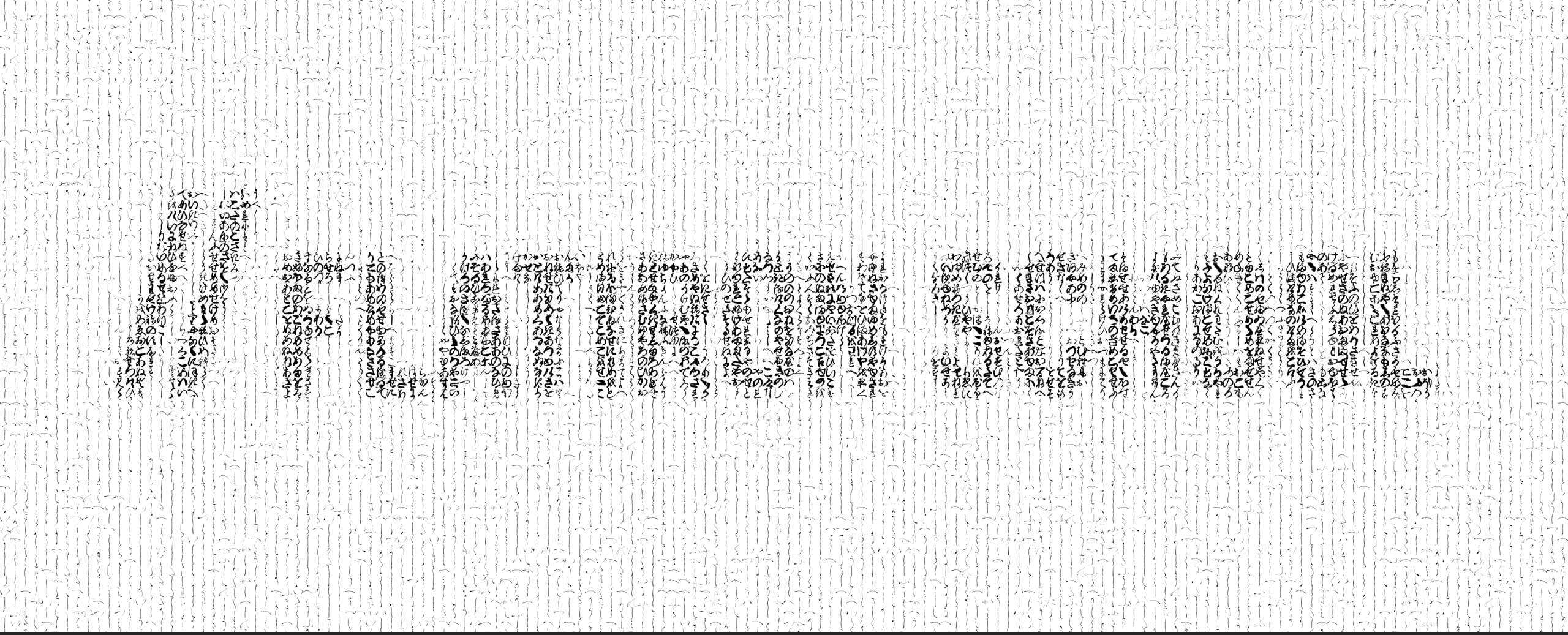
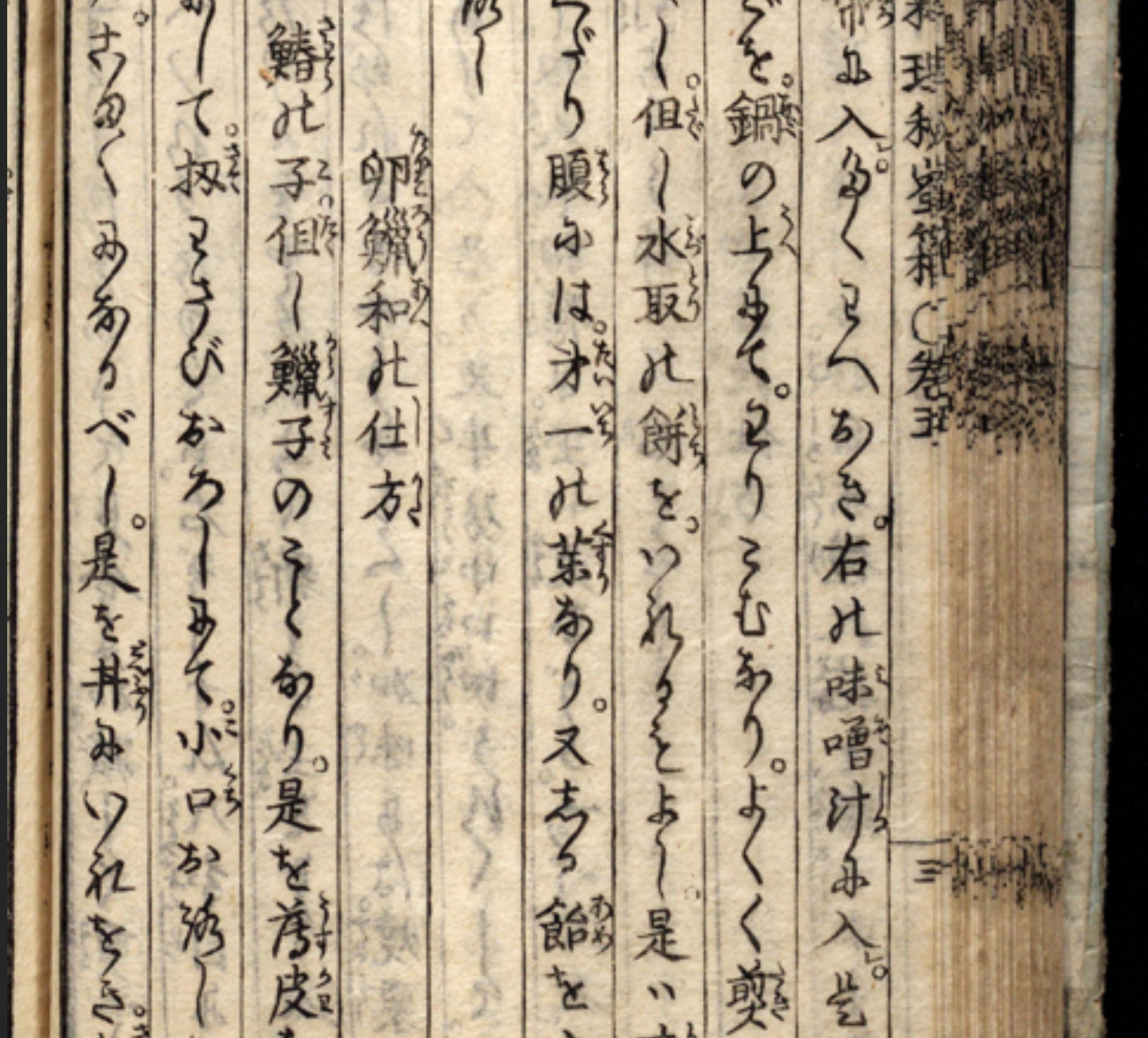


