Audio in Touchdesigner & Receiving data from Arduino

These tutorials aim to introduce some of the basis workflows and practices for working with audio in Touchdesigner, as well as provide students with external resources to continue on their research journey.

The tutorial is structured in 3 main sessions, each made up of a brief video tutorial and a more in-depth written description of some the operators used, as well as some extra tips and tricks to continue experimenting with.

Audio-Reactive Graphics

In this first session we'll set up a network to extract numerical data from an audio sample. The data is later used to animate a graphic, you can quickly test this set up out by animating the radius of a Circle TOP.

While this brief video introduces the basis of extracting numerical values from a audio file, you can further explore the **Audio Spectrum CHOP** and it's parameters to filter out lower/higher frequencies, detect kicks in your audio file, etc.

Recommended resources: **Audio Reactive Drawn Content in TouchDesigner** , **Make Anything Audio Reactive**

Mic-Input

Our laptop's microphone is an easy input to detect voices but can also act as a sensor to detect how many people are in a room or the type of event we are attending. In this second session we continue to work on audio-reactive content but use our microphone as source of input, we will explore how to adjust our new values to the visual.

Generative Sounds, Receiving data from Arduino

In the first two sessions we have explored the possibility of animating with sound, using audio as our source of input. In this session we look at sound as our final output, the result of other interactions happing in a physical realm.

In this example, we begin by connecting a **Force sensor to an Arduino** and use the sensor to generate numerical values, which we will translate into sounds in Touchdesigner. We will use the **Serial DAT** operator to access Arduino's port and translate these numbers into CHOP values. We will use these as our interactive point of reference, to manipulate the *Frequency* of our waveform, from the **Audio Oscillator CHOP**.

While Touchdesigner might not have been initially designed with audio generation in mind, there are a couple of great resources online to help get some interesting sounds out of it:

Owen Kirby is a audio-visual artist, he explores the audio-synthesis side of TouchDesigner in his YouTube channel and has hosted a super insightful TD meet up in 2020, where he share some files and his process: **https://www.youtube.com/watch?v=Xajdyh7kspk.**

VSTs are virtual audio-synthesisers that allow you to easily enhance sounds, you can use a **Audio VST CHOP** to import these onto your network. You can read more about VSTs **here**.

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