

Machine Learning based FoG Detection for Prediction of Parkinson's Disease Patient Accident

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Freezing of Gait (FoG) is a gait symptom of Parkinson's disease (PD), which shows a temporary inability to move. FoG detection allows FoG risk scores to monitor the persistence of medication effects and quantitative indicators to help prevent accidents. In this paper, we used 3D acceleration of ankle data to detect FoG. For detecting FoG, we used 1D-CNN and various machine learning models with feature extraction. As a result of the experiment, Random Forest performed best with AUC 0.973, Specificity 0.898, and Sensitivity 0.933 in the experiment with whole data. The experiment dividing the subjects resulted in the best results, with AUC 0.887, Specificity 0.850, and Sensitivity 0.784. Furthermore, in the experiment with whole data, 1D-CNN performed well, with AUC 0.944, Specificity 0.871, and Sensitivity 0.895. Random Forest with feature extraction will perform best when the data is large and diverse. However, 1D-CNN performed well without any special preprocessing and performed best even in subject-independent situations, which can be considered when the patient was not adequately secured, indicating that it is sufficiently usable. The models will be able to display quantitative indicators like FoG risk scores and falling rates.

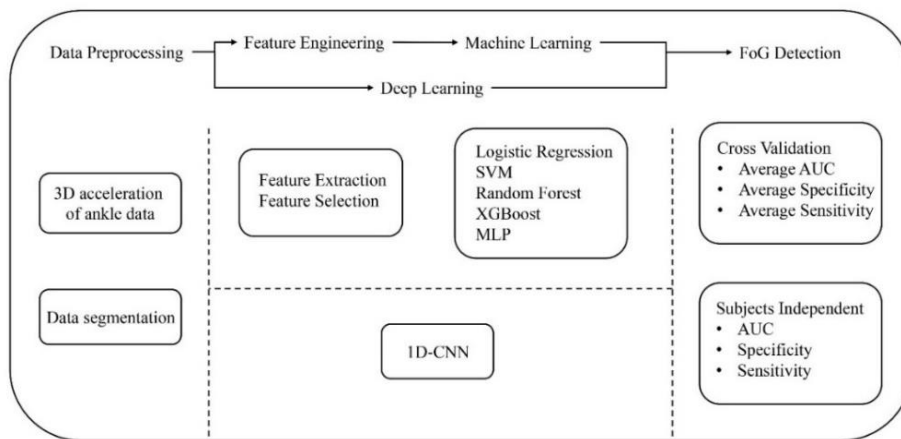


Figure 1 Flow chart of the experiments

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References

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