ASSOCIATIONS BETWEEN MUSICOLOGY AND MUSIC INFORMATION RETRIEVAL

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MIR & MUSICOLOGY

Discussions about the further development of music information retrieval (MIR) have encouraged closer collaboration between MIR and musicology. This study investigates how MIR refers to musicology as a source discipline:

- Which musicology areas are of interest to MIR?
- Are references to specific musicology areas over-represented in specific MIR areas?
- Which functions do musicology references serve in MIR research?

SAMPLING ISMIR PAPERS

1. Sampling:
   - Sampling frame: ISMIR proceedings 2000-2010
   - Pre-selection: full (oral/plenary session) papers ⇝ 416 papers
   - Purposive sample: papers containing references to musicology as a source discipline ⇝ 184 papers

2. Encoding:
   - ISMIR papers ⇝ MIR categories
     Category counts: number of papers in the category
   - References ⇝ musicology categories
     Category counts: number of papers citing the category one or more times

ASSOCIATION MINING

1. **Association mining** to extract associations between musicology and MIR research:

   Support:

   - $s(A)$: support of musicology category A (number of papers citing A)
   - $s(B)$: support of MIR category B (number of papers in B)
   - $s(A, B)$: support of association (number of papers containing references to musicology category A which are in MIR category B)

   Significance: p-value ($\alpha = 0.05$), Fisher's one-tailed exact test on a 2x2 contingency table

   Example of a significant association:
   A: music theory & analysis
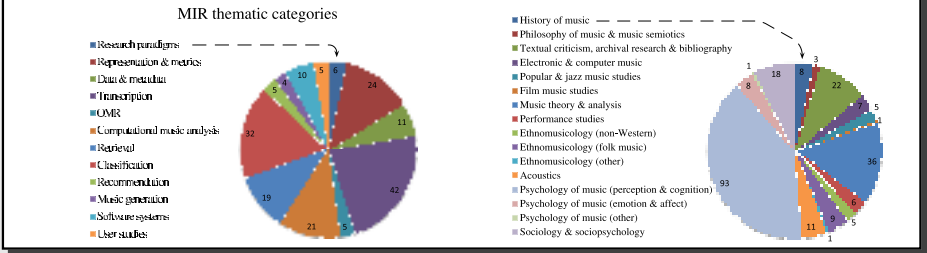   B: representation & metrics

	B	$\neg B$
A	10	26
$\neg A$	44	336

   Example of a non-significant association:
   A: psy. of music (perception & cognition)
   B: representation & metrics

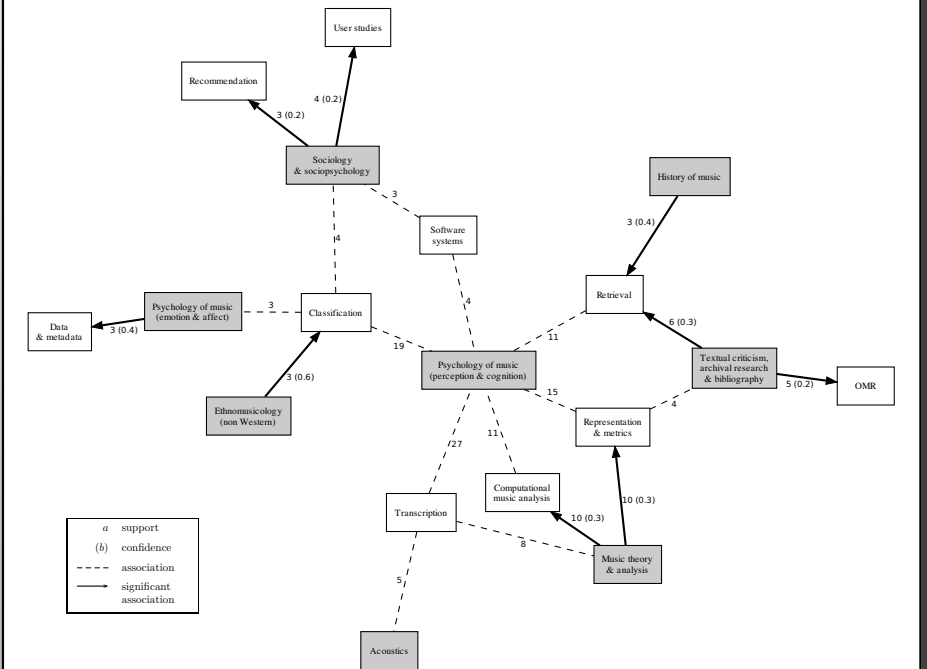 | | B | $\neg B$ |
   |------|-----|----------|
   | A | 15 | 78 |
   | $\neg A$ | 39 | 284 |

   Confidence: the *confidence* of the oriented rule $A \rightarrow B$ was computed as $s(A, B)/s(A)$

2. **Content citation analysis** to identify referencing functions

SUBJECT CATEGORIES

MIR thematic categories

- Research paradigms
- Representation & metrics
- Data & metadata
- Transcription
- OMR
- Computational music analysis
- Retrieval
- Classification
- Recommendation
- Music generation
- Software systems
- User studies

Musicology thematic categories

- History of music
- Philosophy of music & music semiotics
- Textual criticism, archival research & bibliography
- Electronic & computer music
- Popular & jazz music studies
- Film music studies
- Music theory & analysis
- Performance studies
- Ethnomusicology (non-Western)
- Ethnomusicology (folk music)
- Ethnomusicology (other)
- Acoustics
- Psychology of music (perception & cognition)
- Psychology of music (emotion & affect)
- Psychology of music (other)
- Sociology & sociopsychology

ASSOCIATIONS

A	B	$s(A, B)$	p-value
textual criticism, archival research & bibliography	omr	5	9.7e-05
sociology & sociopsychology	user studies	4	0.00068
music theory & analysis	computational music analysis	10	0.0035
psychology of music (emotion & affect)	data & metadata	3	0.0078
sociology & sociopsychology	recommendation	3	0.0091
music theory & analysis	representation & metrics	10	0.01
textual criticism, archival research & bibliography	retrieval	6	0.016
history of music	retrieval	3	0.037
ethnomusicology (non western)	classification	3	0.038

REFERENCING FUNCTIONS

Function	Co-text examples
Relevance	"Repeated patterns [...] represent therefore one of the most salient characteristics of musical works [music theory references]" (ID242)
Contribution	"This paper addresses systematic differences in the performance of final ritardandi by different pianists [...] the kinetic model is arguably too simple [...] In this work [...] [psychology of music references]" (ID159)
Task definition	"As stated in [music theory reference] musical analysis is 'the resolution of a musical structure into relatively simpler constituent elements, and the investigation of the functions of these elements within that structure"' (ID24)
General approach	"The [basic] idea is motivated by the results of musicological studies, such as [...]" (ID859)
Method, algorithm	"HMM initialization [...] The covariance matrix should also reflect our musical knowledge [...], gained both from music theory as well as empirical evidence [psychology of music reference]" (ID30)
Data	"we evaluated both [OMR] systems on the same set of pages to measure their accuracy [...] [textual criticism, archival research & bibliography reference]" (ID729)
Related work	"dimensions of dissimilarity have been interpreted to be e.g. [...] [psychology of music reference]" (ID345)