

## Gait Analysis for Early Stroke Detection Using ML

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### Abstract

Stroke continues to be a major global cause of mortality and long-term disability, highlighting the critical need for accurate risk assessment and easily accessible early detection. In order to predict strokes, this study analyzes human gait patterns using machine learning techniques. A dataset of 12,430 examples of both healthy and artificially simulated stroke gait data was used to develop and assess three classifiers: Support Vector Classifier (SVC), Random Forest (RF), and Artificial Neural Network (ANN). With an overall classification accuracy of roughly 95%, all three models produced impressive results. With the SVC improving by almost 16%, the RF by roughly 4%, and the ANN setting a new standard at 95.9% accuracy, this is a definite improvement. When taken as a whole, these enhancements demonstrate the models' resilience and dependability and point to a useful new method for assessing stroke risk. The models are easy to implement, computationally efficient, and especially useful in healthcare settings with limited resources. Their capacity to provide prompt, accurate evaluations aids in clinical judgment and could greatly cut down on diagnostic hold-ups. This study shows how machine learning can improve stroke risk assessment by analyzing gait, offering a scalable and economical method of early diagnosis and lowering the incidence of stroke worldwide.

### Keywords

Stroke Diagnosis, Machine Learning, Gait Analysis, Artificial Neural Network (ANN), Random Forest (RF), Support Vector Machine (SVM), Predictive.