

Analysis of difference between male and female facial expressions in Japanese picture scrolls using GM Method with IIIF Curation Platform

Chikahiko Suzuki(1)(2), Akira Takagishi(3), Alexis Mermet(4)(2), Asanobu Kitamoto(1)(2), Jun Homma(5)

(1) ROIS-DS Center for Open Data in the Humanities, (2) National Institute of Informatic, (3) University of Tokyo, (4) L'Ecole polytechnique fédérale de Lausanne, (5) FLX Style

Purpose

- To clarify the production situation in picture scrolls created by multiple painters in the middle ages of Japan (13th to 16th centuries)
- To analyze the difference of facial expressions between male (Priests) and female (Nuns) with ICP.

Material & Tools

- **Material:** *Yugyo Shounin Engi-Emaki, "Shojo-Kouji Kouhon"* 遊行上人縁起絵巻 清浄光寺 甲本 (*Kouhon*) archived in *Shojo-Kouji Temple*.
 - One of the copy of original and lost version depicting the establishment of the *Jishu* 時宗 sect in the Kamakura period with multiple painters.
- **Tools:** **IIIF Curation Platform** (ICP)
 - <http://codh.rois.ac.jp/icp/index.html.en>

GM Method with ICP

GM Method with digital tools *The name GM comes from Giovanni Morelli (1816-1891) and Gazing Microcontents. GM Method has two steps.

1. Place a labeled photo that capture all or part of art works on a large table.
2. Rearrange photos for comparison and grouping.

This is classic method of art history research, and digital tools will enhance usefulness and potential like follow ways.

1. Creating dataset with help of machine learning

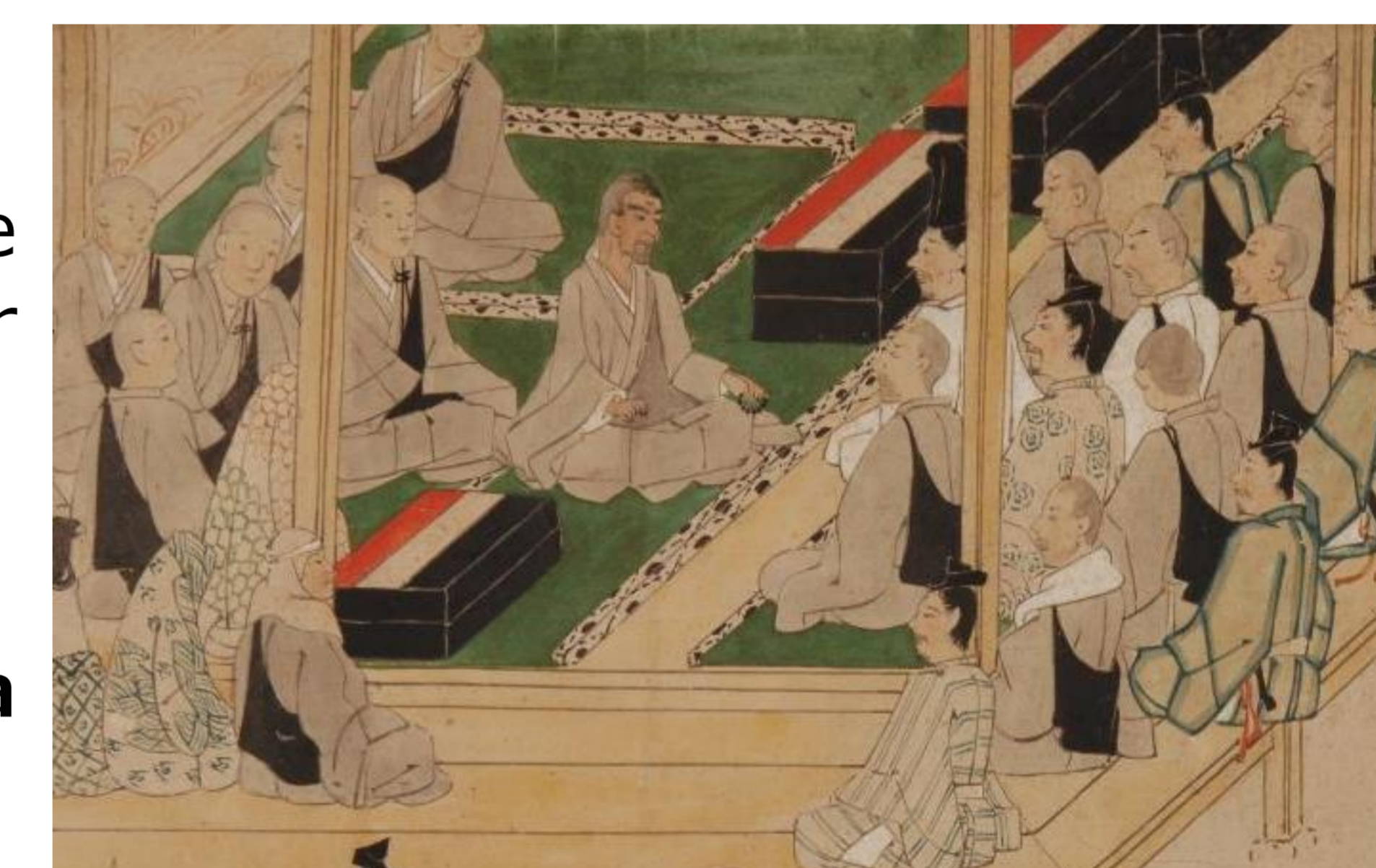
- Picked up all facial expressions from *Kouhon* to create dataset.
- This task could be done faster using a machine learning-based face detector. *About machine learning, please check "Automated Face Detection for Pre-modern Japanese Artworks using Deep Neural Networks" (short paper session, JADH2020).

