

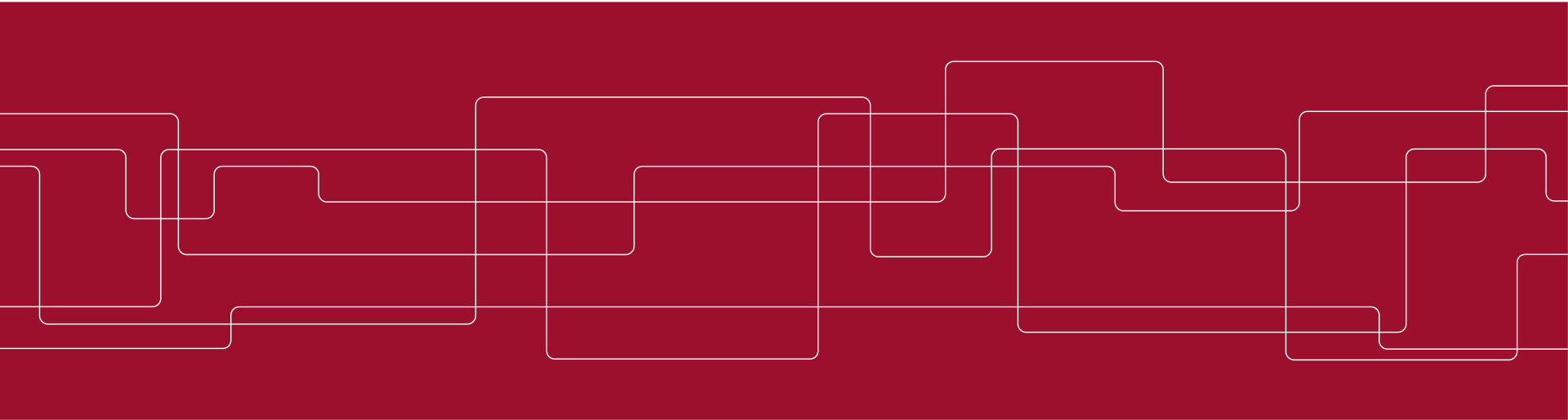


Master Thesis Projects 2024/25

Creative Media Technology

Andre Holzapfel (holzap@kth.se)

<https://www.kth.se/hct/mid/research/cmt/available-degree-projects>





Project List

1. Environmental impact of Generative AI: The Case of a Radio Station
2. Tempo and rhythmic aesthetics in AI-generated music
3. Micro-timing in music recordings: How precise can AI approaches detect notes?
4. AI-based music beat tracking: critique and improvement of data and algorithms



Project 1: Environmental impact of Generative AI: The Case of a Radio Station

- **Objective:** Estimate the energy use of a customized AI-based generative radio station (KSPR).
- **Background:**
 - Increasing concern related to environmental impacts of GenAI.
 - Life-cycle assessment and other methods not easily applicable to understand these impacts.



Project 1: Environmental impact of Generative AI: The Case of a Radio Station

- **Project description:**
 - gather a group of users who will be invited to design their own radio programs based on KSPR.
 - involves re-configuring and training ML models.
 - Data on energy use of the included models will be collected.
 - Combination of participatory design, machine learning, and LCA.
 - Background and preferences of the students will define the emphasis among these!
 - Collaborations between students with differing backgrounds encouraged!
- **Supervisors: Dr. Anna Furberg, annafur@kth.se; Andre Holzapfel (holzap@kth.se)**



Project 2: Tempo and rhythmic aesthetics in AI-generated music

- **Objective:** Investigate tempo and rhythm properties in AI-generated music compared to corpora of popular music.
- **Background:**
 - With the introduction of generative AI, the aesthetics of music production is shifting.
 - The **underlying question** is in how far rhythm aesthetics have changed throughout periods in popular music production.



Project 2: Tempo and rhythmic aesthetics in AI-generated music

- **Project Description:**
 - Possible tasks: Conduction of expert interviews with producers, computational analysis music corpora, historical overview of research on timing in popular music.
- **Possible Outcome:**
 - Understanding of common studio practices regarding microtiming and tempo corrections.
 - Emerging biases in rhythm due to GenAI.
 - Learning outcome: interview conduction, media production technology, understanding of rhythmic concepts.
- **Supervisor:** Andre Holzapfel (holzap@kth.se)



Project 3: Micro-timing in music recordings: How precise can AI approaches detect notes?

- **Objective:** to increase temporal precision of algorithms for music note onset detection for specific instruments (e.g. bass, drum).
- **Background:**
 - Timing of a rhythm section (drum, bass) is important.
 - Manual annotation of note onsets is too time consuming, and an automatic annotation usually would not be sufficiently accurate.



Project 3: Micro-timing in music recordings: How precise can AI approaches detect notes?

- **Project description:**
 - Run and improve available algorithms for music note onset detection on an available dataset of annotated Jazz performances.
 - No musical background is needed, BASIC knowledge of signal processing is helpful but not required.
- **Outcome:**
 - Improved algorithms for onset detection with high timing accuracy.
 - Insights into timing in Jazz rhythm sections.
- **Supervisor:** Andre Holzapfel (holzap@kth.se)



Project 4: AI-based music beat tracking: critique and improvement of data and algorithms

Objective: Identify and overcome limitations in deep-learning based beat tracking algorithms.

- **Background:**

- Most music is characterized by a beat, which helps listeners to tap their foot or dancers to move their body to the music.
- Beat Trackers based on deep learning have been developed, but it is unclear for which musics they break and why.



Project 4: AI-based music beat tracking: critique and improvement of data and algorithms

- **Project description:**
 - Combine music data that leading researchers share with us into an evaluation data repository.
 - Evaluate and compare algorithms on the compiled repository.
 - Propose further improvements.
- **Outcome:**
 - Clear documentation of the state of the art, and a data repository, resulting in a major journal publication in the field of MIR.
- **Supervisor:** Andre Holzapfel (holzap@kth.se)