Literature Survey For Detecting Parkinson's Disease Using Machine Learning

Paper- 1

IETE Journal of Research

[https://www.tandfonline.com/doi/abs/10.1080/03772063.2018.1531730?cookieSet=1]

Parkinson's disease (PD) has affected millions of people worldwide and is more prevalent in people, over the age of 50. Even today, with many technologies and advancements, early detection of this disease remains a challenge. This necessitates a need for the machine learning-based automatic approaches that help clinicians to detect this disease accurately in its early stage. Thus, the focus of this research paper is to provide an insightful survey and compare the existing computational intelligence techniques used for PD detection. To save time and increase treatment efficiency, classification has found its place in PD detection. The existing knowledge review indicates that many classification algorithms have been used to achieve better results, but the problem is to identify the most efficient classifier for PD detection. The challenge in identifying the most appropriate classification algorithm lies in their application on local dataset. Thus, in this paper three types of classifiers, namely, Multilayer Perceptron, Support Vector Machine and K-nearest neighbor have been discussed on the benchmark (voice) dataset to compare and to know which of these classifiers is the most efficient and accurate for PD classification. The Voice input dataset for these classifiers has been obtained from UCI machine learning repository. ANN with Levenberg–Marquardt algorithm was found to be the best classifier, having highest classification accuracy (95.89%). Moreover, we compared our results with those obtained by Resul Das ["A comparison of multiple classification methods for diagnosis of Parkinson Disease," *Expert Systems and applications*, vol. 37, pp 1568–1572, 2010].

Paper - 2

International Research Journal of Engineering and Technology [https://www.irjet.net/archives/V8/i8/IRJET-V8I8165]

Neurological diseases, like as Parkinson's disease (PD), may be studied using biomarkers obtained from human speech. PD is a progressive neurodegenerative illness that affects around one million people. In the past, clinicians have relied on subjective grading systems to gauge the severity of Parkinson's disease. Difficulties with motor control make it possible to detect and diagnose PD via vocalization. Healthcare professionals could benefit from cheaper and more accurate diagnoses as a result of technological advancements and the widespread

use of audio collecting devices in everyday life. We provide evidence to validate this concept here using a voice dataset collected from people with and without PD using Machine Learning algorithms: Decision Tree, Logistic Regression, and Naive Bayes and Deep Learning algorithm like Recurrent Neural Networks (RNN) by predicting with accuracy rate and performance comparison of all Machine Learning and Deep Learning algorithms.

Paper-3

Machine Learning Approaches for Detecting Parkinson's Disease from EEG Analysis [file:///C:/Users/91637/Downloads/applsci-10-08662-v2]

Diagnosis of Parkinson's disease (PD) is mainly based on motor symptoms and can be supported by imaging techniques such as the single photon emission computed tomography (SPECT) or M-iodobenzyl-guanidine cardiac scintiscan (MIBG), which are expensive and not always available. In this review, we analyzed studies that used machine learning (ML) techniques to diagnose PD through resting state or motor activation electroencephalography (EEG) tests. Methods: The review process was performed following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. All publications previous to May 2020 were included, and their main characteristics and results were assessed and documented. Results: Nine studies were included. Seven used resting state EEG and two motor activation EEG. Subsymbolic models were used in 83.3% of studies. The accuracy for PD classification was 62–99.62%. There was no standard cleaning protocol for the EEG and a great heterogeneity in the characteristics that were extracted from the EEG. However, spectral characteristics predominated. Conclusions: Both the features introduced into the model and its architecture were essential for a good performance in predicting the classification. On the contrary, the cleaning protocol of the EEG, is highly heterogeneous among the different studies and did not influence the results. The use of ML techniques in EEG for neurodegenerative disorders classification is a recent and growing field.

Conclusion

The proposed system can detect PD using a cloud-based system for computation, data preserving, and regular monitoring of voice and tremor samples captured by smartphones. Thus, this system can be a solution for healthcare authorities to ensure the older population's accessibility to a better medical diagnosis system in the developing countries, especially in the pandemic situation like COVID-19, when in-person monitoring is minimal.