Using feature analysis and machine learning to assess the authenticity of work ascribed to Josquin Desprez

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CIRMMT Scientific Event

The Josquin Problem

- Josquin Desprez (c. 1450-1521)
 - Extremely famous composer
 - Martin Luther said of him: "Josquin is the master of the notes, which must do as he wishes, while other composers must follow what the notes dictate."
- Works attributed to Josquin are found in many sources (music manuscripts and prints) created during his lifetime and long afterwards
 - A German publisher said that "now that Josquin is dead, he is producing more compositions than when he was still alive."

Which works did Josquin compose?

- Jesse Rodin (Stanford) and Joshua Rifkin (Boston University): "The Josquin Canon at 500" (*Early Music*, 2022)
- Includes a list of the works they believe are by Josquin
 - "Guilty unless proven innocent" assume it's not by Josquin unless there is good evidence.
- I: The core group (54 works),
 - Source created at a time and place close to the composer
 - Attributions to pieces by other composers are convincing
 - Musical variants in source are convincing (e.g. no contrapuntal errors)
 - External evidence piece can be connected to a time and place

Additional levels

- II: Provisional Acceptance, based on source and style (49 works)
- III: Problematic (35 works)
- IV: The rest (205 works)
 - a: no convincing argument (135 works)
 - b: almost certainly by another named composer (70 works)

c: lost compositions named by theorists (3)

Pilot study (1/3)

- In a pilot study, we used the jSymbolic 2.2 features to train a 2-class SVM classifier, based on the following training data:
 - First class: Josquin
 - The Josquin music in the most secure Rodin level (I. Core group)
 - Second class: NotJosquin
 - All the JRP music available from 21 other Renaissance composers
- This model was then used to classify the Josquin music in the remaining 4 Rodin levels . . .

Pilot study (2/3)

• The more insecure a piece is, according to Rodin's classification, the less likely it was to be classified as being by Josquin by our classifier

Rodin Certainty Level	% Classified as Josquin
Level 2 "Merit provisional acceptance"	45.6%
Level 3 "Problematic, ranging from 'fat chance' to 'could be'"	28.2%
Level 4a "No convincing argument can be made at present"	17.4%
Level 4b "Almost certainly by another (named) composer"	1.9%

Pilot study (3/3)

- Similar trends were evident when the classifier was retrained using the two most secure Rodin levels as the "Josquin" group
- These results demonstrate overall empirical support for Rodin's categorizations
 - This is a good example of how features extracted by a computer and human expert knowledge can complement one anther

Rodin Certainty Level	% Classified as Josquin
Level 3 "Problematic, ranging from 'fat chance' to 'could be'"	35.9%
Level 4a "No convincing argument can be made at present"	19.8%
Level 4b "Almost certainly by another (named) composer"	2.9%

Next steps

- Break out the music into groups based on:
 - Genre
 - Masses, motets, chansons
 - Number of voices
- Explore which features differentiate the groups
 - And may thus be characteristic of Josquin's particular style



SIMSSA : Single Interface for Music Score Searching and Analysis

Thanks for your attention!

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