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Parkinson's Detection Using Voices on Mobile Devices

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Abstract

Parkinson's disease (PD) is a challenging neurodegenerative condition that may be monitored using mobile devices, possibly enabling real-time assessment. This research leverages machine learning and explainable AI to focus on PD detection and identifying crucial vocal attributes. Employing techniques like group-wise scaling, anomaly detection, and gradient boosting, we have created an accurate model for PD detection. Testing on experimental voice data yielded an exceptional 80% accuracy, surpassing prior studies. In the long run, this framework enables early treatment and potential cost reduction in PD care.

Methods





Both age and gender are important factors in PD risk assessment. Nevertheless, the data exhibits significant discrepancies in age and gender distribution, potentially causing the model to focus on detecting age or gender rather than PD itself.

We introduce group-wise scaling distinct across data variations within method that adapts to each а groups, group, improving feature representations.





Method	Acc.	F1	Prec.	Rec.
[1]	75%	59%	66%	54%
Scaling	66%	63%	55%	73%
Batch-	80%	79%	71%	89%

Anomaly Detection



Interpretability



References

- Wroge, T. J., et al. "Parkinson's disease diagnosis using machine learning and voice." IEEE SPMB 2018.
- N. Momeni, S. Whitling, A. Jakobsson, "Detecting Parkinson's Disease Using Voice Recordings From Mobile Devices." EUSIPCO 2024.



Dataset

Anomaly

negative

which

data.

Refinement:

are

