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Investigation of Different Speech Types and Emotions for Detecting Depression Using Different Classifiers

Haihua Jiang^a, Bin Hu^{a,*}, Zhenyu Liu^b, Lihua Yan^b, Tianyang Wang^b, Fei Liu^b, Huanyu Kang^b, Xiaoyu Li^b

^aFaculty of Information Technology, Beijing University of Technology, Beijing 100124, China

^bUbiquitous Awareness and Intelligent Solutions Lab, Lanzhou University, Lanzhou 730000, China

ABSTRACT

Depression is one of the most common mental disorders. Early intervention is very important for reducing the burden of the disease, but current methods of diagnosis remain limited. Previously, acoustic features of speech have been identified as possible cues for depression, but there has been little research to link depression with speech types and emotions. This study investigated acoustic correlates of depression in a sample of 170 subjects (85 depressed patients and 85 healthy controls). We examined the discriminative power of three different types of speech (interview, picture description, and reading) and three speech emotions (positive, neutral, and negative) using different classifiers, with male and female subjects modeled separately. We observed that picture description speech rendered significantly better ($p < 0.05$) classification results than other speech types for males, and interview speech performed significantly better ($p < 0.05$) than other speech types for females. Based on speech types and emotions, a new computational methodology for detecting depression (STEDD) was developed and tested. This new approach showed a high accuracy level of 80.30% for males and 75.96% for females, with a desirable sensitivity/specificity ratio of 75.00%/85.29% for males and 77.36%/74.51% for females. These results are encouraging for detecting depression, and provide guidance for future research.

Keywords: Acoustic Features; Depression; Classifiers; Speech Types; Speech Emotions.

* Corresponding author. Tel.: +86 10 67391747; e-mail: bh@bjut.edu.cn

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