Automatic Speech Analysis for the Detection of Emotional Disturbances in Persons with Dementia

Alexandra König 1,2, Nicklas Linz 3, Johannes Tröger 3, Aurore Rainouard 1, Auriane Gros 1, Jan Alexandersson 3, and Philippe Robert 1

1 CoBTeK - Cognition Behaviour Technology Research Unit, Université Côte d’Azur, Nice, France, 2 INRIA – French Institute for Research in Computer Science and Automation, Sophia Antipolis, France, 3 German Research Centre for Artificial Intelligence, Saarbrücken, Germany

Emotional disturbances found in dementia patients such as depression, anxiety or apathy have an important impact on quality of life of both patients and their caregivers and represent a strong predictor for illness progression. However, they are often underdiagnosed since current assessment tools rely primarily only on subjective measures.

New computational approaches may allow a more objective evaluation of these behaviors that humans struggle to quantify. Therefore the study aims to investigate whether automated analysis of linguistic and paralinguistic biomarkers derived from audio recordings could be useful to determine emotional disturbances in dementia patients and thus demonstrate potential to improve early diagnosis.

Results: Vocal features such as speech rate or sound duration correlate significantly with severity levels of certain emotional disturbances like apathy. Classification between pathological and non-pathological groups based on the extracted features obtain 88% accuracy.

The ELEMENT project is developing solutions that enable assessment of neurocognitive functions as well as certain neuropsychiatric symptoms. It is based on speech analysis and artificial intelligence, enabling multiple use cases ranging from non-clinical telemedicine screening to expert diagnosis support settings. This results in a faster and earlier diagnosis leading to timely intervention.

Contact: alexandra.konig@inria.fr