BRNO UNIVERSITY OF TECHNOLOGY
FACULTY OF INFORMATION TECHNOLOGY

Master's Thesis Assignment

162782

Institut:	Department of Information Systems (DIFS)
Student:	**Makiš Jozef, Bc.**
Programme:	Information Technology and Artificial Intelligence
Specialization:	Computer Vision
Title:	**Computational Musicology: Models, Methods, and Applications**
Category:	Theoretical Computer Science
Academic year:	2024/25

Assignment:

1. Based upon the supervisor's instructions, investigate computational musicology and computational models used in this scientific area, including grammars and automata.
2. Formalize selected music notions by the models from part 1 based upon the supervisor's instructions.
3. Based upon the supervisor's instructions, study properties of these models, such as their power and descriptional complexity.
4. Design new methods of making computer music based upon the models from part 1. Consult this design with your supervisor carefully.
5. Apply the achieved methods in music to classify or create selected music passages.
6. Implement the applications from part 5. Evaluate them. Compare them against already existing implementation versions of this kind.
7. Summarize the achieved results of this work. Suggest how to continue with the work.

Literature:

- Rozenberg, G., Salomaa, A. (eds.) Handbook of Formal Languages, Volume 1-3, Springer, 1997, ISBN 3-540-60649-1.
- Schulze, W. A Formal Language Theory Approach To Music Generation. Matieland 7602, South Africa, 2009. University of Stellenbosch. Vedúci práce Merwe, A. van der.
- Krakowski, S. Rhythmically-Controlled Automata Applied to Musical Improvisation. Rio de Janeiro, 2009. Phd thesis. IMPA. Music.
- Zeyu, Y. Formal semantics for music notation control flow. Carnegie Mellon University, Pittsburg, 2013.
- Jurish, B. Music as a formal language. Universität Potsdam, 2004, Phd thesis.
- Roads, C., Wieneke, P. Grammars as Representations for Music. *Computer Music Journal* 3, no. 1 (1979): 48–55. DOI: 10.2307/3679756.
- Zuidema, W. et al. Formal models of Structure Building in Music, Language and Animal Songs. DOI: 10.48550/arXiv.1901.05180.

Requirements for the semestral defence:
Items 1 to 3, partially item 4.

Detailed formal requirements can be found at https://www.fit.vut.cz/study/theses/

Supervisor:	**Meduna Alexandr, prof. RNDr., CSc.**
Head of Department:	Kolář Dušan, doc. Dr. Ing.
Beginning of work:	1.11.2024
Submission deadline:	21.5.2025
Approval date:	3.2.2025