Chet Roe

Team third report

Sound Visualization Using Salt on a Speaker

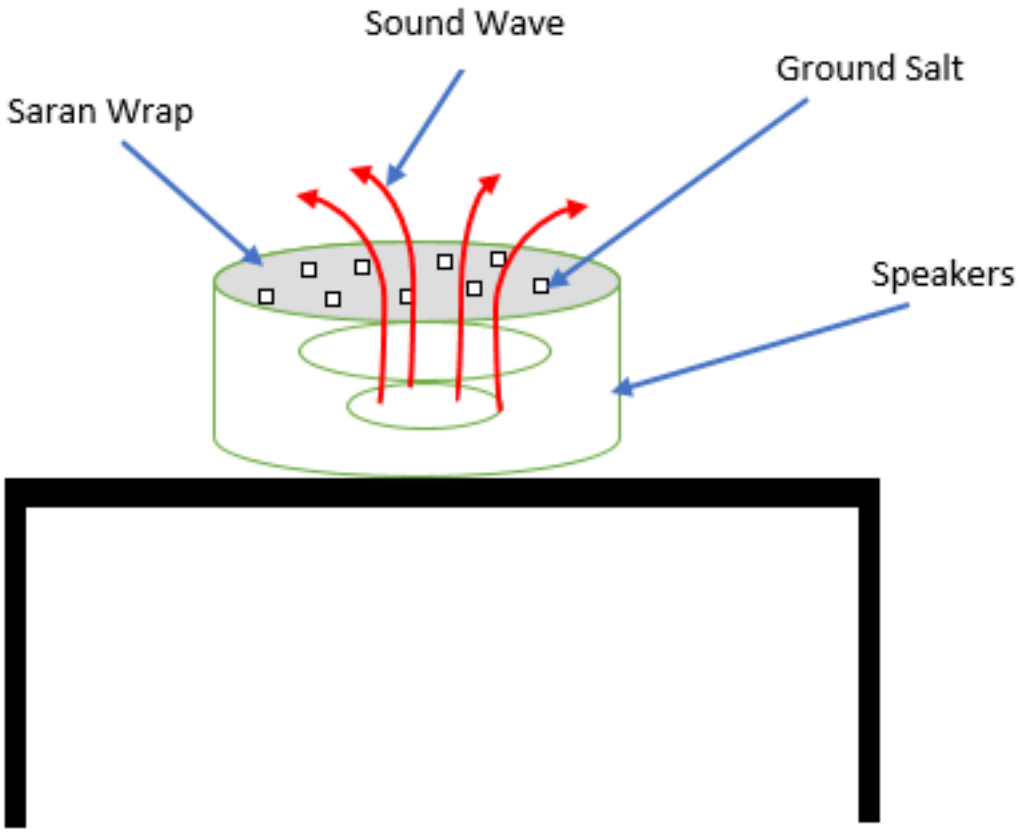
Photographic and Scientific Intent:

This video **(**Ibrahim, change this to image**)** was taken for a Flow Visualization course at the University of Colorado Boulder. For this project, we attempted to visualize sound wave patterns. We saw a beautiful video (https://www.youtube.com/watch?v=Q3oItpVa9fs) that inspired us to attempt our own version. Artistically, experimenting with cymatics creates beautiful patterns and allows for scientific exploration. This was a team collaboration between Eli Copp-Devol, Ibrahim Alhajji, Chet Roe, and Hana Kieger. (Written by Hana). Personally, my video can be found at https://www.youtube.com/watch?time_continue=1&v=6BUOud2tvko, with the shorter archival version in the files of Prof. Hertzberg.

Setup:

The setup for this experiment is simple. As you can see in the sketch below, a KEF q300 speaker cabinet was used as a sound wave source. The speaker was covered with Saran wrap and a small amount of grounded pink Himalayan rock salt was placed on the middle of the Saran wrap. To start the sound waves and to generate vibration, songs were played together with a sliding tone

generator. Desired vibration frequency was achieved by adjusting the volume using the sliding tone generator.



Physics:

Sound is a mechanical wave generated by the vibration of particles in the medium at which the vibration travels (air is the medium for this experiment). The sound generated by the speaker vibrate surrounding objects carrying the sound along. When the sound waves reach the salt particles, they start to vibrate the particles causing them to move and shake. Changing the

volume or the frequency of the sound would change the salt particles movement. (Written by Ibrahim)

Source: https://study.com/academy/lesson/how-does-sound-travel-lesson-for-kids.html

Visualization Technique

As mentioned previously, ground salt was used to visualize the effect of different frequencies on fine particulate. The black face of the speaker playing the frequencies was used as a background which helped contrast against the white salt. An LED light panel was focused directly on the salt, adding clarity to the footage and one or two floor lamps were placed at a distance to create ambient light and eliminate any hard shadows generated by the light panel.
(Written by Eli)

Photographic Technique:

The field of view of the video is roughly a foot wide, and the distance from the setup to the lens is roughly a foot. The video was taken on a Nikon d3200 digital camera. The original pixel ratio was 1920 × 1080. For my editing, I spliced the videos of the actual Silver Soul song (by Beach House) together with video footage of playing with the tone generator (1). I made sure to jump cut on the large beats to add to the effect of the sound. I made some color changes to a few sections also on the beats to add visual entertainment. The music from most of the clips was

edited down to low levels, so one mostly hears the song, but can hear some of the tone generation.

Personal experience:

I am very passionate about music and loved getting the chance to play with the speaker to visualize sound. Working at an amplifier and speaker company, PS Audio, has inspired me to think about sound in new ways. I think we got results here that are very unique and fun. The patterns are beautiful and it shows well even with a relatively simple setup. I think it is very inspirational and I had a lot of fun testing the various salt levels and sound levels. It made for lots of interesting footage.

(1) http://www.szynalski.com/tone-generator/