

Project #1 (optional with 5 points extra credit)

Due 9:00am Mar 9 (F) 2018

Digital Audio Signal Processing

This project is built upon the homework problems 7.4, 7.5 and 8.4. In this project, we will conduct an experiment to compare the moving average filter and median filter in reducing different types of noises in a real audio signal. Please use modular programming approach to write your program. You should only have one main script file including Step 1, all the other steps should be functions.

Step 1 Save the flute.wav file in your working directory, and use the wavread function to load it into memory. You should obtain the sampling rate as well when loading it. Play the sound using sound function in MATLAB.

Experiment 1, reducing uniform white noise

Step 2 Add a uniform white noises to the flute signal, play the noisy sound to hear the difference.

Step 3 Apply the moving average filter with different orders of 10 and 20, respectively, to the noisy sound, and play both resulting signals. Compare the results.

Step 4 Apply the median filter with orders of 10 and 20, respectively, to the noisy sound and play both resulting signals. Compare the results.

Comparing the above results from Step 3 and Step 4. What conclusions can you draw about reducing white noises?

Experiment 2, reducing spike noise

Step 5 Add 10 points of spike noise with values three times larger than the original signal values. These 10 points should be uniformly randomly distributed among the entire signal. Play the sound.

Step 6 Apply the moving-average filter to this noisy signal using appropriate orders. Play the resulting sound. Are the spike noise removed?

Step 7 Apply the median filter with orders of 3 and 5, respectively, to the noisy sound and compare the results.

Compare the results from Step 6 and Step 7. What conclusions can you draw about reducing spike noises?

Submit your programs as a single zip file, with all functions and script files. (NOT A PDF FILE)