

Time delay beamforming using a microphone array

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Introduction to audio and video techniques (ELEN0002-2)

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Acoustic beamforming using a microphone array

Consider the following microphone array (Figure 1), which contains of 16 omnidirectional microphones spaced by 7 cm. The microphones aligned uniformly along the x -axis.

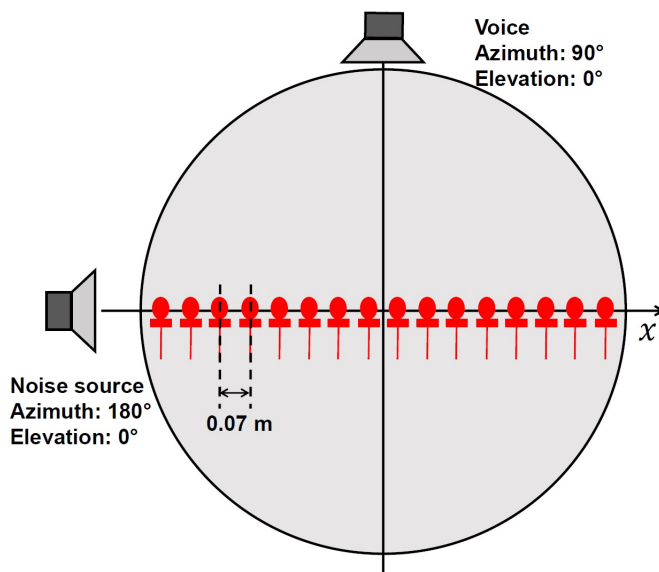


Figure 1: 16-element uniform linear acoustic array.

Now, consider two loudspeakers emitting "noise" and "speech" signals simultaneously. The incident direction of the noise signal is 180 degrees in azimuth and 0 degrees in elevation. The direction of the speech signal is 90 degrees in azimuth and 0 degrees in elevation.

We registered the output of microphones simultaneously with the sampling frequency of 48000 Hz, we thus produced 16 ".wav" files corresponding to 16 microphones. Given the ".wav" files and using MATLAB, complete, run, and send us either

- beamforming_homework_2020.mlx, or
- beamforming_homework_2020_alternative.m