KDUIRC INTERNATIONAL RESEARCH CONFERENCE 2022

ID 281

Predicting the Freezing of Gait in Parkinson's Patients based on Machine Learning and Wearable Sensors: A Review

MDVAG Jayawardena[1#], PPCR Karunasekara[1] and YVND Sirisena[2]

[1]*Department of Electrical, Electronic and Telecommunication, Faculty of Engineering, General Sir John Kotelawala Defence University, Ratmalana, Sri Lanka*
[2]*North Central Teaching Hospital, Ragama, Sri Lanka*

[#]varsha.anarkali@gmail.com

Freezing of Gait (FoG) is a common incapacitating complication in Parkinson's patients, which will temporarily hinder the forward progression and will prevent them from re-initiating their normal gait. This can lead to potentially fatal falls and severely affect the quality of life of the patient. Due to characteristic changes in their gait, FoG can be identified by using wearable sensors such as pressure sensors, Inertial Measurement Units (IMU), and Electroencephalogram (EEG) electrodes. Classification models that run on machine learning algorithms have been frequently used. Prediction of FoG would be highly useful for the patients since this identifies the changes in their gait preceding the event and the patient can be notified. This will allow them to overcome FoG. This systematic review identifies the best sensors, sensor placements, predictive algorithms, and the limitations of the existing prediction systems. Out of all the methods reviewed, combinations of plantar pressure sensors placed on the insoles and IMUs placed on the shank produced the highest accuracies with a specificity of 91.6%. The best algorithm was identified as Convolutional Neural Networks.

Keywords: *freezing of gait, prediction, machine learning, wearable sensors*