Background Noise Reduction by Using Spectral Selection to Remove Unneeded Frequencies

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Noise proliferates our increasingly developing environment in the form of noise pollution. Because noise can both negatively influence the quality of signals as well as the health of individuals, it is necessary to find the most efficient solution to remove as much noise as possible without interfering with our signal, which in this case will be the human voice. Noise reduction by the means of digital signal processing still remains prevalent to this day, so necessary steps were taken to create a noise reduction algorithm fit for the purpose of the investigation. In order to accurately craft a program capable of removing noise, a discrete Fourier transform is applied to a small sample of signal and noise obtained from a microphone, the noisy input, in order to accurately judge the frequencies of the signal and noise and the amplitude/volume of the noisy input. A method calculates a signal to noise ratio and use that ratio to find a noise floor that indicates the boundary between the noise and signal, then decreasing the prevalence of the noise accordingly. The program was tested by comparing the filtered recording of some participants with the raw data to find artifacts and percent difference. This project provides an alternative to conventional real-time noise reduction algorithms that is both efficient and practical in its ability to remove noise while avoiding artifacts found in the data.

Awards Won:
Oracle Academy: Award of $5,000 for outstanding project in the systems software category.