SVM implementaion

December 12, 2022

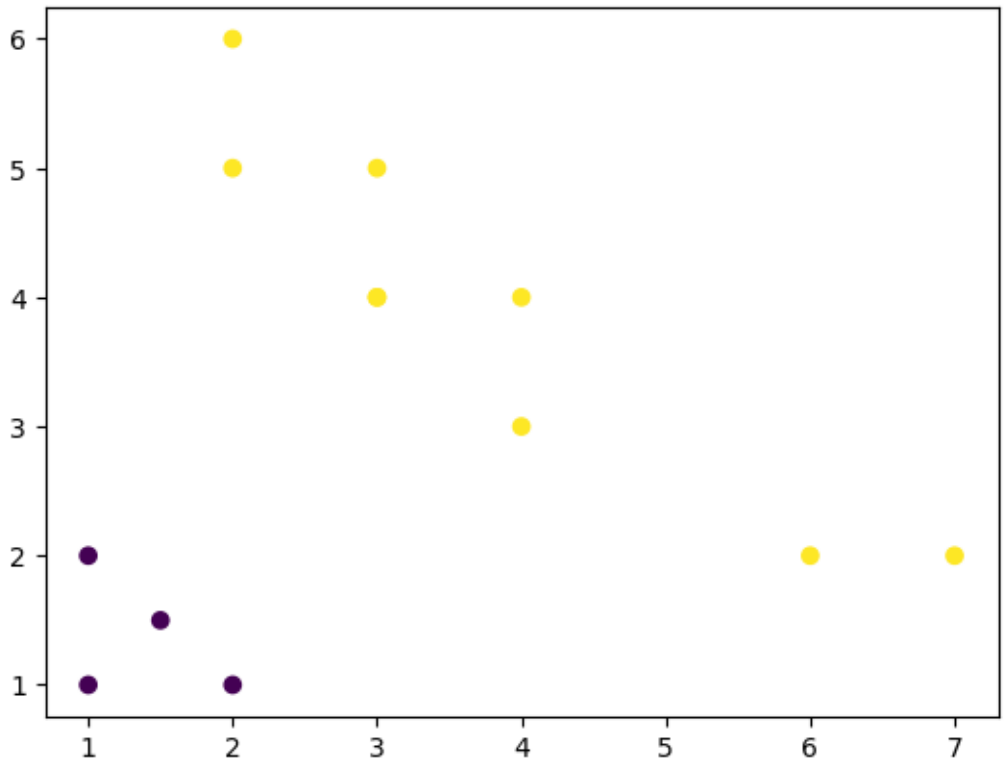
[61]:
```
import numpy as np
import matplotlib.pyplot as plt
from sklearn.svm import SVC
```

[115]:
```
X = np.array([[1,1],[2,1],[1,2],[1.5,1.
↪5],[3,4],[2,5],[4,3],[7,2],[3,5],[2,6],[6,2],[3,4],[4,4]])
y = [0,0,0,0,1,1,1,1,1,1,1,1,1]
```

