KaoKore:

A Pre-modern Japanese Art Facial Expression Dataset

Joint work with Chikahiko Suzuki, Tarin Clanuwat, Mikel Bober-Irizar, Alex Lamb, Asanobu Kitamoto

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Who am I?

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Agenda

01 Pre-modern Japanese Literature

02 KaoKore Dataset

03 Quantitative Results

04 Qualitative / Creative Results

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01 **Pre-modern Japanese Literature**

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Pre-modern Japanese Literature

An example of a Picture Scroll

宇津保物語/ Tale of the hollow tree
National Institute of Japanese Literature
http://codh.rois.ac.jp/pmjt/book/200017526/

Pre-modern Japanese Literature

Cursive texts telling the story

Illustrations explaining the story

Make humanities research benefit more from machine learning

"It might be a good idea to think about the way machine learning can (or cannot) be used for humanities research."

「機械学習は人文学研究にどう使えるのか（または使えないのか）について、考えを巡らせてみるのもよいかもしれません」

Source: http://codh.rois.ac.jp/face/

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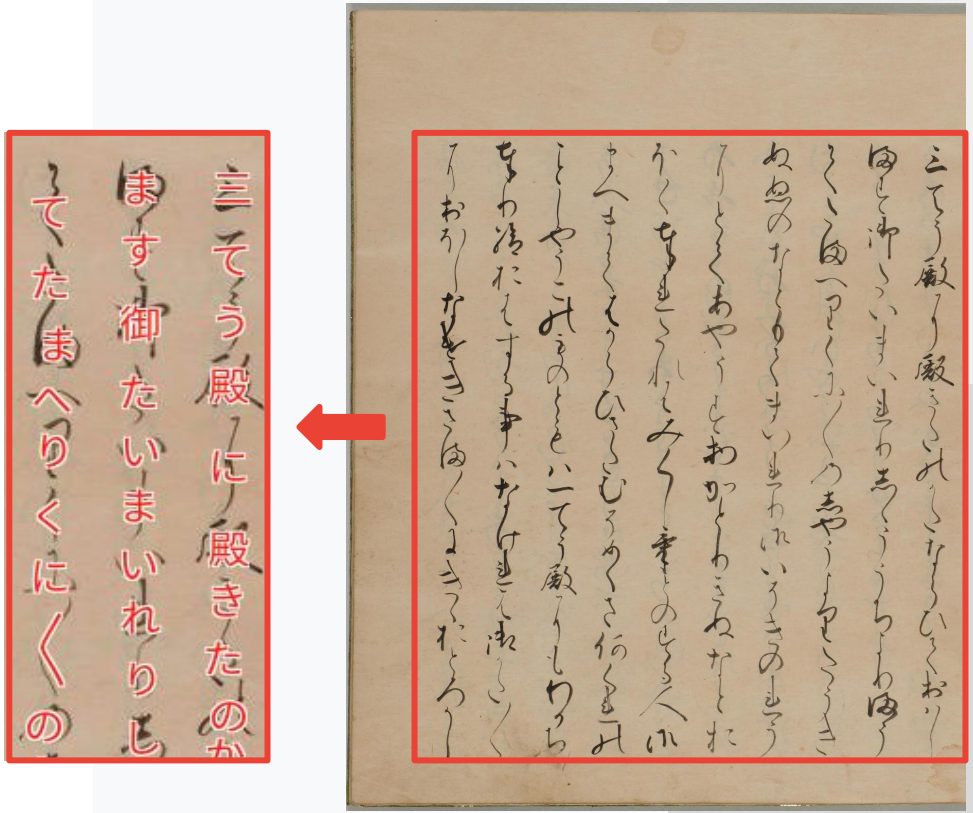
Machine learning accelerates research

Benefit from ML:
Cursive Writing Recognition



Machine learning accelerates research

Missing elephant in the room:

- Illustrations
- Especially faces

Also to benefit from ML?

KA O KA TA CHI KO RE KU SHO N

顔 貌 コレクション

Facial Expression Collection

Facial Expressions Collections

Center for Open Data in the Humanities / CODH
National Institute of Informatics, and
Research Organization of Information and Systems

Project site: http://codh.rois.ac.jp/face/

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Facial Expressions Collections

http://codh.rois.ac.jp/face/

Facial Expressions Collections is providing **cut out and collected parts of faces** appearing in art works for researches into art history, especially in the study of artistic style.