2. Analyzing dataset with IIIF Curation Board (ICBoard) <http://codh.rois.ac.jp/software/iiif-curation-board/>

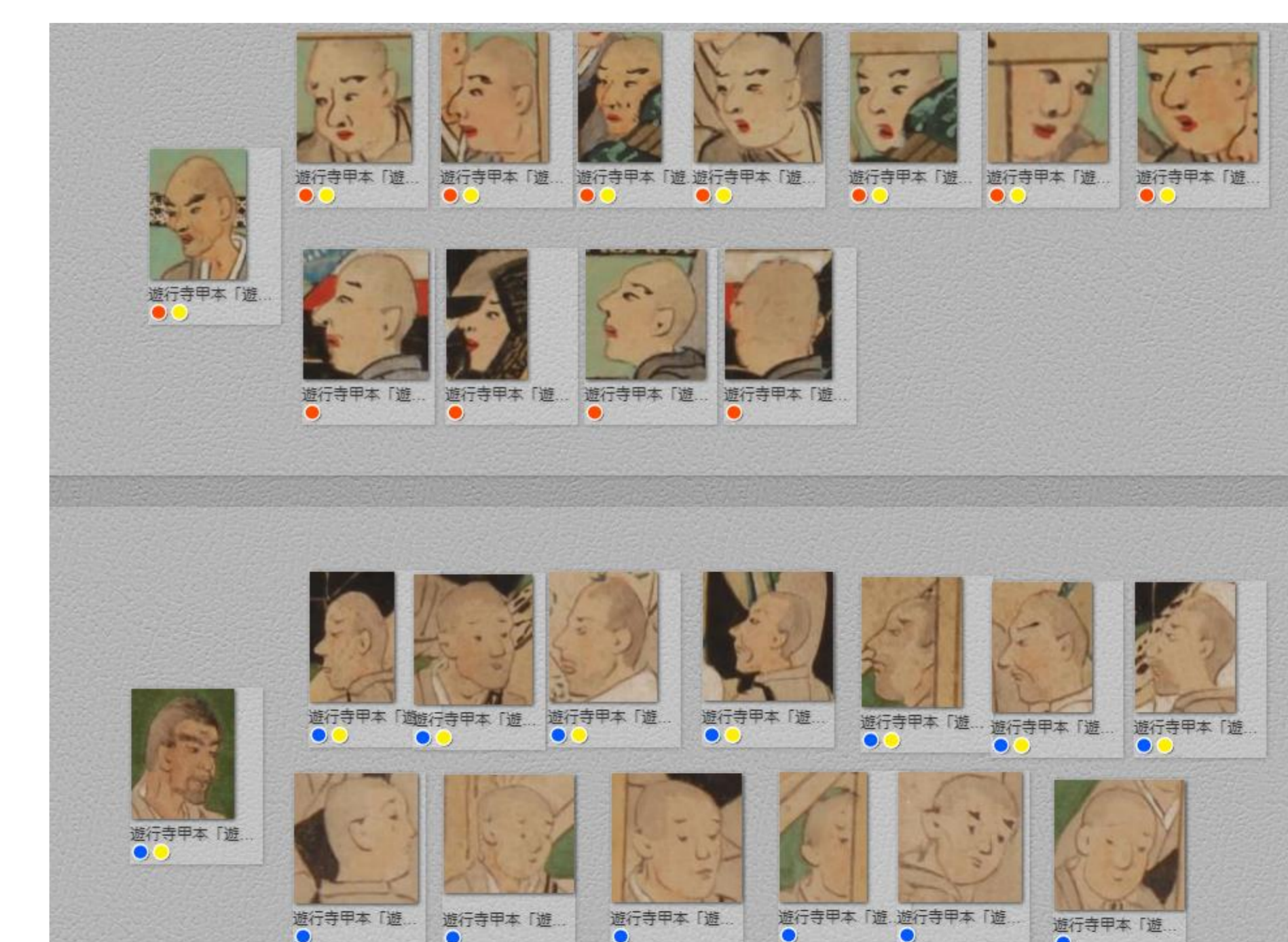
- We analyzed 579 facial expressions of Priests and Nuns appeared in the 28 scenes.
- With real photocards, there are too many facial expressions to analyze. **ICBoard can help us to embark on a comprehensive analysis of many facial expressions.**



