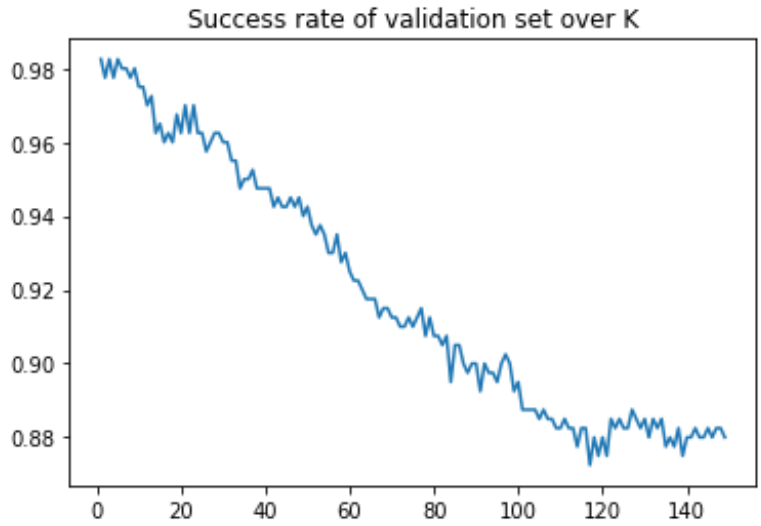
In [3]:

```
from Nearest_neighbors import *
from scipy.io import loadmat
import matplotlib.pyplot as plt
```

In [7]:

```
mats = loadmat('ABCD_data.mat')
train_data = mats['train_data']
valid_data = mats['valid_data']
test_data = mats['test_data']
opt_k, k_neighbors, success_rates = find_optimal_neighbors(train_data, vali
d_data)
fig, ax = plt.subplots()
ax.plot(k_neighbors,success_rates)
plt.title("Success rate of validation set over K")
plt.show()
```

```
success rate of 5 neighbors: 0.9825
```



In [8]:

```
t = ['a', 'b', 'c', 'd']
test_successful_classifications = 0
for index, element in enumerate(test_data):
    clf = KNeighborsClassifier(n_neighbors=opt_k)
    clf.fit(train_data, tags)
    if clf.predict([element]) == t[index//100]:
        test_successful_classifications += 1

opt_success_rate = test_successful_classifications/len(test_data)
print("success rate of opt k for test data:", opt_success_rate)
```

```
success rate of opt k for test data: 0.9925
```