



Incorporation of a Module for Automatic Prediction of Oral Productions Quality in a Learning Video Game

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Abstract

This document presents the research project TIN2017-88858-C2-1-R of the Spanish Government. Antecedents and goals of the project are presented. Current status, recent achievements and collaborations after the first year development are described in the paper.

Index Terms: Computer Assisted Pronunciation Training, Prosody, Down syndrome speech, Learning video games.

1. Antecedents

This project continues the research line opened in 2014 with the project *La piedra mágica*¹ supported by Resercaixa and continued in 2016 with the project *Pradia*² supported by BBVA Humanidades Digitales. The first of these projects served to develop a video game for Down syndrome adolescents to train oral communication, in particular prosody and pragmatics [1]. In the second project, the video game routines had been enriched and a clinical evaluation of user's performance was tested with formal evaluation.

2. Goals of the project

The video games developed in previous projects require the permanent assistance of a personal trainers (a teacher, a therapist, a relative...) to control and monitor the progress of the game users. The goal of the current project is programing a module to increase the software capabilities so that users can play in an autonomous way supervised by an intelligent tutor. This intelligent system will be responsible to decide on the user to repeat or continue with the training activities giving feedback for him/her to be more competent in oral communication and prosodic skills.

Three stages have been defined: 1) corpus collection of audio of DS people playing with the video game; the DS audios will be rated by professional voice therapists; correcting advices of the therapists will be also monitored. 2) computational models of quality of DS turns will be trained from the audio; a knowledge data base will be compiled with the therapist corrective orders. 3) An expert system is using the compiled information to decide about the user activities in real time.

3. Current status

The following activities have been performed according to the programed schedule:

- The software has been adapted to record in real time annotations from trainers about the quality of the video game users' oral turns.

- An app for mobile devices has been programmed to collect trainers annotations in a transparent way for players.
- An evaluation template has been devised including a set of criteria to be evaluated by the trainers. This template has been designed in collaboration with voice therapists from the centers Colegio Tórtola de Educación Especial of Fundación Personas Valladolid and ASDOVA Down Syndrome Association Valladolid.
- An inter-rater consistency evaluation process is being run for assessing the evaluation template and guaranty the consistency of parallel evaluation to be performed during the sort term recording activity.

4. Achievements

Main achievement in this first year of the project development is the publication [2] which reports on results derived from data obtained in previous projects. The video game was also presented in [3]. The PhD thesis of Mario Corrales, framed in this project, was presented in XXXIV Congreso SEPLN Sevilla Septiembre 2018 (the SEPLN society granted the student to attend the conference). In the current conference we also present advanced on the rating of quality of DS voice from data [4]

5. Collaborations

Apart from the already reported collaborations with Fundación Personas Valladolid and ASDOVA, we have open several national and international promising collaborations.

On one hand, we are collaborating with the research group of Pastora Martínez from the Department of Psychology of UNED Madrid. She is co-author of several relevant publications in the field of Down syndrome and prosody [5, 6]. She has provided as with her paired corpus of typical-DS speech, obtained while applying the PEPS-C test [7].

On the other hand, we submitted an Erasmus+ project (strategic partnership) in collaboration with different research groups and education centers in Portugal, Ireland, Italy, France and Bosnia. The project was finally rejected but the evaluation gives encouraging feedback for future resubmissions.

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¹<http://prado.uab.es/rececaixa/>

²<http://www.pradia.net>

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