixof K-Mean:

```
[[ 0 50  0]
 [ 2  0 48]
 [36  0 14]]
```

In [26]:

```
from sklearn import preprocessing
scaler = preprocessing.StandardScaler()
scaler.fit(X)
xsa = scaler.transform(X)
xs = pd.DataFrame(xsa, columns = X.columns)
#xs.sample(5)
```

In [27]:

```
from sklearn.mixture import GaussianMixture
gmm = GaussianMixture(n_components=3)
gmm.fit(xs)
```

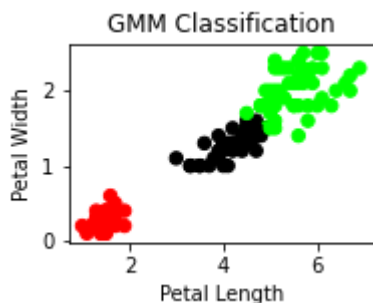
```
y_gmm = gmm.predict(xs)
#y_cluster_gmm
```

In [28]:

```
plt.subplot(2, 2, 3)
plt.scatter(X.Petal_Length, X.Petal_Width, c=colormap[y_gmm], s=40)
plt.title('GMM Classification')
plt.xlabel('Petal Length')
plt.ylabel('Petal Width')
```

Out[28]:

Text(0, 0.5, 'Petal Width')



In [29]:

```
print('The accuracy score of EM: ',sm.accuracy_score(y, y_gmm))  
print('The Confusion matrix of EM:\n',sm.confusion_matrix(y, y_gmm))
```

The accuracy score of EM: 0.36666666666666664

The Confusion matrix of EM:

```
[[50  0  0]  
 [ 0  5 45]  
 [ 0 50  0]]
```