

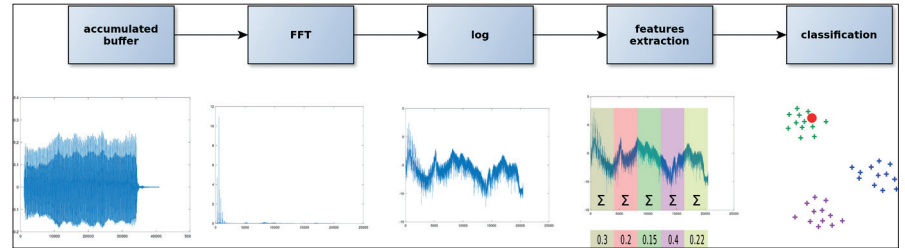
FunSpeech

promoting speech production in young children with hearing disabilities

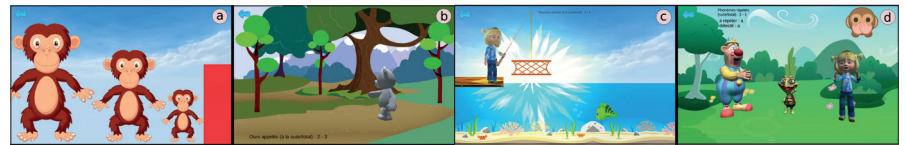
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Brief description

Scientific studies on infants show a strong improvement in pronunciation and speech when speech practice begins as early as possible. Unfortunately, hard of hearing newborns cannot undergo cochlear implant surgery until six months after birth. Therefore, we have developed the Ra&D project FunSpeech, a serious game that aims to help young implanted children to improve their speech production abilities through frequent practice. FunSpeech has been carried out with good preliminary results in a control population of normal hearing children, indicating that it has the potential to successfully fill the gap in applications targeting speech production skills in young children with hearing implants.



Signal processing and algorithm used to perform the phoneme identification.



Four of FunSpeech's mini-games.

The cochlear implant (CI) is a device that restores hearing by electrically stimulating the auditory nerve. Successful rehabilitation with a CI requires acoustic stimulation and training, especially for young children. Therefore, children should attend an intensive speech therapy after implantation.

FunSpeech is a serious game aimed at the unaddressed population of very young implanted children (2-4 years old). It intends to motivate these children to practice their speech production skills as often as possible.

Five mini-games working on different parameters necessary for accurate voice production have been created. They are designed to address the sound parameters required for the controlled production of speech: intensity, rhythm, pitch and phoneme construction. Dedicated signal processing and algorithms have been developed to:

- detect the presence of a meaningful sound of a given duration;
- classify the volume and frequency of a sound;
- identify phonemes.

It is interesting to note that the algorithm used for phoneme recognition mimics sound processing strategies commonly used in CI. To study and analyze the children's progression, clinical data are automatically extracted and collected.

The use of educational games has proven to be an effective treatment strategy in populations with disabilities. Indeed, clinicians and manufacturers of cochlear implants have begun to develop mobile game-based applications to support patients achieving optimal outcomes. However, speech production and very young children have received very little attention from the field. Promising preliminary results show that FunSpeech has the potential to successfully fill this gap. In addition, the strategy used in this innovative solution could potentially be extended to other areas, such as the promotion of communication skills in various syndromes.

Key points

- FunSpeech provides a fun and engaging experience that motivates children to practice their speech independently and as often as possible.
- No other serious game addresses the issue of promoting speech production in young children with hearing disabilities.
- The game is adapted to cognitive abilities of very young children.
- FunSpeech presents an innovative educational approach since each voice activity is directly translated into visual responses in games, so that the child receives an immediate and direct visual feedback.