MUSIC-GA 2199-002 (5547)
New Media Creation Workshop:
Gesture, Sound, and Image Interactions

Instructor: Jaime Oliver La Rosa
Meeting time & place: MON 3-5pm, Room 365 (24 Waverly)

In this course we will develop interactive artwork that explores the relationships between sound, image, and gesture through the inspection of historical and contemporary works, and relevant subjects in new media theory, cognitive science, and interactive architecture and behavior design. Artwork in this case means music/computer music (interactive/generative systems, musical instrument design, visual music) and sound art practices (sound sculpture, sound installation, sound objects). The course will combine weekly lectures and additional meetings for workshops and critique will be scheduled as necessary.

Topics may include the use of video analysis as a sensor / sound analysis and feature extraction / generating and editing visual material from sound signals / topics in physical computing (Pd/RaspberryPi) / intermodal cognition / Pixel, OpenGL, and Shader manipulation / data sonification / alternative/graphic scores. These topics may vary according to the specific needs of student projects. Examples will be provided in Pure Data, Gem, Raspberry Pi, (and C/C++ whenever necessary).

This course will run in parallel with the implementation of the studio and workshop spaces in the department, which will be complemented by guest workshops. Students are expected to take advantage of these workshops and facilities.

Topics:

1. Introduction to GEM, the GPU, Graphics vs. images & video (Pixels, Image Resolution and Weight, Matrices, and Colorspaces).
2. Video analysis as a gesture sensor (Video Tracking, indexing and continuity)
3. Visual Music.
4. Alternative/graphic scores: Federico Von Reichenbach, UPIC, and images as scores.
5. Generating and editing visual material from sound signals / database form // Sound analysis and feature extraction (envelope following, onset detection, timbreID).
6. Intermodal cognition (Gestalt theory in visual and sonic domain, Latency: Levitin + Mäki Patola; audiovisual overriding: McGurk, etc.; Synchresis)
7. Mapping and Behavior design (Triggers and Continuous Control, Classification)
8. Video Mapping; projecting onto unusual surfaces
9. Topics in physical computing (Pd in RaspberryPi, UNIX and Raspbian).
10. Drawing Sound Waveforms onto Image Matrices and
11. Infrared light and video.
12. OpenGL.
13. GLShaders.

14. Data Sonification.

Topics will vary according to the specific needs of student projects. Examples will be provided in Pure Data, Gem, Raspberry Pi, (and C/C++ whenever necessary), but any programming language is welcome. The course will focus on learning certain techniques that allow you to design, program, and realize a new work.

References

MAIN READINGS
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Other References
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Whitney, John. *Digital Harmony: On the complementarity of music and visual art*. McGraw-Hill, Inc., 1981.

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Wertheimer, Max, and Kurt Riezler. "Gestalt theory." *Social Research* (1944): 78-99.
Bregman, Albert S. *Auditory scene analysis: The perceptual organization of sound*. MIT press, 1994.
McGurk, Harry, and John MacDonald. "Hearing lips and seeing voices." (1976): 746-748.
Schutz, Michael, and Scott Lipscomb. "Hearing gestures, seeing music: Vision influences perceived tone duration." *PERCEPTION-LONDON-* 36.6 (2007): 888.
Schutz, Michael, and Michael Kubovy. "Causality and cross-modal integration."*Journal of Experimental Psychology: Human Perception and Performance* 35.6 (2009): 1791.
Levitin, Daniel J., et al. "The perception of cross-modal simultaneity."*International Journal of Computing Anticipatory Systems* (2000): 323-329.
Mäki-Patola, Teemu. "Musical effects of latency." *Suomen Musiikintutkijoiden* 9 (2005): 82-85.
Mäki-Patola, Teemu, and Perttu Hämäläinen. "Latency tolerance for gesture controlled continuous sound instrument without tactile feedback." *Proc. International Computer Music Conference (ICMC)*. 2004.