

James Yang

CSCI 431

HW03

Abstract

To use MatLab to process a sound file to estimate the number of popcorn popped by smoothing.

Questions

1. Estimated about 99 kernels popped.
2. One assumption I made was that a popcorn wouldn't pop within 500 samples of another pop. This would be the heuristic to not double count values close to each other. Also, I assumed that the first 20000 samples to be the baseline background noise. This way, I had something to compare the samples to in order to determine what was a pop and what was not.
3. First, I smoothed the original sound samples by finding the median over 50 samples for every point. This resulted in a less jagged graph than the original. Afterwards, I smoothed the samples over 500 samples, creating a smoother curve. From there, I took the background noise by taking the highest value in the first section of the samples, where there were no jumps. I compared each sample to that to find if a popcorn kernel popped, skipping 500 samples to avoid double counting.

Conclusion and Observations

I found it difficult to smooth out the curve since there were so many samples, the plotted graph looked less like a line, and more like spikes every now and then. To solve this issue, I zoomed in to certain sections to see what was actually happening to the smoothed curve. Using different colors to plot each curve also helped for visualization. The heuristic to avoid double counting is more of a number that seemed like a fair estimation. Overall, I feel more comfortable about signal processing using median smoothing.