High Accuracy Neural Network Based Deep Learning Solution For Non-Intrusive Early Diagnosis of Dementia

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Dementia cases are rapidly increasing with a projection of over 150 million people globally by the year 2050, a 300% increase from the current 50 million cases. Despite the prevalence of Dementia, care for patients costs an average of $340,000. Current diagnosis techniques include MRIs and behavioral tests, which have a low accuracy of 64% and can cost upwards of $1000. Dementia is responsible for millions of families experiencing large financial, social, and emotional burdens that can be alleviated through a more technologically advanced solution using neural networks. Data was extracted from .wav audio files and refined into input vectors containing the content of an individual's speech as well as its tonality. These features can accurately determine an individual's frustration, uncertainty, and speech tempo. After creating an input vector, it is fed into a multilayer perceptron neural network with a sigmoid activation function. This neural network was trained on 100 3 minute long audio samples, and tested on 100 3 minute long samples, for a total of 200 trials. The overall accuracy was over 88% with a precision of 0.95, revealing that the model was accurate and precise. The model took an average of 9.76 seconds per audio file and had a negligible cost, making it cheaper, faster, and more accurate than current detection processes.

Awards Won:

Third Award of $1,000