Application of Voice Extraction technology in assessing speech intelligibility in adult patients after cochlear implantation

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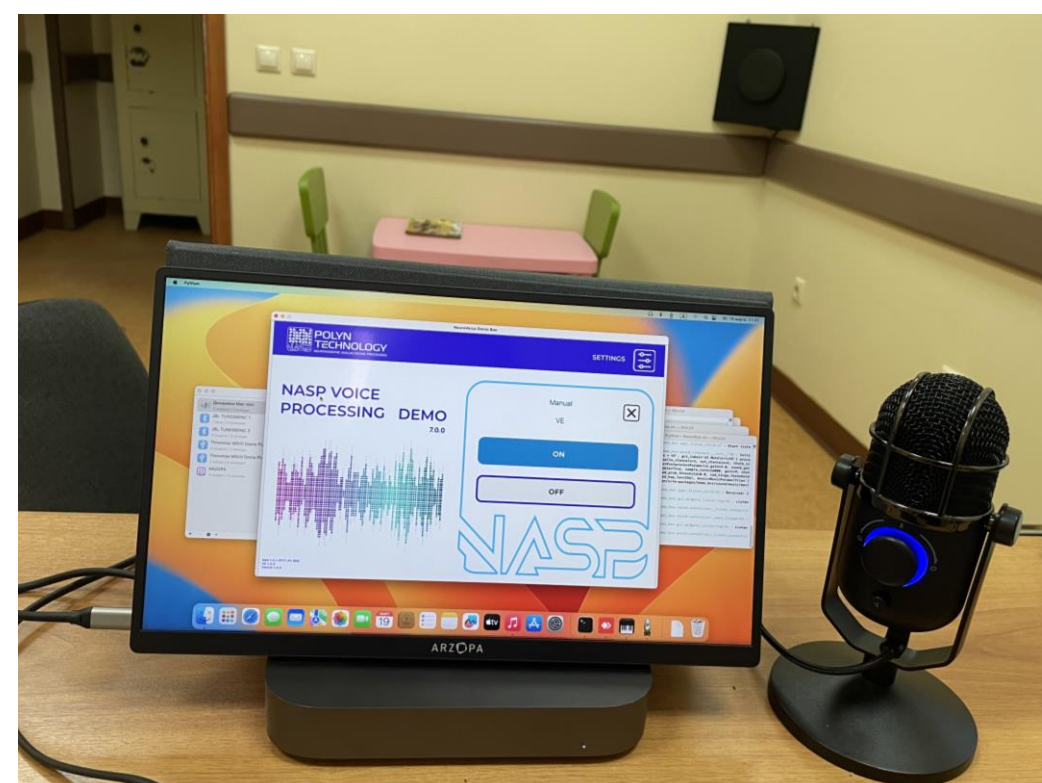
Abstract

During the present research our scientific team has studied an opportunity to explore neural network in assessing efficiency after cochlear implantation. The results of our study showed better speech intelligibility in noise processed through a voice extraction device. The voice extraction device is based on a trained neural network and operates autonomously (no Internet connection required). Polyn Technology has prototyped a stand-alone Voice Extraction (VE) device based on a portable microcomputer.

