



Towards Computational Music Analysis for Music Therapy

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Goal

Provide overview of potential applications of computational music analysis in MIR for active music therapy.

Music therapy (MT)

Therapists create musical experiences in a holistic manner involving cognition, emotion, movement and social interaction. Divided into active (music making) and receptive music therapy (music listening)

Clinical improvisations

When therapist and client play together, therapist encourages changes in the client's playing style to stimulate changes in the patient's inner state, or in interrelation between client and others. Therapist and patient try to break out of typical habits in the process of consecutive MT sessions.

- Introduce therapeutic concepts relating to musical structure.
- Identify steps for establishing collaboration between MIR and Music Therapy on computational music analysis.
- We focus on improvisation, composition & \bullet songwriting within active MT.



Figure 2: Piano improvisation setting (Foubert et al, 2017)



Figure 1 Main forms and methods of music therapy with application areas for computational music analysis. This paper focuses on the areas depicted by colored blocks.

Analysis of music therapy improvisations

Application areas for computation

Initial clinical assessment

- Therapists carry out analyses after the MT session by listening to the recorded music.
- E.g. Improvisation Assessment Profiles (IAP): therapists fill out questionnaires based on observations describing e.g. Autonomy, Tension, Variability, and Congruence.
- Support music structure analysis of improvisations to reduce manual work on large amounts of musical data.
- Support initial clinical assessment, monitoring the process of the client, and detecting important musical changes.
- Therapists use structured improvisations in first therapy session to determine if patients' symptoms are consistent with a specific mental disorder.
- Computational analyses of the musical data can support this initial clinical assessment.

Monitoring process

- Data gathered through improvisations in later stages of the therapy is used for monitoring the process of the patient during treatment, e.g. for detecting any form of progress or development of the client.
- Computational tools can assist in analysing the musical content of consecutive sessions for identifying typical playing styles of a client, and detecting changes.

Moments of Interest

- Therapists seek to identify specific moments as turning points in the development of a patient, so-called Moments of Interest (MOIs).
- Therapist notices if the change leads indeed to something new within the improvisation.
- Computation can support the identification of these turning points.

MIR methods on musical structure

- MIR methods for musical structure analysis and pattern discovery are of potential use for analysing clinical improvisations.
- Challenge: modeling of musical structure as emerging from an interaction, address highlevel concepts of therapists describing these interactions.

Collaboration perspectives for MIR and music therapy

- Investigate music analysis methods of therapists and create data sets with clinical improvisations and music analytic annotations from therapists.
- Establish a catalogue of typical intervention methods of therapists in clinical improvisations as a first step on finding appropriate musical features.
- Initiate case studies for exploring the emergence of musical structures in clinical improvisations, e.g. different playing styles of patients with psychosis.
- Assess how much therapists (dis)agree in their individual intervention and analysis styles.
- Assess how intuitive knowledge of therapist on their experience of the improvisation can be enhanced by the analysis of the music through computation.
- Consider aspects of usability, including considerations from HCI, for developing appropriate tools for the daily practice of therapists.