Speech for Intelligent cognition change tracking and DEtection of AD (SIDE-AD) Research Program: SIDE-AD

Fasih Haider, PhD [1] , Stina Saunders, PhD [1] , Graciela Muniz-Terrera, PhD [1,2] , Craig W Ritchie, MBChB, PhD [1,3] and Saturnino Luz, PhD [1]

(1) University of Edinburgh, Edinburgh, United Kingdom, (2) Department of Social Medicine, Ohio University, Athens, OH, USA, (3) Scottish Brain Sciences, Edinburgh, United Kingdom

SIDE-AD is an observational longitudinal study developing speech biomarkers for use in neurodegenerative disease. Participants are recruited from the PREVENT Dementia study REF and NHS Memory services in Scotland. The objective of the SIDE-AD study is to recruit participants (n=150) across the AD spectrum. The developed infrastructure will be used to collect data of participants with an objective of analysing baseline speech markers in relation to self-reported mood, anxiety and apathy as well as clinical outcomes from patients' health care records.

There is emerging evidence that speech could be a potential indicator and manifestation of early Alzheimer's disease (AD) pathology. Symptomatic AD may change an individual's language, especially certain elements in speech such as elaboration and attribution. Therefore, the University of Edinburgh and Sony Group Corporation are collaborating within the Sony Research Award Program to create the SIDE-AD study which aims to develop digital speech-based biomarkers technology for AD. The study is designed to assess disease status in the pre-dementia stages in a real-world at-risk population in Brain Health Services.

The study is currently under IRB review with data collection due to start in summer 2023. In the context of the SIDE-AD study, we have developed a secured online data collection infrastructure for collecting voice data by prompting individuals to record a voice sample talking about their brain health. Individuals are asked to rate their mood, anxiety and apathy. The baseline speech biomarkers will be compared to the follow-up visit's speech recordings as well as to other variables from routinely collected health care data. The SIDE-AD study will employ signal processing and machine learning technologies to automate the assessment of the respondents' speech.

Survey Demo:
https://genealogies.mvm.ed.ac.uk/limesurvey/index.php?r=survey/index&sid=985169&lang=en

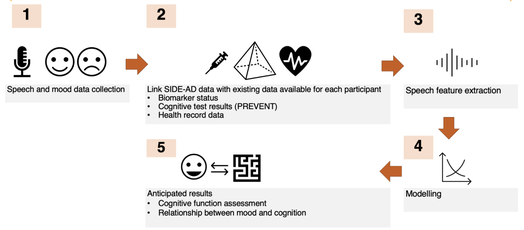

Figure 1. Speech for Intelligent cognition change tracking and DEtection of AD (SIDE-AD) Research Program: SIDE-AD

The SIDE-AD study is carrying out research and development of a speech-based application recording data on individuals' self-perceived brain health. A secured online data collection infrastructure is developed to collect speech data with an objective to analyse speech data in combination with routinely available clinical data in Brain Health Clinics, enabling real world validation of speech-based digital biomarkers for the early detection of AD. We plan to use automatic speech recognition and acoustic patterns for the automatic assessment of brain health status relevant to emergent AD-specific speech biomarkers.

Haider, F., De La Fuente, S. and Luz, S., 2019. An assessment of paralinguistic acoustic features for detection of Alzheimer's dementia in spontaneous speech. *IEEE Journal of Selected Topics in Signal Processing*, *14*(2), pp.272-281.

Fasih Haider, PhD

Fasih.Haider@ed.ac.uk