

# A Pathological Voice Analysis to Detect Parkinson's Disease with MFCC and SVM

Gopu, Asha (School: Eagle's Landing High School)

Parkinson's disease is a neurodegenerative disorder that eventually deprives an individual of normal movement, affecting over ten million people worldwide. As it progresses, the person with Parkinson's may become harder to understand as their voice becomes softer, monotone with less emotion, faster, or repeated. Together these symptoms are known as hypokinetic dysarthria, an underlying symptom of Parkinson's Disease. The aim of this work is to provide a significant improvement on a novel method, which is easy-to-use, efficient, noninvasive for the patient, and affordable. 25 voice samples of individuals with normal acoustic features and 25 voice samples of individuals with Parkinson's disease were obtained. The samples were processed through PRAAT software, providing the parameters for classification. The system designed for this particular task relies on the Mel-Frequency Cepstral Coefficients for feature extraction and Support Vector Machines for classification. Specifically, a non-linear decision boundary was used when applying the SVM in order to achieve maximum accuracy. The compression of the MFCC using SVM with the codebook size of 1 has shown to be the most accurate criterion for the detection of voice disorder in Parkinson's disease, showing a mean classification accuracy of 93%. Thus, the use of MFCC's features provides a more compressed representation of the features while the SVM classifier gives more accurate classification results.