

Music Walks

Generative Deep Learning has received considerable attention in the last few years. This development has sparked repeated interest in an old, philosophical question:

Can artificial intelligence produce art? or, more general, **Can machines be creative?**

In last year's very successful Master Project "Art Generation with GANs", we were able to demonstrate that current Generative Adversarial Networks (GANs) can indeed produce high quality artworks (ref: MPSS2021FN1). This year, we want to experiment with the generation of music using deep learning. Together with the Museum Barberini (<https://www.museum-barberini.de/>)

and producer/composer Henrik Schwarz (<http://www.henrikschwarz.com/>), we want to push the boundaries of AI and art even further. For the anniversary of the Museum Barberini, an experiential musical level will be added to the permanent impressionist collection.



It combines three components:

1. the artistic ideas of the impressionists,
2. contemporary electronic music, and
3. innovative technology based on AI.

The result shall be a museum experience that is unique in the world, in which visitors can experience the collection in an audio-visual combination that is different and individual with each visit.

The focus of the master project lies on the development and integration of AI methods to create music based on user input and sensor data in combination with paintings and newly composed music samples in the context of the museum.

Project Outline

Through layering of several musical levels as well as subtle changes of mood and the conveyance of a fleeting atmosphere, the combination process will draw on the working methods of the impressionists. Influenced by external data, the music will be modulated differently again and again, and combined into new music. Parameters affecting the composition include

1. Movement patterns of the visitors
2. The respective galleries and artworks of the exhibition
3. The individual length of stay of the visitors
4. Other signals, e.g., from smartphone sensors

Visitors can thus influence the modulation of the music themselves—and enjoy the Impressionism collection with a new and individual composition created in real time during each visit.

Project Approach

Deep Learning methods are able to compose/generate music given enough training data. In this project, we want to explore these possibilities using GANs or



transformers. Further, we want to be able to control the generated music based on external input. To this end, we need to investigate conditional GANs and approaches to include and re-use existing music snippets. One particular challenge is the application scenario: we want to produce the music in real-time and individually for each visitor. Thus, we probably need to pre-compute specific parts and then arrange and merge these parts on the fly

Summary

What we offer:

- Exciting project between technology and art:
Artificial Intelligence - Impressionist Paintings + Musical Composition
- Professional project partners:
App development - Museum Barberini - Henrik Schwarz
- Contributing to an exciting, unique experiment with high visibility

What we expect:

- Curiosity and creativity
- Python programming skills
- Familiarity with machine learning
- Some experience with deep learning is a plus

Contact

The HPI Information Systems chair and Information Profiling and Retrieval Group (ZBW + CAU Kiel) will jointly supervise this project. If you have any questions, please do not hesitate to contact Prof. Dr. Krestel (ralf.krestel@hpi.de) or Alejandro Sierra (alejandro.sierra@hpi.de)

References

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