[63]:
```
X_x1 = X[:, 0]
X_x2 = X[:, 1]
```

[64]:
```
plt.scatter(X_x1, X_x2, c=y)
```

[64]:
```
<matplotlib.collections.PathCollection at 0x7f7923c91120>
```



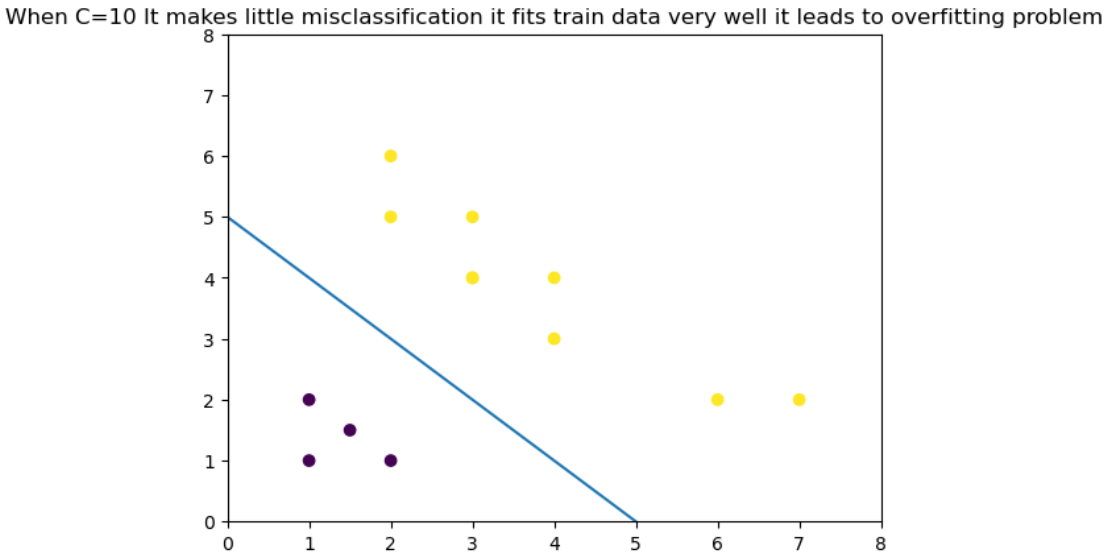
0.0.1 C = 1.0 default

0.1 creating function it takes 2 params c -> refers to C for svc algo

0.2 title_header to print the title for graph

[118]:
```
def create_model_and_line(c, title_header):
    clf = SVC(kernel='linear', C=c)
    clf.fit(X, y)
    clf.coef_, clf.intercept_
    x1 = np.arange(0, 10)
    x2 = -1 * (clf.intercept_ + clf.coef_[0][0] * x1)/clf.coef_[0][1]
    plt.plot(x1, x2)
    plt.scatter(X_x1, X_x2, c=y)
    plt.axis([0, 8, 0, 8])
    plt.title(title_header)
    plt.show()
```

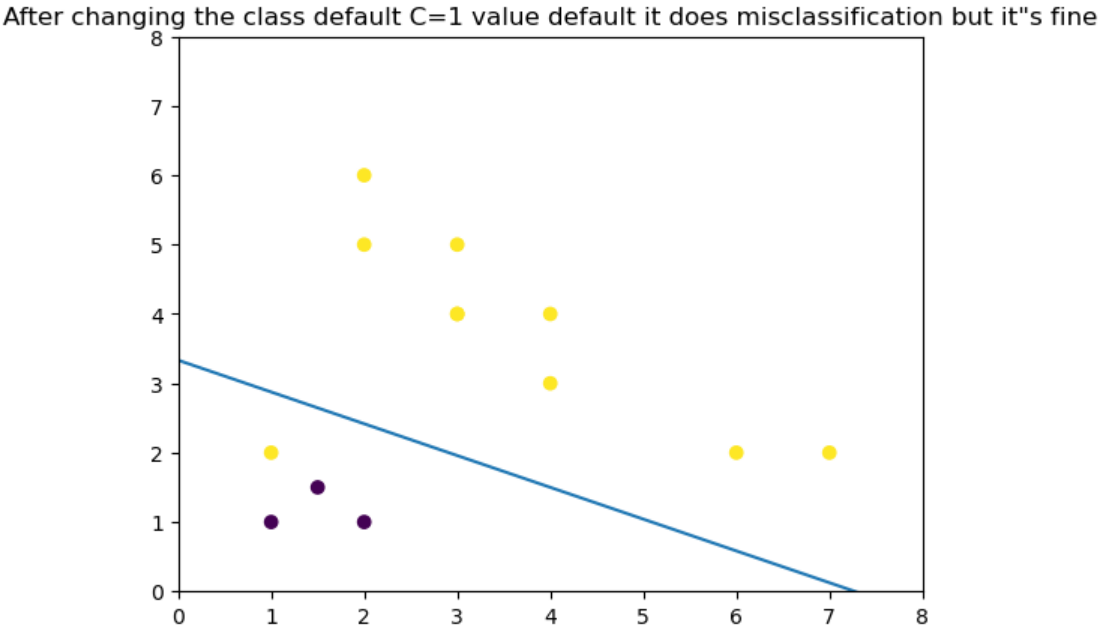
[119]:
```
head = 'When C=10 It makes little misclassification it fits train data very␣
 ↪well it leads to overfitting problem'
create_model_and_line(1, head)
```



0.3 After change the class of [1,2] from 0 to 1

[120]:
```
y = [0,0,1,0,1,1,1,1,1,1,1,1,1]
```

[123]:
```
create_model_and_line(1, 'After changing the class default C=1 value default it␣
↪does misclassification but it"s fine')
```



[125]:
```
create_model_and_line(100, 'Updating C=100 you can observe the model fit best␣
↪for training it also leads to overfitting. ')
# try to keep C is always low because if model overfit the data it. If it's␣
↪come for test it not predict that much accurate
```

Updating C=100 you can observe the model fit best for training it also leads to overfitting.