



Parkinson's disease recognition

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Motivation

There are no systems designed for Parkinson's Disease recognition. More than 10 million of the world's population suffers from Parkinson's Disease and this disease is the cause of death in more than 100 000 cases every year. Our system in combination with measuring devices could be used as a diagnosis assistance.

Datasets

From machine learning repositories:

<https://archive.ics.uci.edu/ml/datasets/Parkinson+Speech+Data+set+with++Multiple+Types+of+Sound+Recordings#>

(29 attributes)

<https://archive.ics.uci.edu/ml/datasets/parkinsons+telemonitoring> (22 attributes)

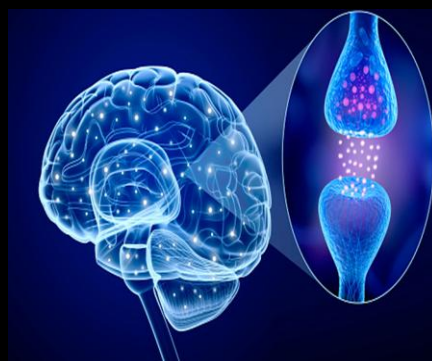
<https://archive.ics.uci.edu/ml/datasets/Parkinson+Disease+Spiral+Drawings+Using+Digitized+Graphics+Tablet#>

(7 attributes and 77 files) Each patient had 2 or 3 tests . Eight attributes from each test were extracted and used to train the neural network. For the 1st and 2nd dataset, 10 attributes were extracted by correlation .



Methods

We used neurolab, numpy , sklearn and keras python libraries. Feed forward Neural Network with one input, one output and one to three hidden layers was used. About 70% of each dataset was used for training, 20% for testing, and 10% for validation. For the 1st and the 3rd dataset we used resilient backpropagation as a training function. The networks were trained for Parkinson's Disease classification. For the 2nd dataset the neural network was used to calculate motor UPDRS and total UPDRS using stochastic gradient descent. Performances were compared with LASSO and SGDRegressor.



Results

Neural network accuracy was 100% for the 1st dataset, from 70-100% accuracy for the 3rd dataset, and it guessed UPDRS from the 2nd dataset with 7-8.5 RMSE.

There were no similar researches in this field to compare the results with.

Further research

With further analysis and data mining for third dataset , better accuracy could be achieved in recognizing Parkinson's disease. Also, we could improve this system if users could have access to devices used to collect data that we used. We could improve results for UPDRS guessing if we worked with doctors and scientists in this field and make a system which could give predictions with more accuracy.