Japanese *Kuzushiji* Character Classification

STEPHEN LANIER

Problem Statement

Japanese characters, of which there are more than 4,000, are especially hard to recognize as *kuzushiji*, cursive–font characters. Can machine learning help us identify them?



Value

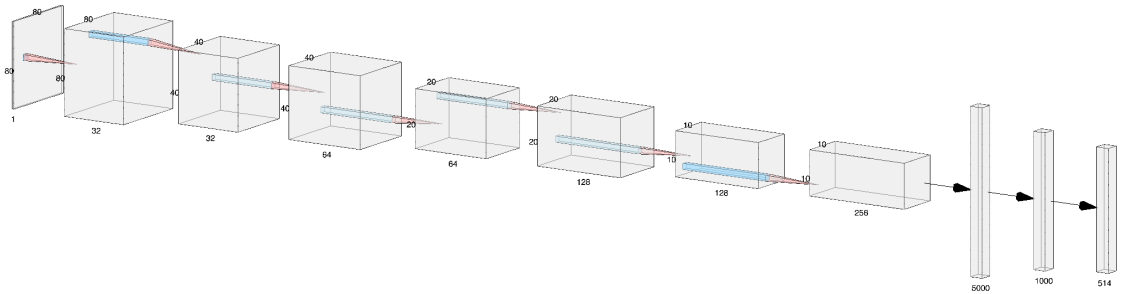
"Japan has millions of books and over a billion historical documents… [and yet] there are very few fluent readers of kuzushiji *today (only 0.01% of modern Japanese natives)."*

