A 2D-approach towards the detection of distress using Fuzzy K-Nearest Neighbor

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This research focuses on a novel approach of distress detection referred to as the 2D approach, using the fuzzy K-NN classification model. Unlike the traditional approach where single emotions were qualified to depict distress such as fear, anxiety, or anger, the 2D approach introduces two phases of classification, with the first one checking the speech excitement level, otherwise referred to as arousal in previous researches, and the second one checking the speech polarity (negative or positive). Speech features are obtained from the Berlin Database of Emotional Studies (BDES), and feature selection done using the forward selection (FS) method. Attaining a distress detection accuracy of 86.64% using fuzzy K-NN, the proposed 2D approach shows promise in enhancing the detection of emotional states having at least two emotions that could qualify the emotion in question based on their original descriptions just as distress can be either one or many of a number of emotions. Application areas for distress detection include health and security for hostage scenario detection and faster medical response respectively.

Keywords: Speech; Emotions; Distress; 2D approach; Fuzzy K-NN.