

## Project

Your DSP Lab project should involve **real-time programming of an audio or video signal processing algorithm**. (The values of an output signal should be generated as values of an input signal are acquired.) **Your project should illustrate your understanding of the tools, techniques, and ideas that we learned in the course.** Creativity is encouraged. Your project is not expected to be a research project. **You may implement an algorithm from a book or paper or build a system (e.g., GUI) based on what you learned in class.** One option is to explore and implement a topic in the text book that was not included in class, or extend in a creative way a topic we learned about, or combine in a creative way multiple topics we learned about. **But your project should not be simply a variant or combination of one or more course assignments.** Projects can be done individually or in groups of two. You may use any available Python libraries.

**You may build upon and extend existing projects that other people have posted (e.g., on GitHub).** But in this case, you must clearly refer to their work and clearly explain what you did (what code you wrote) and how it is different from the existing project. In your project submission, the code that you wrote and the existing code should be in **separate** folders so that they can be readily distinguished.

Each student (or group) should choose a different project (some degree of similarity is acceptable). Therefore, to avoid overlap between projects, we will use a shared spreadsheet for everyone to list their project topic. Please consult the shared list before finalizing your project topic.

Past projects have included: keyboard synthesizers, guitar effects, multi-voice chorus effects, music mixers, sound effects in games, pitch shifting, pop music vocal processing techniques, audio equalizer tools, guitar tuning applications, spatial sound simulations (e.g., audio panning), no-touch video-based musical instruments ('air drums', digital theremins), video object tracking using a webcam, finger painting in air using a webcam, piano keyboards, video special effects, reverberation simulation tools, real-time audio noise suppression, real-time chorus tool for singers, raspberry pi security camera, real-time voice transformation tools, automatic music generation by gesture or other control input, real-time guitar chord classification, real-time graphic visualization of audio. **Please do not** do any of the following projects (they have been done too many times): instagram face filter, in-air finger painting, intruder-detection camera, simple piano keyboard with simple sounds, or a game.

[Example projects from previous semesters \(link\)](#)

Due dates for the following stages will be posted on the course page.

**Project Topic.** Enter your project title on the designated shared spreadsheet. Submit a description of your project topic and a list of your group members. You can subsequently change your project topic - just let me know.

**Project Demo Video.** Record a video demonstrating your project and share it with the class. You can combine screen-recordings and other video. Your video should begin with a demonstration of your project, showing the real-time aspect of your project. Your recorded video

can be up to 5 minutes in duration. If the project is done by a group, then each group member must participate and speak in the video.

**Project Document and Software.** You should prepare a written document explaining your project, how you implemented it, and what libraries or functions you used beyond what we learned in class. Include screenshots and/or photographs of your project. Your uploaded document should be a pdf file. You should prepare a zip file of your software. If your zip file is less than 10MB then you may upload it to NYU Brightspace / Assignments. If your zip file is larger, then upload it to your NYU Google Drive and provide a link to it in NYU Brightspace / Assignments.

**Project Peer Feedback.** Each student will view and give feedback on videos made by other students. The feedback you give to other students will be part of your course grade.