Voice Extraction (VE) device, Polyn Technology

Results

For 55 study participants (82%), VE technology increased intelligibility by an average of 11.9% in absolute terms. However, the average improvement in intelligibility was -1.8% for SNR=6, +21.9% for SNR=3 and +7.9% for SNR=0 respectively. For 55 participants (82%), VE technology increased intelligibility by an average of 22.6% relative to their clear intelligibility rate. However, the average relative intelligibility improvement was -1.9% for SNR=6, +39.5% for SNR=3 and +16.6% for SNR=0.
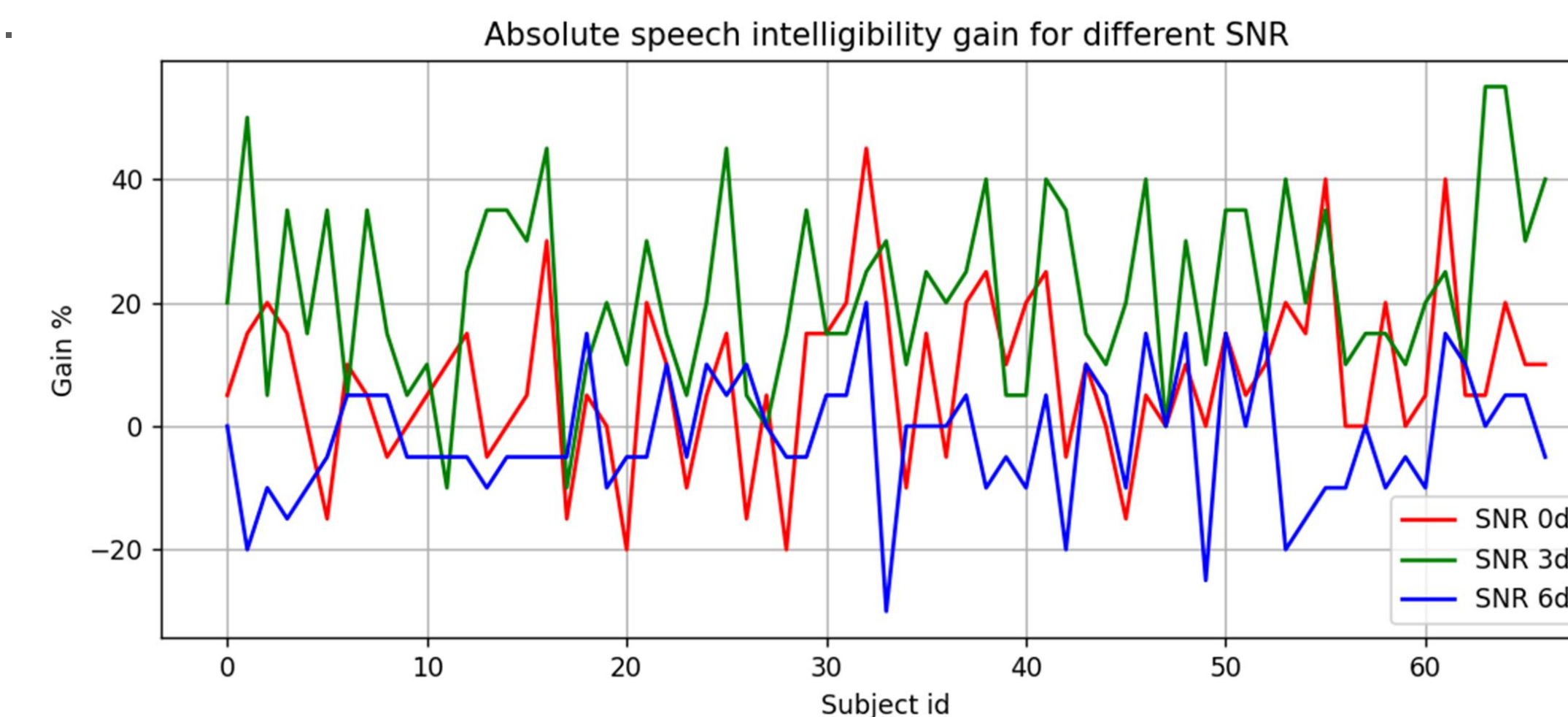

Objectives

To evaluate the feasibility of using VE technology in adult patients after cochlear implantation and to conduct a comparative analysis of speech intelligibility of a noise-free signal and a signal using VE technology in adult patients after cochlear implantation.

Conclusion

The application of Voice Extraction technology in the development of new options for speech coding by a sound processor, and as a result, in the rehabilitation of patients after cochlear implantation, seems to be a promising and effective method.

Materials and methods

- 67 patients aged 18 to 77 years old
- chronic bilateral severe to profound sensorineural hearing loss
- unilateral cochlear implantation
- pure-tone free field audiometry using an optimally fitted sound processor of the cochlear implant
- free field speech audiometry using an optimally fitted sound processor of the cochlear implant in quite and in noise (SNR) = 0 (dB), SNR = 3 (dB), SNR = 6 (dB)
- free field speech audiometry using an optimally fitted sound processor of the cochlear implant in quite and in noise (SNR) = 0 (dB), SNR = 3 (dB), SNR = 6 (dB) through a voice extraction device

References

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