A case study on the influence of progressive alcohol intoxication on speech features measured with My-Voice Analysis Python library

Apart from the linguistic information, speech presents non-verbal characteristics related to the speaker. The characteristics that can change within short time can be caused by fatigue, sleepiness, stress, emotion, illness and alcohol intoxication [1]. It has been already presented in literature that there are many applications of voice feature extraction and analysis in other scientific domains such as medicine and social sciences. In medicine, for instance, neurodegenerative and mental illnesses can be diagnosed and the stage of them can be assessed with speech-related tests and tools [2]. Automatisation of the process of features extraction and speech analysis can have a great influence on the technology development for medical, social and professional use.

A pilot case study of alcohol intoxication degree measure based on speech features extraction with the My-Voice Analysis library [3]. A case study was conducted with one 27 year old participant who agreed to record his speech five times during one day, sober and then after alcohol consumption in four stages. For the purposes of this study, a picture description task was selected. The participant was Polish native speaker, and the study was conducted also in the Polish language. Audio files were in .wav format, recorded at 44kHz sample frame and 16 bits of resolution as it is recommended by the authors of the library. With the My-Voice Analysis library, the following features were extracted: number of syllables, number of pauses, rate of speech, articulation rate, original duration, speaking duration, F0 (mean, median, standard deviation, minimal and maximal value). The speech mood assessment module was also used in the study. The results of the study show little difference in the extracted parameters. However, significant difference in standard deviation of F0 can be observed. The programme recognised the gender of the speaker correctly and assessed his mood of speech as showing no emotion, normal in each recording. The major conclusion form this case study is that the My-Voice Analysis library can be a useful tool for speech analysis and feature extraction, however it has to be tested for languages other than English on larger sample.

[1]   T. Bocklet, K. Riedhammer and E. Noth, "Drink and Speak: On the automatic classification of alcohol intoxication by acoustic, prosodic and text-based features," INTERSPEECH , pp. 3213-3216, August 2011.
[2]   V. Boschi, E. Catricalà, M. Consonni, C. Chesi, A. Moro and S. F. & Cappa, "Connected Speech in Neurodegenerative Language Disorders: A Review," Frontiers in Psychology, 6 March 2017.
[3]   "GitHub," 2019. [Online]. Available: https://github.com/Shahabks/my-voice-analysis. [Accessed 19 April 2019].