



Information Retrieval for Music and Mathematics


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Information Retrieval for Special Domains

- Music

Sheet music information retrieval

MusicXML

- Mathematics

Formulas' retrieval

MathML

Similar subtasks:

- Work with a structured document (XML) as input data
- Compare request and an object from index (similar, but have some differences)



Rippling for Automated Reasoning

Rippling heuristic for performing the induction step

induction hypothesis \rightarrow induction conclusion

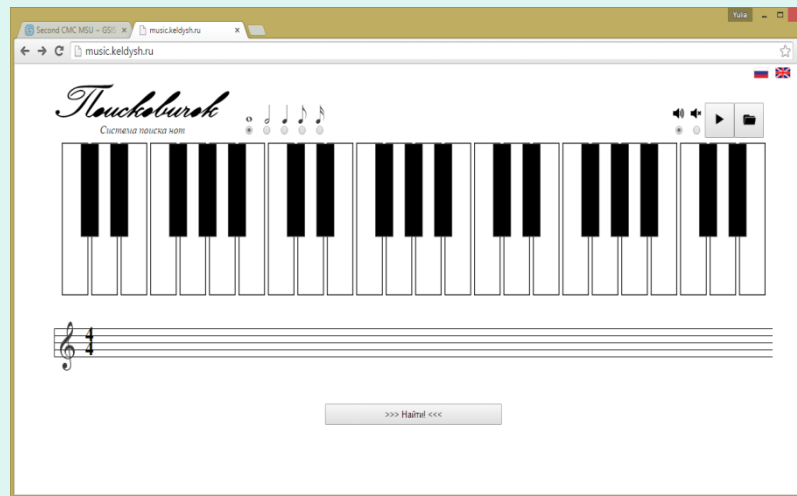
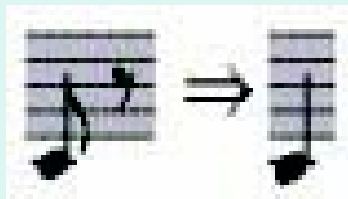
- special rewriting rules, that changes only differences between hypothesis and conclusion are used
- the differences are reduced with every step of proof (a measure is introduced to estimate it)

Music Information Retrieval

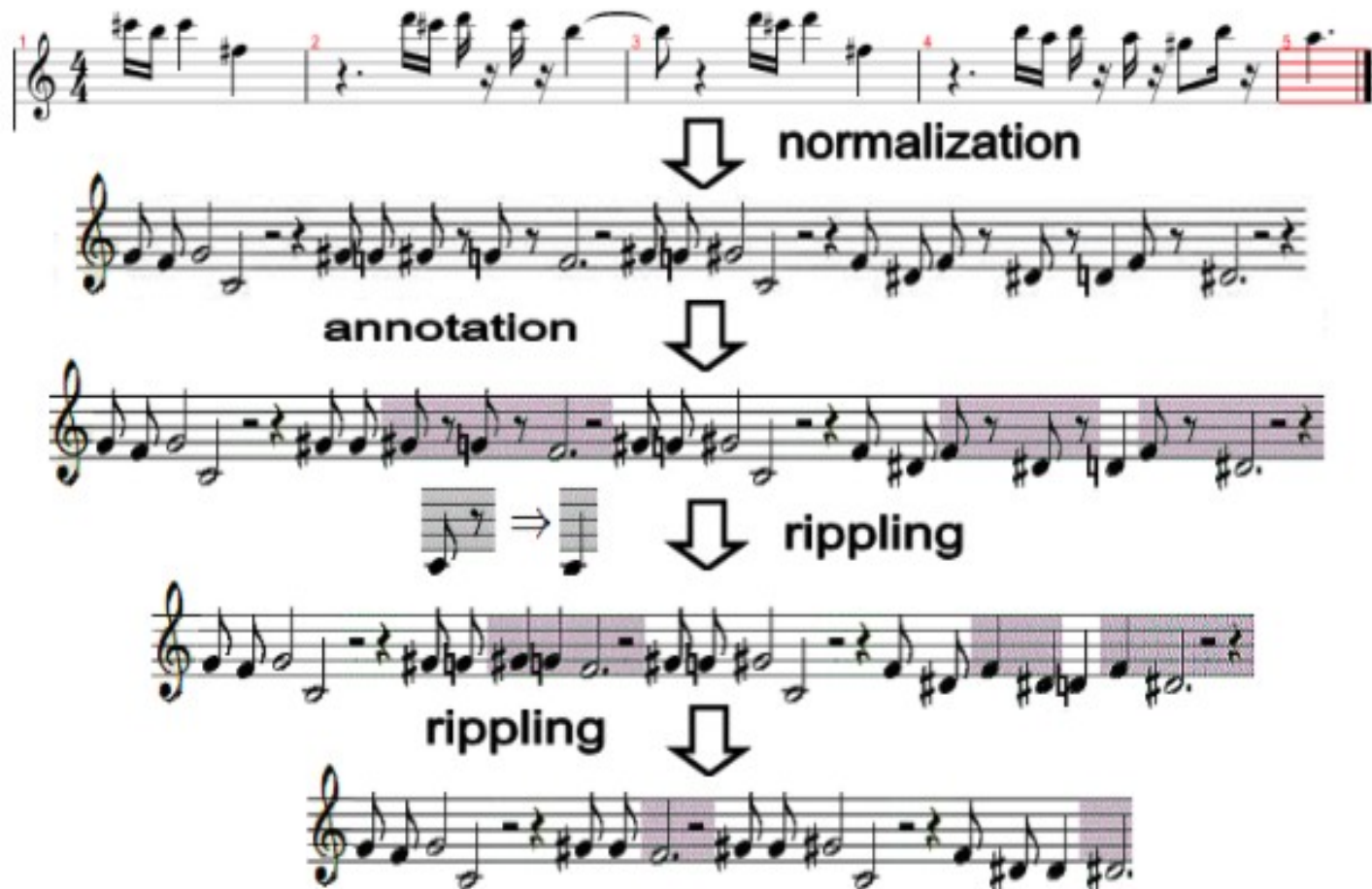
A query is entered using virtual keyboard and transformed to MusicXML format

An indexed library of MusicXML files is stored

We are comparing query with indexed expressions using rippling:



Rippling application — an example





Conclusions

- In addition to "traditional" use of automated reasoning methods (for proof automation, for program synthesis, verification and transformation) we add a new domain - information retrieval for structured documents.
- Extra heuristics are still required to perform the search faster in large indexes - databases.