

Neume Component Pitch and Type Classification

SIMSSA XIX

Evan Savage

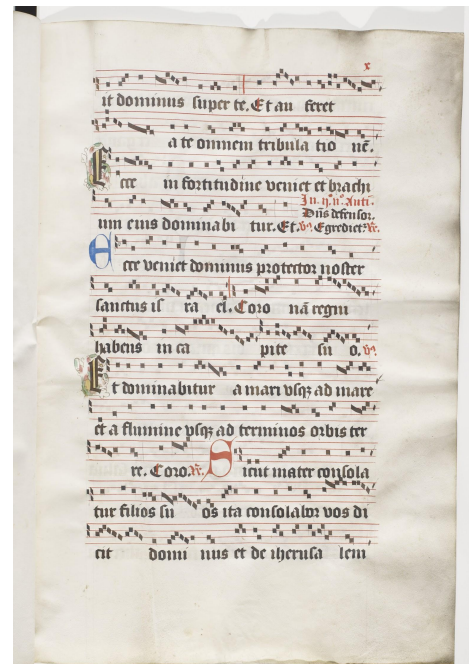


Pitch: G

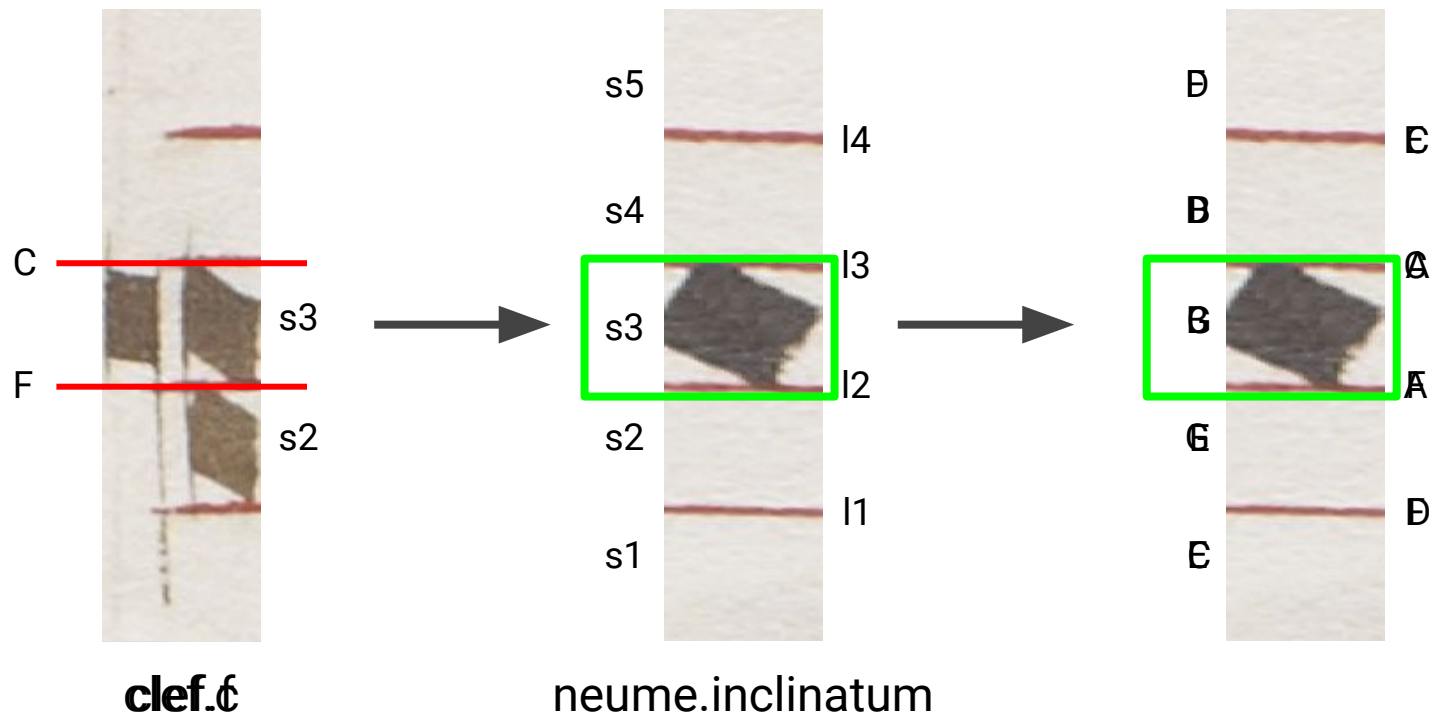
Type:
neume.inclinatum

Introduction

- OMR workflow currently features heuristic methods for position and pitch classification of neume components
 - Not robust or easily generalizable
- Machine learning approach (Convolutional Neural Network)
 - Augmented code from Alicia Nuñez-Alcover and Jorge Calvo-Zaragoza
 - Trained models for position and type classification and staff-line detection
- Rodan workflow
 - Imported tasks as two separate jobs
 - Position training
 - Single-step pitch and type classification

