Online Algorithmic Music

Course Syllabus: MAAD 22506 - Spring 2023

where	when	prof	email	TA
JCL 134	Tues 2pm	Nick Briz	nbriz@uchicago.edu	netnet

In this course, students will learn how to use JavaScript and web-based technologies to create algorithmic musical compositions and experimental web-based instruments. Through the use of the WebAudio API and JavaScript libraries like tone.js, students will learn how to programmatically generate and manipulate sound, creating interactive and generative audio works that can be shared online. Along the way, the class will also survey works by artists working in this field and will feature a visiting artist who will walk students through their own practice. Themes of generative art, randomness and chance, originality and machine creativity, and the cultural implications of influential musical algorithms will also be explored. This class is an intermediate level programming course. A beginner to intermediate level understanding of core programming concepts (ideally in JavaScript) is required. While a background in music can certainly be beneficial, it is not required for success in this course.

Schedule

Week 1 (03.21.2023): *Introduction to Algorithmic Music*

- Overview of the course and syllabus
- Introduction to the history/principles algorithmic music and the cultural impact of these technologies

Week 2 (03.28.2023): *Interactive Oscillators*

- Introduction to the Web Audio API
- Workshop: web based theramin
- Survey of interfaces/controllers

Week 3 (04.04.2023): *AI Interfaces*

- Debug/Discuss our web based theramins
- Introduction to Machine Learning models as interfaces
- Workshop: AI-UI theramin

Week 4 (04.11.2023): *Generative Music Techniques*

- Introduction to basic music theory
- Workshop: Melody Generator and Arpeggiators

Week 5 (04.18.2023): *Sampling and Transcoding*

- Introduction to the history of music sampling technology

- Workshop: Audio Buffers, sampling audio and other file types

Week 6 (04.25.2023): *Visiting Artist*

- Jake Albough will be visiting and presenting his work

Week 7 (05.02.2023): *Prepare for Clusterflux* ——— **(05.04.2023):** *Share work at Clusterflux*

- Clusterflux preparation/rehearsal (May 2) and (optional) performance (May 4)

Week 8 (05.09.2023): *Sound Processing*

- Introduction to sound processing
- Survey of effects and analysis algorithms

Week 9 (05.16.2023): *Project Development*

- Discuss/debug assignments

Week X (05.23.2023): *Class Performance*

- Final group performance

assignments

Each assignment should be submitted as a URL on the class canvas (either a netnet.studio project url or a GitHub URL to a repo with an index.html page at the root). All assignments will be produced using JavaScript, the web audio api and (optionally) the tone.js library (and/or other audio/musical JavaScript libraries).

Assignment 1: For this assignment, students will design and develop a web-based musical instrument. The instrument should allow users to interact with it and generate sounds in a meaningful way. Students should explore different interfaces and consider the use of sensors or controllers to enhance the user experience. the final deliverable will be a functional web-based instrument that can be shared online, along with a brief written reflection on the creative process and technical challenges.

Assignment 2: Algorithmic Composition For this assignment, students will create an algorithmic system that generates musical compositions. The system should be controllable in some way, allowing users to adjust parameters and influence the output. The final deliverable will be a functional algorithm that generates unique and interesting musical compositions. The final deliverable will be a web-based interface where the algorithm can be run online, along with a brief written reflection on the creative process and technical challenges.

Assignment 3: Sound Processing For this assignment, students will explore the possibilities of sound processing. Students should investigate different techniques, such as filtering, modulation, or granular synthesis, and create a piece

of music that showcases these techniques. The final deliverable will be either a recorded piece of music that demonstrates the use of sound processing techniques or a web based audio processing tool, along with a brief written reflection on the creative process and technical challenges.

Evaluation:

Assignments are not considered "complete" until I mark them as such on canvas. I will be evaluating assignments based on the criteria below. If/when a student does not satisfy the criteria below I will leave feedback on canvas explaining why as well as suggesting for what sort of changes you can make to meet the criteria. Assignments are due by the end of the quarter, though it is recommended that students submit assignments as soon as their ready and not wait until the end of the quarter, this way you have sufficient time to address any feedback I leave on canvas.

- Craft (40%): Assignments will be evaluated based on technical proficiency and clarity of code. Students should use appropriate programming concepts, techniques and libraries to create functional and well-designed musical instruments, algorithms and sound processing tools.

- Creativity (40%): Assignments will be evaluated based on originality and creativity of the musical instruments, algorithms and sound processing tools created by the students. Students should leverage the capabilities of JavaScript and web-based technologies to explore new possibilities in music and sound creation.

- Presentation (20%): Assignments will be evaluated based on the quality of the final presentation, including the clarity of the description of the musical instrument, algorithm or sound processing tool, the quality of the audio examples and demonstrations, and the overall professionalism of the presentation.

Plagiarism

Plagiarism of concepts, code, compositions, samples and/or other elements is strongly encouraged, so long as you leave clear attribution within your code via comments. Ensure that anything you copy is in some way transformed, either by creating a variation on the copied elements or combining those elements with other copied elements. NOTE: transformation/combination (however subtle) is not a substitute for attribution, but rather a requirement for all copied elements.

AI Policy

We're entering a new era of "Machine Learning" or AI. These algorithms are having (and will continue to have) drastic effects on every aspect of our society (including art). Today, artificial neural networks trained on troves of data

(which are not always ethically sourced) can make "predictions" and create "hallucinations" (often with clear biases) that would have seemed like impossible sorcery just a few short years ago. In certain high stakes applications this can save lives, but it can also destroy them. In other contexts this biased hallucinatory predictive sorcery can be quite exciting, as is the case with media art. This technology, like many others that came before it (smart phones, the Internet, the computer) will most certainly change everything in our field, exactly how and to what extent is still anyone's guess. In the interest of collectively learning how to leverage its promises and minimize its perils, I encourage anyone interested to experiment with AI (beyond the tools covered in class) so long as you are transparent about what/when/how you use it and are willing to share your process/perspective on it in class.

Course's Sound Track

The following soundtrack will be played in the classroom before class. It was curated by the Internet's collective hive mind as filtered through ChatGPT. The prompt was for a playlist which would be thematically tied to the course, but would also serve as good "background music" in the classroom.

1. Brian Eno - Music for Airports (1978)
2. Steve Reich - Music for 18 Musicians (1978)
3. Aphex Twin - Selected Ambient Works 85-92 (1992)
4. Alva Noto - Xerrox Vol. 2 (2009)
5. Ryoji Ikeda - dataplex (2005)
6. Holly Herndon - Platform (2015)
7. Autechre - Confield (2001)
8. Karlheinz Stockhausen - Kontakte (1960)
9. John Chowning - Turenas (1972)
10. Morton Subotnick - Silver Apples of the Moon (1967)