

In [8]:

```
%matplotlib qt
import numpy as np
import matplotlib.pyplot as plt
import matplotlib.image as mpimg
import os
from sklearn.decomposition import PCA
from sklearn.cluster import KMeans
from sklearn.manifold import TSNE
```

In [4]:

```
img = np.load('/home/bhavy/Dropbox/7th-semester/courses/ML/Assignments/Assignment/h
```

In [5]:

```
X = img['X']
Y = img['Y']
```

PCA

In [6]:

```
pca = PCA(n_components=2)
```

In [7]:

```
principalComponents = pca.fit_transform(X)
```

In [17]:

```
plt.figure()
for i in range(1, 11):
    plt.subplot(2, 5, i)
    kmeans = KMeans(n_clusters=10, random_state=i).fit(principalComponents)
    label = kmeans.labels_
    plt.scatter(principalComponents[:, 0], principalComponents[:, 1], c=label)
    #plt.savefig('PCA' +str(i+1) +'.jpg')
plt.show()
```

In [10]:

```
kmeans = KMeans(n_clusters=10, random_state=7).fit(principalComponents)
label = kmeans.labels_
plt.scatter(principalComponents[:, 0], principalComponents[:, 1], c=label)
```

Out[10]:

```
<matplotlib.collections.PathCollection at 0x7fdc18db4588>
```

In [11]:

```
kmeans = KMeans(n_clusters=1, random_state=7).fit(principalComponents)
label = kmeans.labels_
plt.scatter(principalComponents[:, 0], principalComponents[:, 1], c=label)
```

Out[11]:

<matplotlib.collections.PathCollection at 0x7fdc18cefd68>

t-SNE

In [12]:

```
X_embedded = TSNE(n_components=2).fit_transform(X)
```

In [16]:

```
%matplotlib qt
for i in range(1, 11):
    plt.subplot(2, 5, i)
    kmeans = KMeans(n_clusters=10, random_state=i).fit(X_embedded)
    label = kmeans.labels_
    plt.scatter(X_embedded[:, 0], X_embedded[:, 1], c=label)
    #plt.savefig('PCA' +str(i+1) +'.jpg')
#plt.savefig('PCA.jpg')
plt.show()
```

In [15]:

```
kmeans = KMeans(n_clusters=10, random_state=7).fit(X_embedded)
label = kmeans.labels_
plt.scatter(X_embedded[:, 0], X_embedded[:, 1], c=label)
```

Out[15]:

<matplotlib.collections.PathCollection at 0x7fdc18046400>