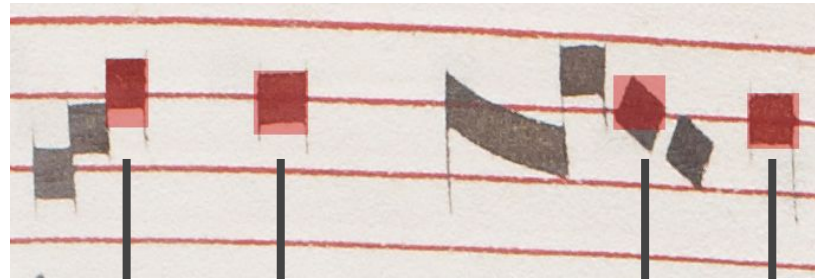


Position, Pitch, and Type Classification



Neume Component Dataset for Training

Connected Components -> Interactive Classifier (Rodan)



13



13



13



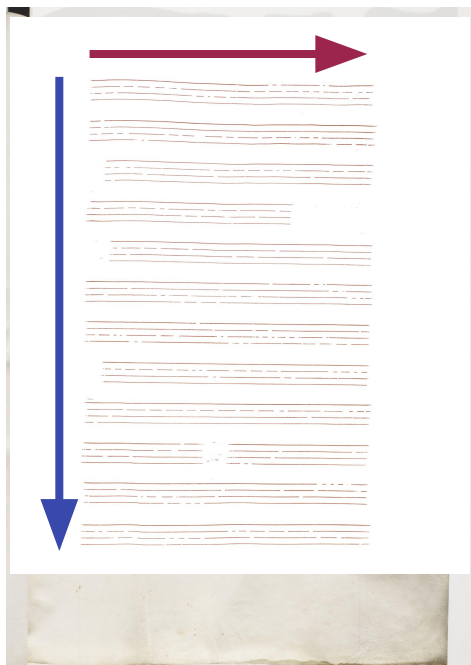
13

Training

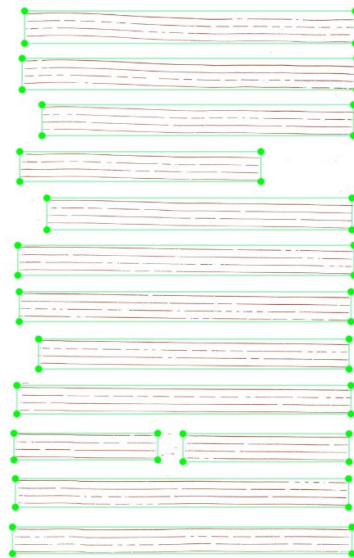


Staff Detection Dataset for Training

Document Analysis Approach (Rodan)



LabelImg



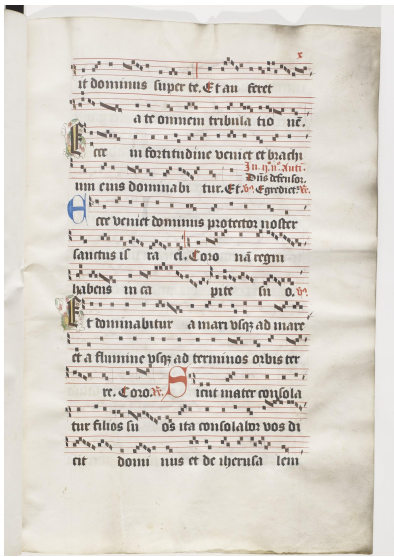
Training



Classification Results

Training Data	Testing Data
Salzannes: 8 pages Einsiedeln: 8 pages (5086 neume components)	Salzannes: 1 page Einsiedeln: 1 page (937 neume components)

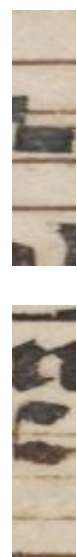
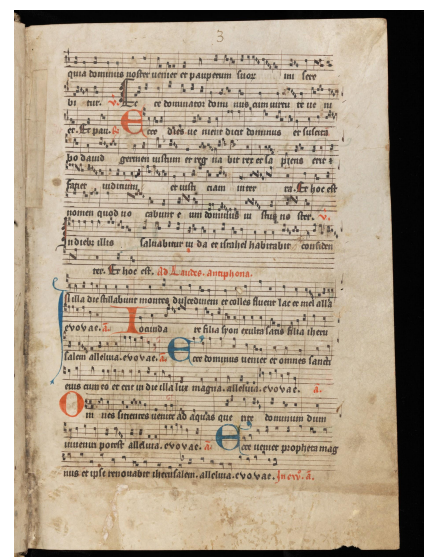
Salzannes



