| | | objectives | Data | methodology | features |
|---|---|---|---|---|---|
| **1 (2006)** | Characterize dyskinesia | ●Optimization of treatment<br>●Maximization of patient function | Intensity<br>modulation<br>Rate<br>Periodicity<br>Coordination of movement | ●PCA (principal components analysis)<br>●Maximization of patient function<br>●EM algorithm to find natural clusters in feature space<br>●Dunn's index for cluster validity | ●Root mean square (RMS)value<br>●Range of the auto-covariance<br>●cross-correlation-on-based features |
| **2 (feb 2007)** | Quantification of Tremor and Bradykinesia | ●Quantification of Tremor and Bradykinesia | Roll<br>Yaw<br>Pitch direction | ●Remove the drift of signals using infinite impulse response (IIR) filter<br>●Burg method for the estimation of the frequency spectrum of the signal for each window | |
| **3 (aug 2007)** | Characterize dyskinesia & bradykinesia | ●Develop a software platform to efficiently process on-board data | Intensity<br>modulation<br>Rate<br>Periodicity<br>Coordination of movement | ●Davies-Bouldin clustering evaluation | ●Root mean square (RMS)value<br>●Range of the auto-covariance<br>●cross-correlation-on-based features |
| **4(jan 2009)** | | ●longitudinal data collection | | | ●maximum peak-to-peak amplitude<br>●mean<br>●RMS<br>●Peak velocity<br>●RMS of the jerk time series |
| **5 (jun 2009)** | Fog detection | ●design an unobstructed system<br>● maximum battery life | | | |
| **6 (nov 2009)** | Monitor motor fluctuations | ●estimation of the severity of Parkinsonian symptoms and motor complications<br>●facilitate the titration of medication in patients with late state Parkinson | | ●filter implementation as IIR filters based on eliptic design<br>●Support Vector Machines (SVM) | ●Data range<br>●Root mean square (RMS)value<br>●cross-correlation-on-based features<br>●Frequency-based features<br>●Signal entropy |
| **7 (mar 2010)** | FOG detection | ●Automatically detect FOG<br>●Rhythmic auditory signal feedback<br>●Reduce the number and length of their motor blocks<br>●Increase safety while walking | | ●Modular research platform | |

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|---|---|---|---|---|---|
| **8 (sept 2010)** | Monitor motor fluctuations | ●Home monitoring for improving the standards of health care<br>●Making efficient and cost effective the process | | ●Support Vector Machines (SVM) | ●Signal entropy<br>●RMS<br>●Data range<br>●Cross-correlation |
| **9 (mar 2011)** | Monitor motor fluctuations | ●facilitate the titration of medication in patients with late state Parkinson<br>●real-time clinician interaction | | | |
| **10 (may 2012)** | Assessment of tremor | ●propose an automated method for both resting and action/postural tremor assessment | | ●Hidden Markov models | ●angle between sensors /Low-Frequency (LF) energy<br>●Spectrum entropy/LF and HF energy/Ratio of high to total energy |
| **11 (2012)** | FOG detection | ●Automatically detect FOG<br>●Rhythmic auditory signal feedback | | ●Correlation based feature Selection<br>●Supervised machine learning techniques from the Weka data mining suite | ●mean<br>●variance<br>●standard deviation<br>●entropy |
| **12 (jan 2013)** | Characterize motor symptoms during TUG and FOG | ●valuable information for the evaluation of treatment and early diagnosis of people with Parkinson's disease | | ● | ●Midswing was first detected by the positive peak of pitch angular velocity |
| **13 (sep 2013)** | FOG detection | ●Support gait rehabilitation<br>●Automatically detect FOG<br>●Rhythmic auditory signal feedback<br>●comfortable | Cadence<br>Step length<br>Trunk posture<br>Gait speed<br>Gait asymetry | ●ABF application and algorithms | ● |
| **14 (mar 2015)** | FOG detection | ●Independent use<br>●Gait assistance at unsupervised envir.<br>●Automatically detect FOG<br>●Rhythmic auditory signal feedback<br>●Long term monitoring | | ●Machine learning algorithms | ●Power of locomotion band (PL)<br>●Power on freeze band (PF)<br>●Total Power (TP)<br>●Freeze Index (FI) |
| **15 (2017)** | FOG detection | ●Investigate FOG<br>●Real time signal processing platform | | ●True Positives and False Positives method | ●Freezing index<br>●Spectral coherence |