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Microphone-Independent Speech Features for Automatic Depression Detection Using Recurrent Neural Network

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Abstract

Depression is a common mental disorder that has a negative impact on individuals, society, and the economy. Traditional clinical diagnosis methods are subjective and necessitate extensive expert participation. Because it is fast, convenient, and non-invasive, automatic depression detection using speech signals is a promising depression objective biomarker. Acoustic feature extraction is one of the most challenging techniques for speech analysis applications in mobile phones. The values of the extracted acoustic features are significantly influenced by adverse environmental noises, a wide range of microphone specifications, and various types of recording software. This study identified microphone-independent acoustic features and utilized them in developing an end-to-end recurrent neural network model to classify depression from Bahasa Malaysia speech. The dataset includes 110 female participants. Patient Health Questionnaire 9, Malay Beck Depression Inventory-II, and subjects' declaration of Major Depressive Disorder diagnosis by a trained clinician were used to determine depression status. Multiple combinations of speech types were compared and discussed. Robust acoustic features derived from female spontaneous speech achieved an accuracy of 85%. © 2022. The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

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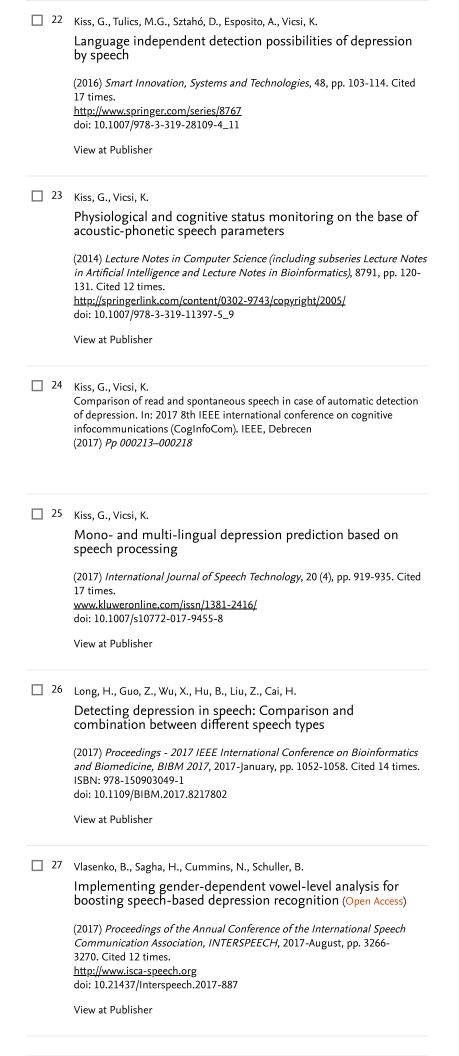
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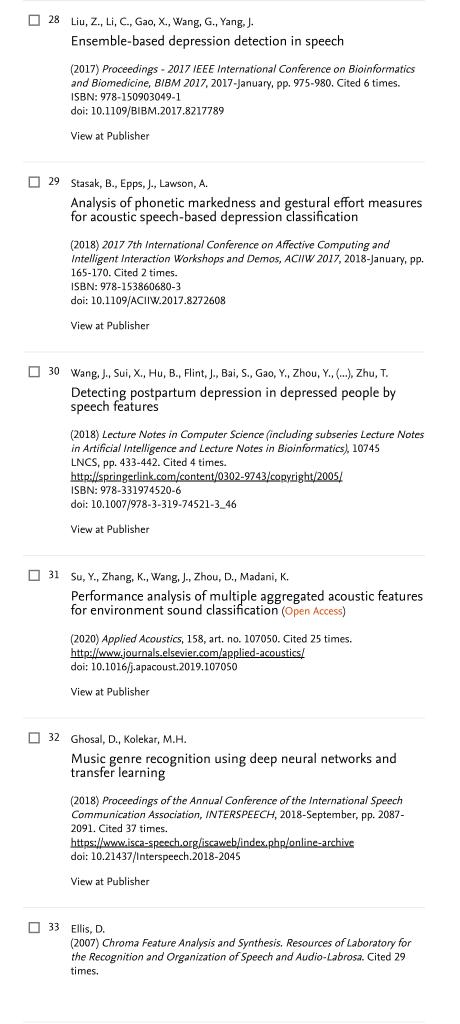
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