position: 13
 type: neume.podatus3

position: 14
 type: neume.oblique2

Einsiedeln



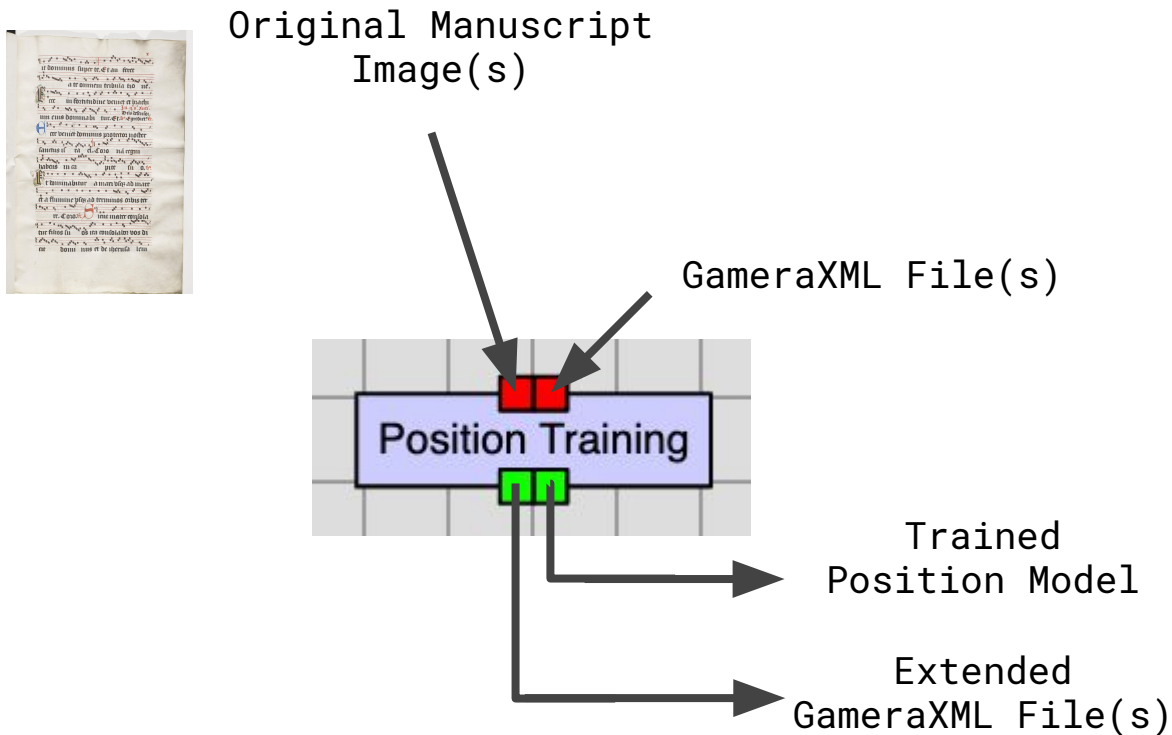
position: s3
 type: neume.punctum

position: s4
 type: clef.c

	Test Results
Position Model	94.87%
Type Model	96.90%
Position and Type Model	Pos: 93.05% Type: 96.04%

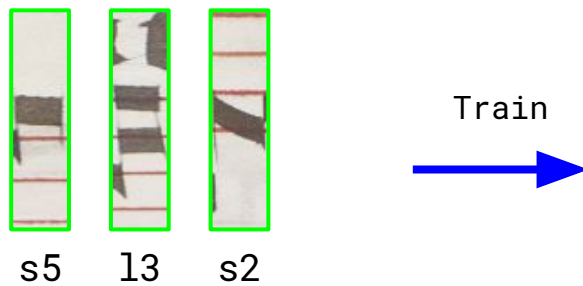
Rodan Workflow Jobs

Rodan Workflow - Position Training

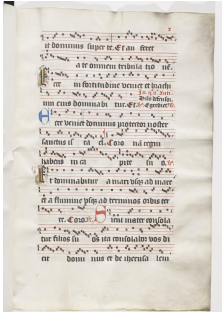


Rodan Workflow - Position Training cont'd

Training Interface



Rodan Workflow - Classification



Original Manuscript Image

GameraXML File

Trained Staff-Detection Model

Trained Position (Type) Model

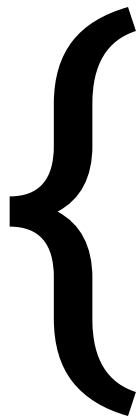


Staff Layer Image



Extended GameraXML File

Extended GameraXML File



```
<glyph>
```

```
...
```

```
<type name="neume.inclinatum"/>
```

```
<pitch-estimation>
```

```
  <position name="s3" confidence="98.93"/>
```

```
  <pitch name="B" octave="3"/>
```

```
</pitch-estimation>
```

```
<staff number="4"/>
```

```
...
```

```
</glyph>
```

Conclusion and Future Work

- Implemented a single-step neume component position and type classification job in Rodan
- Developed the initial version of a training interface for position classification
- Future work:
 - Integrate position training architecture into the interactive classifier
 - Envision a machine-learned approach for neume component object detection from the original manuscript image

Thank you!

Special thanks to Alicia Nuñez-Alcover and Jorge Calvo-Zaragoza



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