Hangul Characters Classification by Quantum Machine Learning

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Motivation

- Classifying Hangul characters using quantum computer

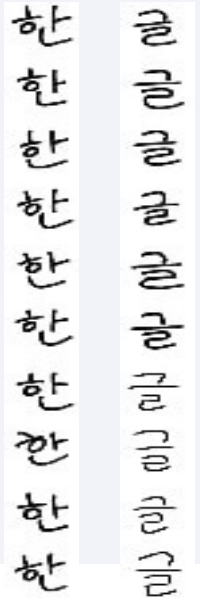
- No QML work on Hangul characters yet

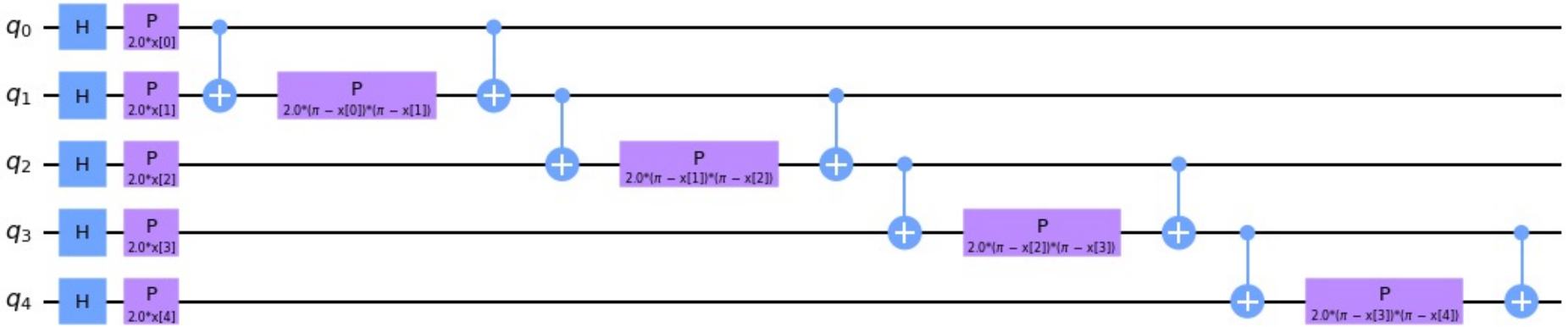
- Expecting more attention from Korean quantum community

Approach

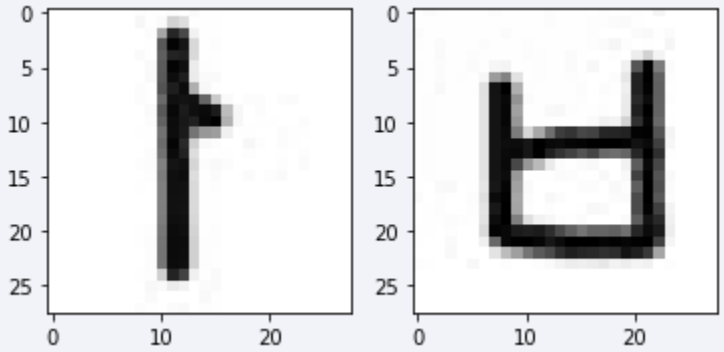
- QSVM (Quantum Support Vector Machine)

- Make our own dataset

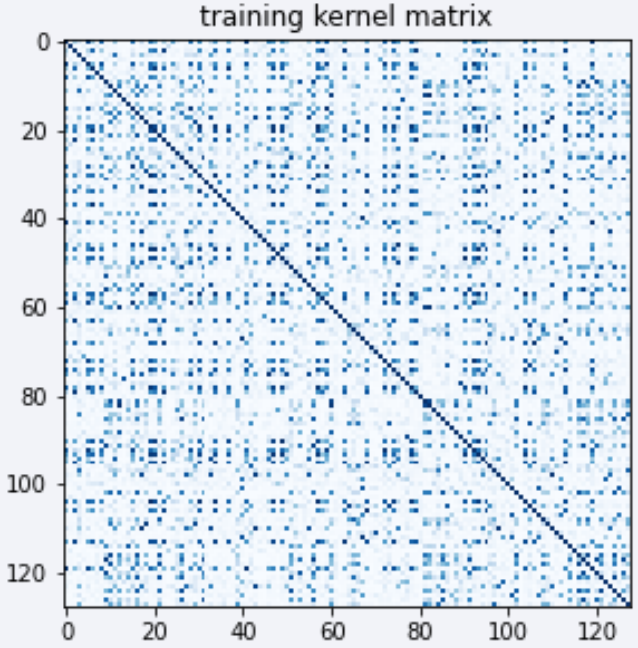


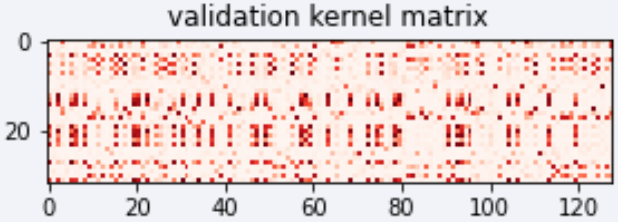


Code1 :
Separate Characters



Code1 :
Separate Characters



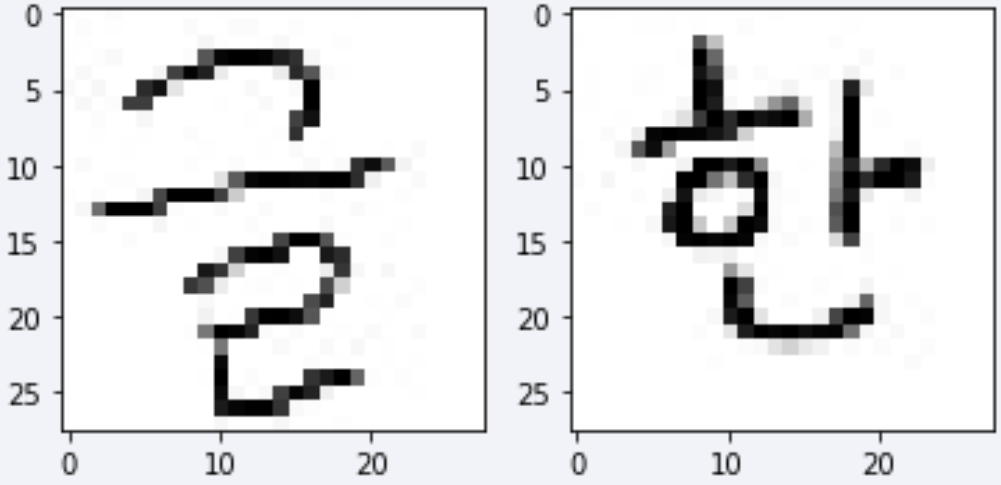


Code1 :
Separate Characters

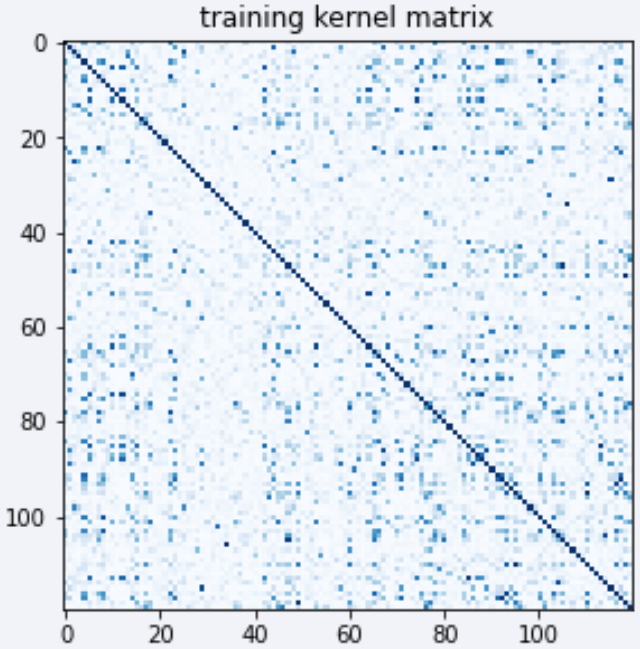
```
zz_svc = SVC(kernel='precomputed')
zz_svc.fit(matrix_train, y_train)
zz_score = zz_svc.score(matrix_val, y_test)

print(f'Precomputed kernel classification test score: {zz_score}')
```