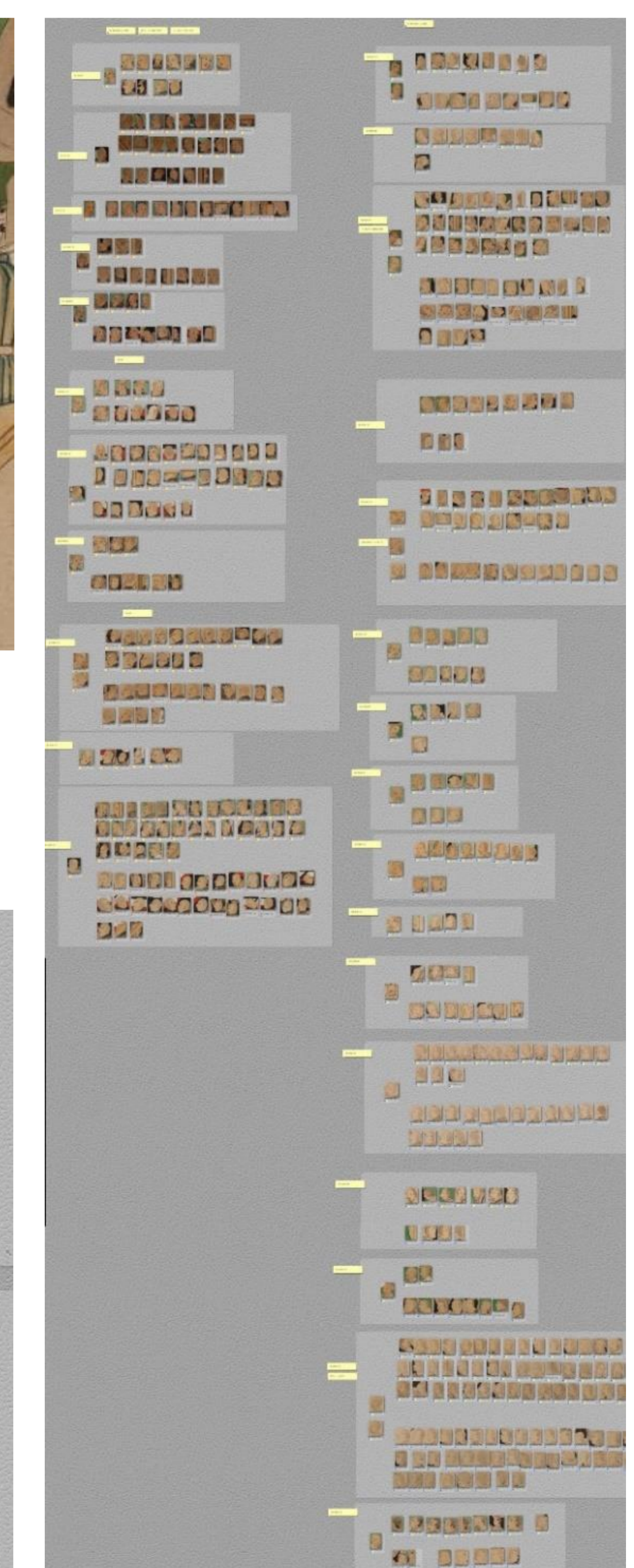
Yugyo Shounin Engi-Emaki, "Shojo-Kouji Kouhon" 遊行上人縁起絵巻 清浄光寺 甲本 (*Kouhon*) . 10-volume picture scroll depicting the establishment of the *Jishu* sect. This scene is depicting the nirvana of *Ippen* 一遍.



Priests and Nuns separated two groups with *Juuni-ko-Bako*. They have similar code of clothes and hair styles. But they are easily identified.



Typical facial expressions of two painters



All facial expressions we analyzed with ICBoard

Results

- Rearranging 579 facial expression, difference in drawing style of two painters became clear.
 - **Painter A:** Draws a unique facial expression in deep colors. Both genders are drawn similar. The outlines of both monks and nuns have smooth curves. The variation within same gender is also small.
 - **Painter B:** Draws in light colors, the differences between genders are apparent. The outlines of the monks are rugged, while the nuns are smooth. The variation within gender is large, such as the hair shaving marks

Discussion

- Using the GM method with digital technology, **many facial expressions were smoothly analyzed.**
- Our results support the previous study that *Kouhon* was created by multiple painters. Furthermore, this result brings about a new research question.
 - If painter B faithfully copied the characters in the original, these variations of character have been intentionally drawn in the lost original picture scroll. Some characters must be specific persons.

*We thank the *Shojo-Kouji Temple* and *Yugyoji Museum* for allowing us to use images for this research.