

A Commentary on the Significance of Machine Learning for Diagnosis of Parkinson's Disease

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DESCRIPTION

Parkinson's Disease (PD) is one of the well-known disorders which occur to the central nervous system of human being. PD often leads to affect the movements. It is a brain disorder which affects the humans in several ways such as shaking, unbalanced walking etc. According to NIH, 50% more men are affected by PD than women [1]. PD is commonly seen in people with age 60. PD occurs whenever the brain cells turn into condition of dead and the dead cells results in producing the chemical named "dopamine" in fewer amounts.

It is a fact that there are no evidences on the cause factor of producing dopamine chemical leading to cell die. PD can be identified using some symptoms such as movement slowness, limb stiffness, trunk stiffness, hand tremor, head tremor etc. In order to diagnose this PD, many treatments are being used such as usage of drugs that increases the brain dopamine level, using of anticholinergic drugs to reduce tremor. Also, many other diagnosing methods such as physiotherapy, voice therapy etc has also used to deal with PD. Despite of using normal medications, researchers as well as practitioners have also showed interest towards diagnosing this PD with the help of novel technologies. One of such novel technology being used to diagnose such kind of movement disorder is machine learning (ML). Senturk [2] has developed a modern methodology for the diagnosis of PD with the help of ML in the year 2020. PD data set from open source UCI (University of California, Irvine) repository has been considered for evaluating the performance. Popular ML methods such as SVM (Support Vector Machine), ANN (Artificial Neural Network) etc were used. Classification accuracy is considered as performance factor. A comparison has also been made with other ML techniques in literature such as RF (Random Forest), k-NN (k-Nearest Neighbor) etc. An accuracy of 93.8% is observed for diagnosing PD. Raval et.al [3] has developed a

reviewed a comparative analysis on the early detection of PD in the year 2020. ML methods such as KNN, RF etc are considered. Accuracy rate, sensitivity, specificity etc are considered as evaluation metrics. An accuracy of 99.79% is observed with RF. Wang et al. [4] has made a comparative analysis of ML, DL (Deep Learning) as well as EL (Ensemble Learning) methods for detecting PD early. A dataset having 401 early PD patients is considered. Accuracy, sensitivity, specificity, precision are used as performance factors for diagnosing early PD. Deep neural networks, namely DEEP1, DEEP2 etc. are used whereas ML methods such as KNN, SVM etc are considered. EL methods such as boosting techniques are used for early PD detection. Better results are observed for early detection of PD by using these ML, DL and EL methods.

It is observed that RF is the popular method which gives accurate results for diagnosing PD. Almost many ML techniques such as SVM, ANN etc. are being used for diagnosis of PD however there is a need to explore many other advanced techniques such as higher order neural networks etc. Also, it is important to focus on accurateness for the diagnosis of PD.

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