

LITERATURE SURVEY

Team ID : PNT2022TMID18082

Domain : Applied Data Science

Title : “ *Detecting Parkinson’s Disease using Machine Learning* ”

Team Members

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1) “ Early Identification of Parkinson’s Disease from Hand-drawn Images using Histogram of Oriented Gradients and Machine Learning Techniques”

Authors : Ferdib – Al - Islam , Laboni Akter

Year : May 2021

Objective : To arrange more data from real hand-drawn tests, and to apply deep learning techniques to get a better solution . The Parkinson’s disease is predicted from the hand-drawn picture.

Merits : Accuracy of this model is 70.0%

Demerits : The machine learning technique used here is Decision Tree which predicts a single data and in a random manner.

LINK : <https://ieeexplore.ieee.org/document/9350870>

2) “Reliable Parkinson’s Disease Detection by Analyzing Handwritten Drawings: Construction of an Unbiased Cascaded Learning System Based on Feature Selection and Adaptive Boosting Model”

Authors : Liaqat Ali ,Ce Zhu ,Noorbakhsh Amiri Golilarz, et.al,

Year : April 2016

Objective : # It proposes a cascaded learning system that cascades a Chi2 with adaptive boosting model.

The Chi2 model ranks and selects a subset of relevant features from the feature space while Ada-boost model and is used to predict PD based on the subset of features.

Merits : # The cascaded system improves the strength of conventional Adaboost model by 3.3% and reduces its complexity.

The cascaded system achieves classification accuracy of 76.44%, sensitivity of 70.94% and specificity of 81.94%

Demerits : The feature counts are high, which is very complex.

LINK : <https://ieeexplore.ieee.org/document/8781770>

3) “Improvement of Feature Extraction Based on HOG”

Author : Zhehao Liu

Year : March 2022

Objective : # HOG is a common feature to describe local texture of image in the field of computer vision and pattern recognition.

The feature needs to calculate the values of different gradients in the region, and then accumulate these values, which are expressed in the form of histogram.

Merits : The Error Rate , Miss Rate and the False Pos are low.

Demerits : # HOG is used for identifying only a single image at a time.

Time consumption is high.

LINK : <https://ieeexplore.ieee.org/document/9743229/>

4) “An Auxiliary Diagnostic System for Parkinson’s Disease Based on Wearable Sensors and Genetic Algorithm Optimized Random Forest”

Authors : Min Chen , Zhanfang Sun, Fei Su , Yan Chen, Degang Bu, and Yubo Lyu

Year : August 2022

Objective : To demonstrate the convenience and high efficiency of the proposed system with the help of Genetic Algorithm, Optimized Random Forest .

Merits : RF classifier, the classification accuracy of the model can reach up to 80.4%

Demerits : # It consists of wearable sensors for the classification and the sensors are costly.
It is possible only in clinic or any medical testing centers.

LINK : <https://ieeexplore.ieee.org/document/9853627/>

5) “A Survey of Machine Learning Based Approaches for Parkinson Disease Prediction”

Authors : Shubham Bind , Arvind Kumar Tiwari , Anil Kumar Sahani

Year : May 2015

Objective : This paper presents a comprehensive review for the prediction of Parkinson disease buy using machine learning based approaches. The brief introduction of various computational intelligence techniques based approaches used for the prediction of Parkinson’s disease.

Merits : Used to choose the algorithms for efficiency and accuracy , specificity , sensitivity

LINK : <https://citeseerx.ist.psu.edu/viewdoc/downloaddoi=10.1.1.735.5660&rep=rep1&type=pdf>

6) “Detection of Parkinson's Disease at The Level of Motor Experiences of Daily Living Using Spiral Handwriting”

Authors : Dwi Arraziqi , Tri Arief Sardjono , Herti Miawarni , Mauridhi Hery Purnomo

Year : November 2020

Objective : To demonstrate the convenience and high efficiency of the proposed system with the help of Random Forest.

Merit : Highest accuracy of 81.67%

Demerit : CNN classifiers do not provide a significant accuracy despite parameter settings.

LINK : <https://ieeexplore.ieee.org/document/9297932>

7) **“Handwritten dynamics assessment through convolutional neural networks : An application to Parkinson’s disease identification”**

Authors : Clayton R. Pereira^a, Danilo R. Pereira^b, Gustavo H. Rosac, Victor H.C. Albuquerque^d, Silke A.T. Weber^e, Christian Hook^f, João P. Papac

Year : May 2018

Objective : To map signals extracted from handwriting dynamics into images that can be further used to feed a Convolutional Neural Network.

Merit : Reduces the dimensionality of the feature space and so the accuracy is high.

Demerit : If the size of the dataset is large, then the process of CNN is very high,

LINK : <https://doi.org/10.1016/j.artmed.2018.04.001>

8) **“Comparative Analysis of Decision Tree Algorithm for Learning Ordinal Data Expressed as Pairwise Comparisons”**

Authors : Nunung Nurul Qomariyah; Eileen Heriyanni; Ahmad Nurul Fajar; Dimitar Kazakov

Year : August 2020

Objective : Decision Trees were chosen due to their ability to represent the complex dataset into an easy-to-understand and yet rich of information graphical displays.

Merit : Complex dataset is handled very easily.

LINK : <https://ieeexplore.ieee.org/document/9166341>

9) “Parkinson’s Disease Identification using KNN and ANN Algorithms based on Voice Disorder”

- Authors** : Ouhmida Asmae , Raihani Abdelhadi, Cherradi Bouchaib, Sandabad Sara , Khalili
- Year** : August 2020
- Objective** : The detection of Parkinson's disease is based on the use of different classifiers. The distinction between them is based on measurement criteria, namely classification accuracy, Spearman correlation coefficient, specificity, sensitivity, F-score (F- measure) ... etc.,
- Merit** : An accuracy rate of 96.7% by using ANN.
- Demerit** : If the dataset is large, then the process of CNN is very high.

LINK : <https://ieeexplore.ieee.org/document/9092228/>

10) “Machine Learning for the Diagnosis of Parkinson’s Disease: A Review of Literature”

- Authors** : Jie Mei , Christian Desrosiers and Johannes Frasnelli
- Year** : May 2021
- Objective** : To diagnose Parkinson’s disease and find the associated outcomes using ML methods.
- Merit** : Average accuracy is 78.34%
- Demerit** : Some ML techniques take long time to train and test.

LINK : <https://www.frontiersin.org/articles/10.3389/fnagi.2021.633752/full>