Music and Artificial Intelligence: Threats and Opportunities

This presentation will highlight the impact of artificial intelligence on all stakeholders in the chain of musical communication: creators, performers, producers, distributors, and consumers, summarizing threats and opportunities for the utilization of machine learning and generative AI and possible societal and environmental, ethical, legal, as well as technical and academic implications.

While media coverage largely covered generative models for text, graphics, and music, it is important to note that other areas of machine learning focusing on the analysis, categorization, and prediction of (musical) data may be equally or even more impactful than pure generative models. Whether machine learning models are (i) generating or hallucinating new outputs, (ii) processing, separating, or morphing a musical audio input, (iii) extracting information about musical style and characteristics, instrumentation, emotional content, etc. or (iv) recommending pieces of music based on meta-data, user behavior, and musical information, there are many ways musicians and the music industry at large are impacted.

Music discovery

Opportunities: There are no doubts that artificially intelligent technology can help listeners to efficiently browse the ever-growing number of existing and new music and media releases. Utilizing content-based as well as user-based data-driven metrics allow for optimized recommendation algorithms and user interfaces to discover music.

Threats: The main risk is that recommendations and similarity metrics may not reflect the interests of the listener. On the one hand, recommendations usually strive to recommend ‘similar’ items, based on data from the music, the user, and similar users. This could lead to ‘listening bubbles’ with no exposure to novel or different musical ideas and styles and reduced diversity. On the other hand, a bias might be introduced through limited catalogues. Furthermore, there is a risk that some content is prioritized for recommendation for commercial reasons, e.g., because it creates more than other content. Lack of transparency of recommendation systems can also be perceived as a threat to artists who want to understand more clearly why certain content is recommended more than other.

Creative practice

Opportunities: New technologies and tools democratize music making in the sense that particular skills and expert knowledge, such as being an proficient instrumentalist or versed in music theory, become less important. In that sense, it allows to focus on the creative idea without needing years of practice and training. Professional composers, musicians, and producers can benefit from being both more efficient and potentially more versatile by using co-creative tools for arranging and exploring new ideas. Finally, there can be an opportunity in AI tools becoming so good that they threaten human artists: a reflection on what creativity means and what the role of human creation in artistic endeavors is.

Threats: If artists utilize the same or similar tools, there is a danger of reducing the diversity of creative output and stifling innovation in the field of music. Jobs are most definitely endangered, with a first focus on roles that are already semi-automated and streamlined. While plagiarism is not usually intended by the developers of modern generative systems, it most certainly occurs with similar legal implications as for human-composed music. The accountability and liability question, however, might be legally more ambiguous, which can be a considerable concern especially for deep fakes or content that might harm, e.g., the reputation of a human artist.

Data

Opportunities: Personalized machine learning systems such as recommendation systems might be able to predict a user's taste surprisingly well given a significant amount of data and context.

Threats: It is currently a legally unresolved issue whether training data can be used without explicit authorization. Privacy and data security are of concern with respect to storing user data.

Other threats

Environmental impact: the development, training, and inference for large models can utilize a significant amount of power, with ramifications on environmental impact, grid stability, and cost.

Monopolization: A currently very immanent threat is the consolidation of state-of-the-art technology at a small number of companies, which could lead to paywalls and access restrictions, opaqueness regarding system capabilities and bias, and unclear training data.