–Kuzushiji Recognition, Kaggle

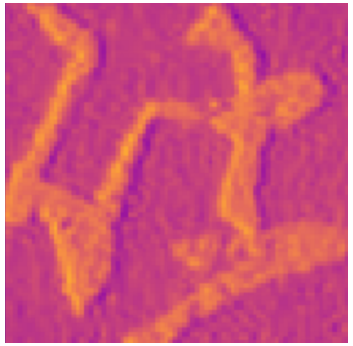
Methodology

Prep

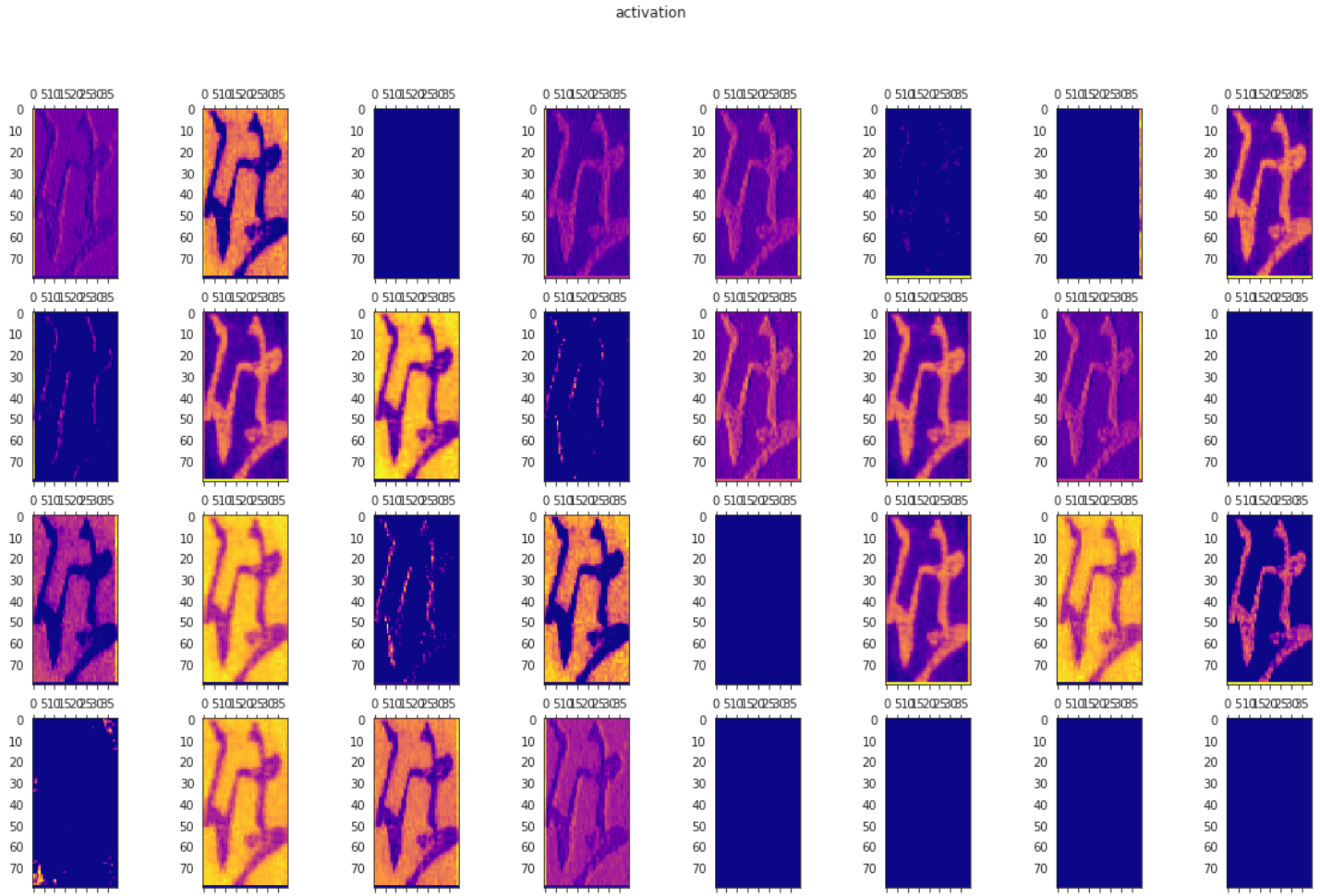
Train



Interpret



Results



Results

Test Accuracy				
Baseline	Xception	ResNet152V2	InceptionResNet	FCN
0.95	0.85	0.80	--	0.65

```
火 (55):        ['人', '大', '左', 'rare', 'rare', 'rare']
為 (58):        ['ゐ', 'ゐ', '湯', 'rare', 'rare', 'rare']
無 (31):        ['む', 'む', '共', '知', 'rare', 'rare', 'rare']
然 (28):        ['rare', 'rare', 'rare', 'rare']
焼 (52):        ['rare', 'rare', 'rare', 'rare']
煎 (37):        ['直', 'rare', 'rare', 'rare', 'rare']
煮 (96):        ['者', '黄', 'rare', 'rare', 'rare']
爰 (15):        ['rare', 'rare', 'rare']
父 (27):        ['と', 'rare']
牛 (26):        ['め', '半']
物 (243):       ['ま', 'ゐ', '類', 'rare', 'rare', 'rare']
玉 (71):        ['に', 'の', 'ば', 'む', 'も', '王', '給', '給']
王 (25):        ['つ', 'に', 'に', 'に', 'ヱ', '玉', '玉', '玉']
```

Results

Conclusions

Model is able to classify characters with high accuracy (approaching human-level ability)

High success at this level means possibly can incorporate more characters

Simplest model currently has best performance, may change with more experimentation

Future Work

- More work on the FCN
- A dashboard for easier interaction
- Showcase predictions on image (possibly with semantic segmentation)

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