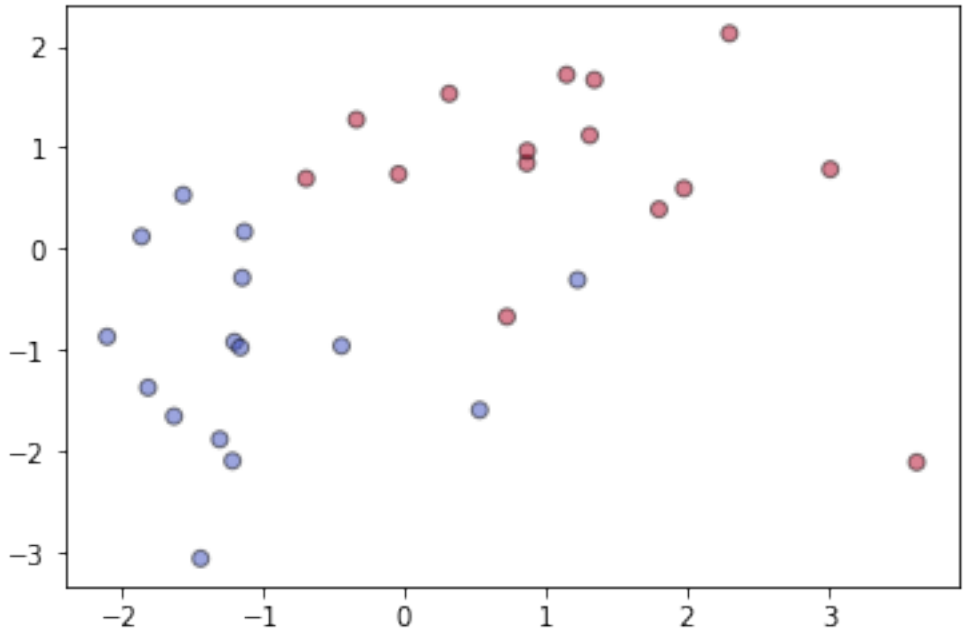
example

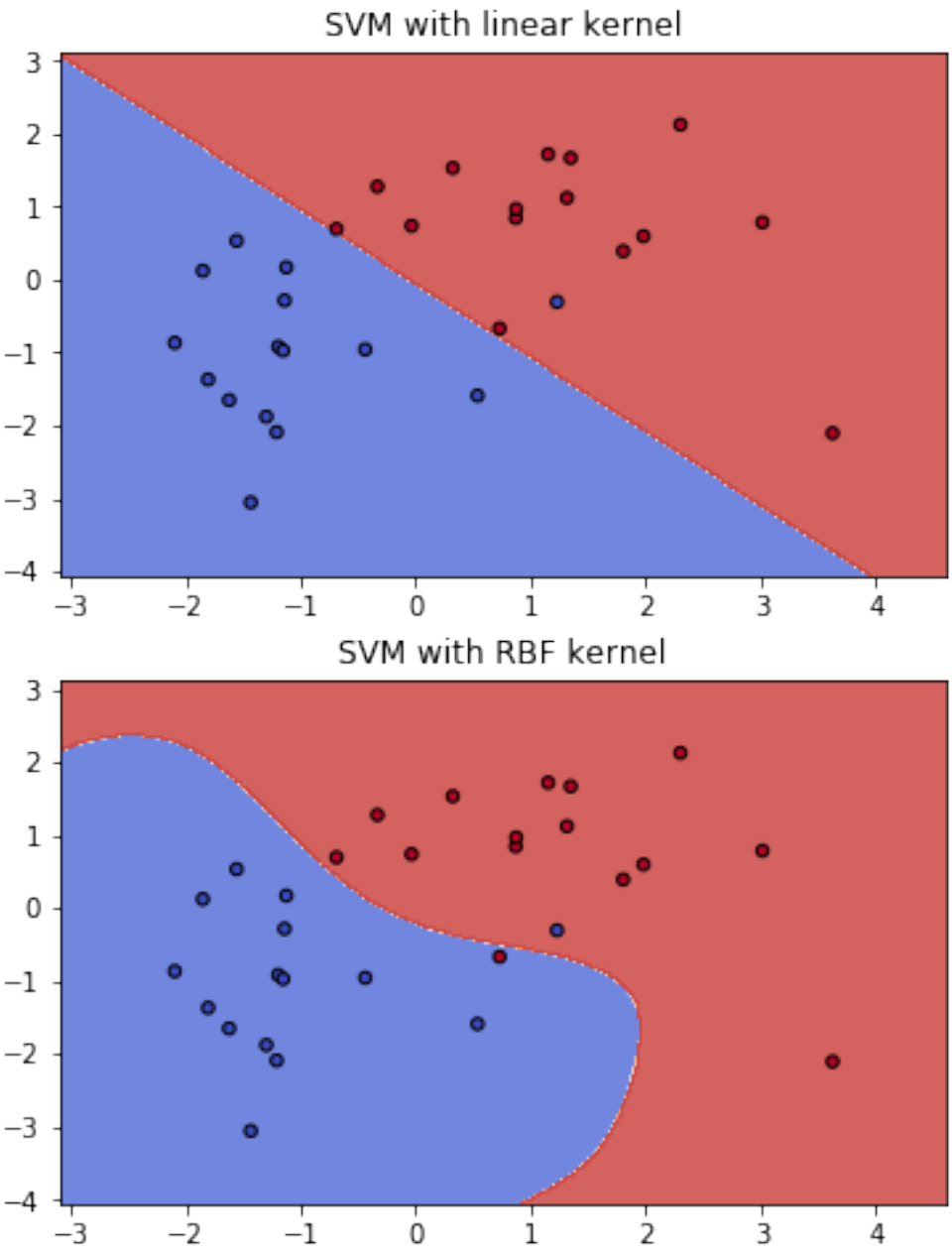
May 3, 2019

In [1]:
```
from SVM import SVM
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
```

In [8]:
```
N = 15

X1 = np.random.multivariate_normal([1,1], [[1,0],[0,1]], N)
y1 = np.ones(N)
X2 = np.random.multivariate_normal([-1,-1], [[1,0],[0,1]], N)
y2 = np.ones(N) * -1

X = np.concatenate([X1, X2])
y = np.concatenate([y1, y2])

plt.scatter(X[:, 0], X[:, 1], c=y, cmap=plt.cm.coolwarm, alpha=0.5, edgecolors='k')
plt.show()
```



```
In [3]: def make_meshgrid(x, y, h=.02):
            x_min, x_max = x.min() - 1, x.max() + 1
            y_min, y_max = y.min() - 1, y.max() + 1
            xx, yy = np.meshgrid(np.arange(x_min, x_max, h),
                                 np.arange(y_min, y_max, h))
            return xx, yy

        def plot_contours(ax, clf, xx, yy, **params):
            Z = clf.predict(np.c_[xx.ravel(), yy.ravel()])
            Z = Z.reshape(xx.shape)
            out = ax.contourf(xx, yy, Z, **params)
            return out

In [10]: models = [SVM(kernel='linear'), SVM(kernel='rbf', sigma=1)]
         for clf in models:
             clf.fit(X, y)

         fig, sub = plt.subplots(2, 1, figsize=[6, 8])
         titles = ('SVM with linear kernel',
                   'SVM with RBF kernel')

         for clf, title, ax in zip(models, titles, sub.flatten()):
             X0, X1 = X[:, 0], X[:, 1]
             xx, yy = make_meshgrid(X0, X1)
             plot_contours(ax, clf, xx, yy, cmap=plt.cm.coolwarm, alpha=0.8)
             ax.scatter(X0, X1, c=y, cmap=plt.cm.coolwarm, s=20, edgecolors='k')
             ax.set_xlim(xx.min(), xx.max())
             ax.set_ylim(yy.min(), yy.max())
             ax.set_title(title)

         plt.show()
```



In [ ]: