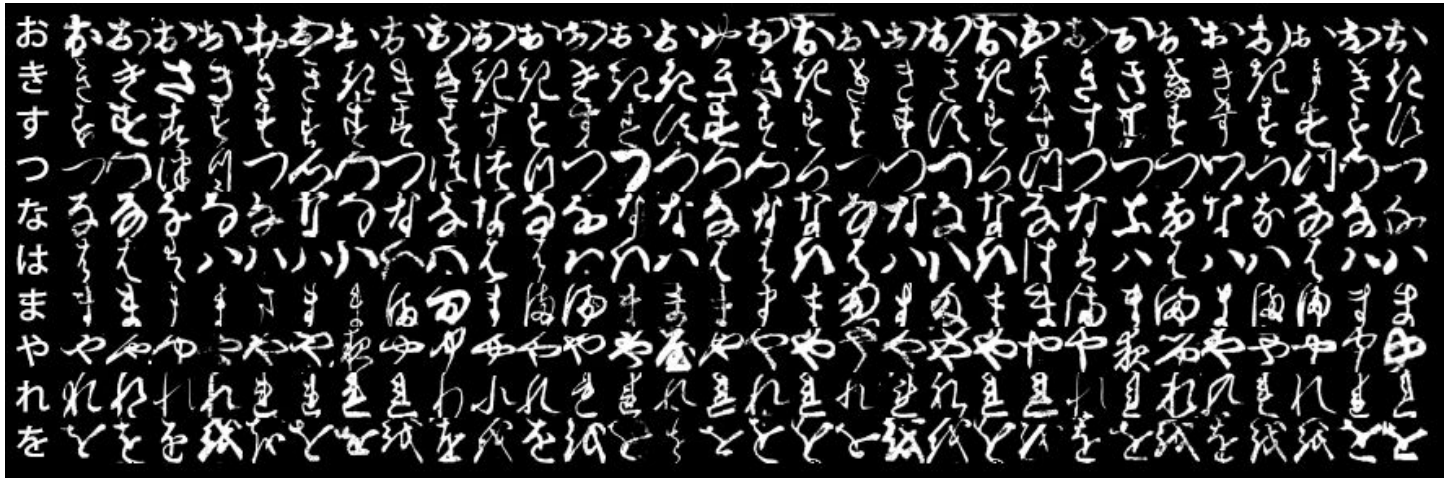
Recognizing Ancient Japanese Cursive Handwriting Using Machine Learning

The goal

Accurately predict the correct Japanese character found in images of ancient Japanese handwriting

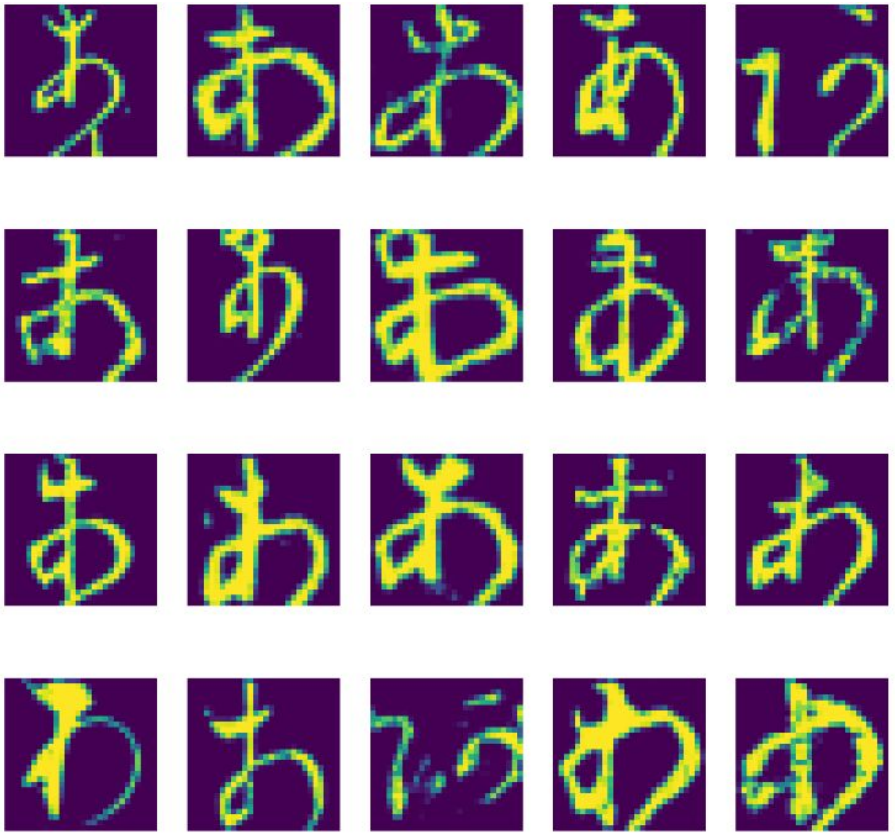


49 different characters

48 Hiragana characters
and 1 iteration mark

Image examples

あ



Plan of attack

1) Test models with varying architecture
2) Select best performing model
3) Test different parameters
4) Select best performing combination
5) Train final model

Models

Model	Loss*	Accuracy*
1	0.2397	0.9420
2	0.2291	0.9463
3	0.3111	0.9259
4	0.2082	0.9510
5	0.2180	0.9456
6	0.1666	0.9598

Additional testing

val_loss	val_acc	loss	acc	optimizer
0.14553251738653053	0.9685847861629328	0.15249694729410723	0.9621829564536413	adam
0.15804367957364865	0.961268908545406	0.2417735350384513	0.9342027082041218	sgd
0.18230095600850627	0.958625356803356	0.2699310582908758	0.935773865363527	rmsprop
0.13682332846199682	0.9684618263905388	0.123740727497497	0.9679142625773133	adadelta

val_loss	val_acc	loss	acc	lr	amsgrad
0.6551614635019714	0.8318578612975905	1.016389008261812	0.73346358111371	1e-05	False
15.671196214419574	0.02772654578058567	15.704261218827472	0.025582522878253838	0.01	False
0.1472627740828798	0.9670478374363238	0.15417947646901697	0.9615886481216125	0.001	False
0.1526931913423682	0.9613303873909219	0.20786495391301318	0.9439780326345907	0.0001	True
0.12919356189783834	0.9684618310296315	0.12250115302308892	0.9677776398454941	0.001	True
0.13668666775517563	0.9665560093398583	0.151575747747906	0.9584053483088264	0.0001	False
3.8005069047927154	0.02772654578058567	3.7965173187551233	0.02648422996258615	0.01	True
0.8754514249417962	0.7775113708738705	1.287268808567689	0.6634514892725636	1e-05	True

Final model

Training accuracy	Test accuracy
0.9901	0.9546

Future work

1) Test other architectures and parameter combinations
2) Augment the imageset
3) Seek new data