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- About

Code

CellToolbar

In [1]:

```
from matplotlib.colors import ListedColormap

from sklearn import cross_validation, datasets, metrics, neighbors


import numpy as np

%pylab inline
```

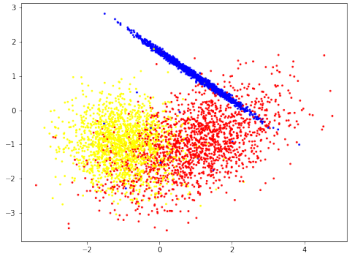
```
/home/riv/.local/lib/python2.7/site-packages/sklearn/cross_validation.py:44: DeprecationWarning: This module was deprecated in version 0.18 in favor of the model_selection module into which all the refactored classes and functions are moved. Also note that the interface of the new CV iterators are different from that of this module. This module will be removed in 0.20.
  "This module will be removed in 0.20.", DeprecationWarning)

Populating the interactive namespace from numpy and matplotlib
```

In [2]:

```
classification_problem = datasets.make_classification(n_samples=5000, n_features =2,
                                                      n_informative = 2, n_redundant = 0,
                                                      n_classes = 3, n_clusters_per_class=1,
                                                      random_state=42)
```

In [23]:

```
colors = ListedColormap(['red', 'blue', 'yellow'])

light_colors = ListedColormap(['lightcoral', 'lightblue', 'lightyellow'])

pylab.figure(figsize=(8,6))

pylab.scatter(map(lambda x: x[0], classification_problem[0]), map(lambda x: x[1], classification_problem[0]),
              c=classification_problem[1],s=3, cmap=colors)

pylab.show()
```



In [4]:

```
from sklearn.model_selection import cross_val_score
```

In [5]:

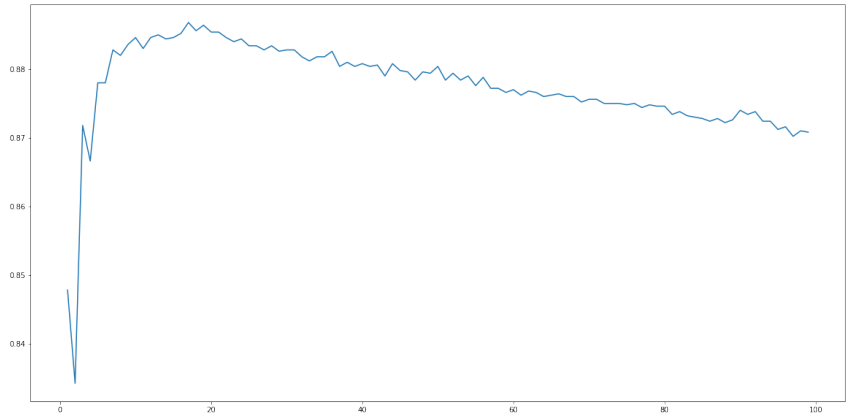
```
k_range_values = range(1,100,1)

scores = []

for k in k_range_values:

    clf = neighbors.KNeighborsClassifier(n_neighbors=k)

    score = np.mean(cross_val_score(clf, classification_problem[0], classification_problem[1], cv=5))

    scores.append(score)
```

In [6]:

```
import matplotlib.pyplot as plt

%matplotlib inline
```

In [7]:

```
plt.figure(figsize=(20,10))

plt.plot(k_range_values, scores)

plt.show()
```



In [8]:

```
winner = k_range_values[scores.index(np.max(scores))]

print(winner)
```

```
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```

In [20]:

```
clf = neighbors.KNeighborsClassifier(n_neighbors=winner)


train_data, test_data, train_labels, test_labels = cross_validation.train_test_split(classification_problem[0],
                                                                                     classification_problem[1],
                                                                                     test_size = 0.3,
                                                                                     random_state = 1)

clf.fit(train_data, train_labels)

predictions = clf.predict(test_data)
```

In [14]:

```
def get_meshgrid(data, step=.05, border=.5,):
    x_min, x_max = data[:, 0].min() - border, data[:, 0].max() + border
    y_min, y_max = data[:, 1].min() - border, data[:, 1].max() + border
    return np.meshgrid(np.arange(x_min, x_max, step), np.arange(y_min, y_max, step))
```

In [21]:

```
#set figure size
pyplot.figure(figsize = (16, 6))

#plot decision surface on the train data
pyplot.subplot(1,2,1)
xx, yy = get_meshgrid(train_data)
mesh_predictions = np.array(clf.predict(np.c_[xx.ravel(), yy.ravel()])).reshape(xx.shape)
pyplot.pcolormesh(xx, yy, mesh_predictions, cmap = light_colors)
pyplot.scatter(train_data[:, 0], train_data[:, 1], c = train_labels, s = 5, cmap = colors)
pyplot.title('Train data, accuracy={:.2f}'.format(metrics.accuracy_score(train_labels, clf.predict(train_data))))

#plot decision surface on the test data
pyplot.subplot(1,2,2)
pyplot.pcolormesh(xx, yy, mesh_predictions, cmap = light_colors)
pyplot.scatter(test_data[:, 0], test_data[:, 1], c = test_labels, s = 5, cmap = colors)
pyplot.title('Test data, accuracy={:.2f}'.format(metrics.accuracy_score(test_labels, clf.predict(test_data))))
pyplot.show()
```