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Paper Title:	Enhanced Diagnosis of Parkinson's Disease Using Digitized Archimedean Spiral Handwriting Analysis
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Abstract

Parkinson's disease is a complex and progressive neurodegenerative disorder that affects movement and typically requires the expertise of a specialist for accurate diagnosis. Handwriting examination, particularly the analysis of Archimedean spirals, is commonly used as an assessment tool. This study investigated Archimedean spirals drawn by Parkinson's patients, using data obtained from the Parkinson's Disease Handwriting Database (PaHaW). The dataset comprises timestamps, x- and y-coordinates of drawing, and pen pressure collected from both Parkinson's disease patients and healthy subjects. The ReliefF algorithm in combination with Sequential Forward Selection (SFS) and Sequential Backward Selection (SBS) were applied to select top relevant features. Support Vector Machine (SVM) and K-Nearest Neighbors (KNN) classifiers, followed by 10-fold cross-validation, were employed to evaluate the classification models. The results demonstrated that the combination of SBS and KNN methods achieved the highest accuracy, sensitivity, and specificity, with values of 85.36%, 85.50%, and 91.00%, respectively. These findings represent an improvement in classification accuracy compared to previous studies.