VOICE ACOUSTIC PARAMETERS FOR DETECTING SIGNS OF EARLY COGNITIVE IMPAIRMENT

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Abstract:

Aiding the detection of very early cognitive impairment in Alzheimer's disease (AD) and assessing the disease progression are essential foundations for effective psychological assessment, diagnosis and planning. Efficient tools for routine dementia screening in primary health care particularly non-invasive and cost-effective methods, are desirable. The aim of this study is to find out if voice acoustic analysis can be a useful tool for detecting signs of early cognitive impairment. This study is part of a larger project (Kokkinakis et al., 2016).

Experiencing cognitive impairment is accompanied by a variety of emotions. Sadness or "low mood" was found by Caracciolo et al. (2011) to be particularly prominent in the very early stages of cognitive decline, and depression is known to commonly occur among patients with mild cognitive impairment (MCI). Patel et al. (2011) found significant emotion main effects for several acoustic parameters when analysing voice production in five emotions, and Meilán et al. (2014) found voice perturbation parameters to distinguish people with AD from healthy controls with an accuracy of 84.8%. In the present study, a group of 53 patients (30f & 23m) with subjective cognitive impairment (SCI) or diagnosed with MCI, and a healthy control group of 35 subjects (22f & 13m) participated. Acoustic voice analysis of several vowel /a/-samples from a read a-loud text will be extracted for each subject, and analysed in terms of fundamental frequency variation (F0), formant frequencies, perturbation measurement such as jitter and shimmer (cycle-to-cycle variations in frequency and amplitude, respectively), harmonic-to-noise ratio (HNR), and long-time-average-spectrum (LTAS). The acoustic data will be compared and correlated according to age, gender, length of education and other parameters gained from the neuropsychological assessment (Wallin et al., 2016).

Keywords: mild cognitive impairment, dementia, voice acoustics, perturbation, acoustic correlates of emotions.

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