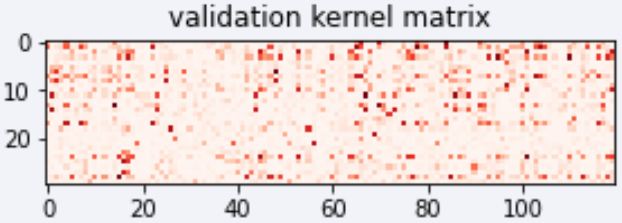
```
Precomputed kernel classification test score: 0.96875
```

Code2 :
Combined Characters



Code2 :
Combined Characters



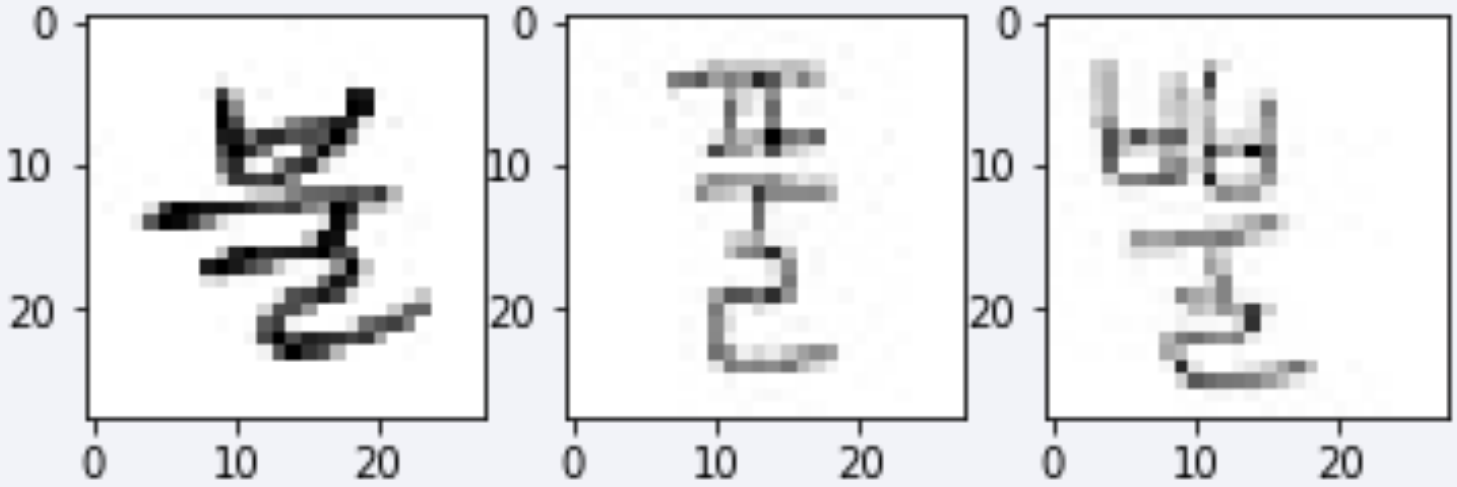


Code2 :
Combined Characters

```
zz_svc = SVC(kernel='precomputed')
zz_svc.fit(matrix_train, y_train)
zz_score = zz_svc.score(matrix_val, y_test)

print(f'Precomputed kernel classification test score: {zz_score}')
```

```
Precomputed kernel classification test score: 0.8
```

Code3 :
Similar characters



Code3 :
Similar characters

```
# prediction
pred_test = np.where((pred_0 > pred_1) & (pred_0 > pred_2),
                     0, np.where(pred_1 > pred_2, 1, 2))

print(f'Prediction: {pred_test}')
```

```
Prediction: [2 1 0 2 0 0 0 1 0 2 1 0 2 1 1 1 2 1 0 1 2 2 0 2 0 1 1 0 1 2 0 0 1 2 0 2]
```

Improvements

- Better Hangul datasets
- Algorithm that can deal with more characters.

Thank You