This project currently focuses mostly on **illustrations from Late Muromachi Period (~13th century) to Early Edo Period (~17th century)**, publicly available from National Institute of Japanese Literature, Kyoto University Rare Materials Digital Archive and Keio University Media Center, as well as providing corresponding **metadata**.

Center for Open Data in the Humanities / CODH
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Accelerating Humanities Research with Machine Learning

Make a **Machine Learning Friendly** dataset!

We make the KaoKore dataset

KA O	KA TA CHI	KO RE KU SHO N
顔	貌	コレクション
Facial	*Expression*	***Colle**ction*

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KaoKore dataset

Totally 8573 256x256 RGB images

00000000.jpg

00000000.jpg

00000001.jpg

00000002.jpg

00000003.jpg

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KaoKore dataset

Totally 8573 256x256 RGB images

Full metadata labeled by experts

00000000.jpg

```
$ head -n 1 tag_list.txt
00000000.jpg:制作年=from 1500;制作年=to 1600;制作年=室町末近世初;原典=ふんせう;向き=四分の三;性別=男;所蔵=慶應義塾大学;身分=貴族
```

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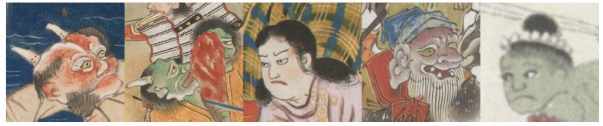
KaoKore dataset

Totally 8573 256x256 RGB images

Full metadata labeled by experts

For supervised learning,
classes labels

Class	*Labels*	*Examples*
gender (性別)	male (男)	
	female (女)	
status (身分)	noble (貴族)	
	warrior (武士)	
	incarnation (化身)	
	commoner (庶民)	

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KaoKore dataset

Totally 8573 256x256 RGB images

Full metadata labeled by experts

For supervised learning,
official train/dev/test splitting

```
$ for label in 'train' 'dev' 'test' ; do
printf "%5s %4d\n" $label $(grep $label
labels.csv | wc -l); done

train 6568
  dev  826
 test  821
```

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Quantitative Results ⇒ Supervised machine learning

Gender: Male or Female?
Social Status: Noble? Warrior? Incarnation? Commoner?

Method (variant)	Gender Classifier Test Accuracy	Social Status Classifier Test Accuracy
vgg (11)	0.9318	0.7882
alexnet	0.9318	0.7415
resnet (18)	0.9300	0.8330
resnet (34)	0.9354	0.7935
mobilenet (v2)	0.9408	0.8402
densnet (121)	0.9479	0.8025
inception (v3)	0.9497	0.8509

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- 01 GAN
- 02 (Intrinsic) Style Transfer
- 03 Neural Painting

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Creativity: GANs

Karras et al.: *A Style-Based Generator Architecture for Generative Adversarial Networks*

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Creativity: GANs

Generated

Real Data

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Creativity: (Intrinsic) Style Transfer

Nakano: *Neural Painters: A learned differentiable constraint for generating brushstroke paintings*

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Creativity: Neural Painting

Huang et al: *Learning to Paint With Model-based Deep Reinforcement Learning*

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Paper & open sourced data:

`https://github.com/rois-codh/kaokore`

Future directions:

Helping human-in-the-loop annotation mechanism

Going beyond face images.

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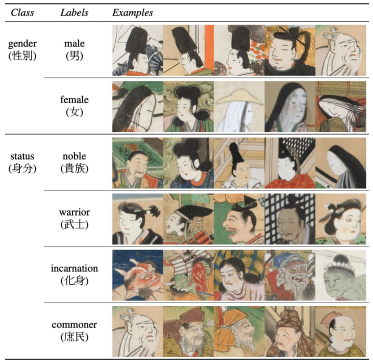
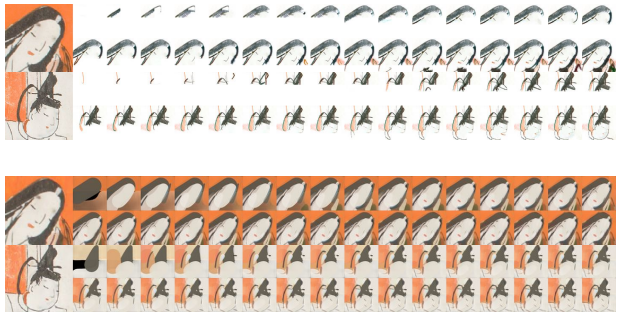
Kaokore

Classics

Dataset



Creativity



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