Búzios - RJ
CBEB 2018

XXVI Brazilian Congress on Biomedical Engineering

October 21st to 25th, 2018 - Búzios, Rio de Janeiro

Use of non-contact capacitive sensors to detect hand gestures

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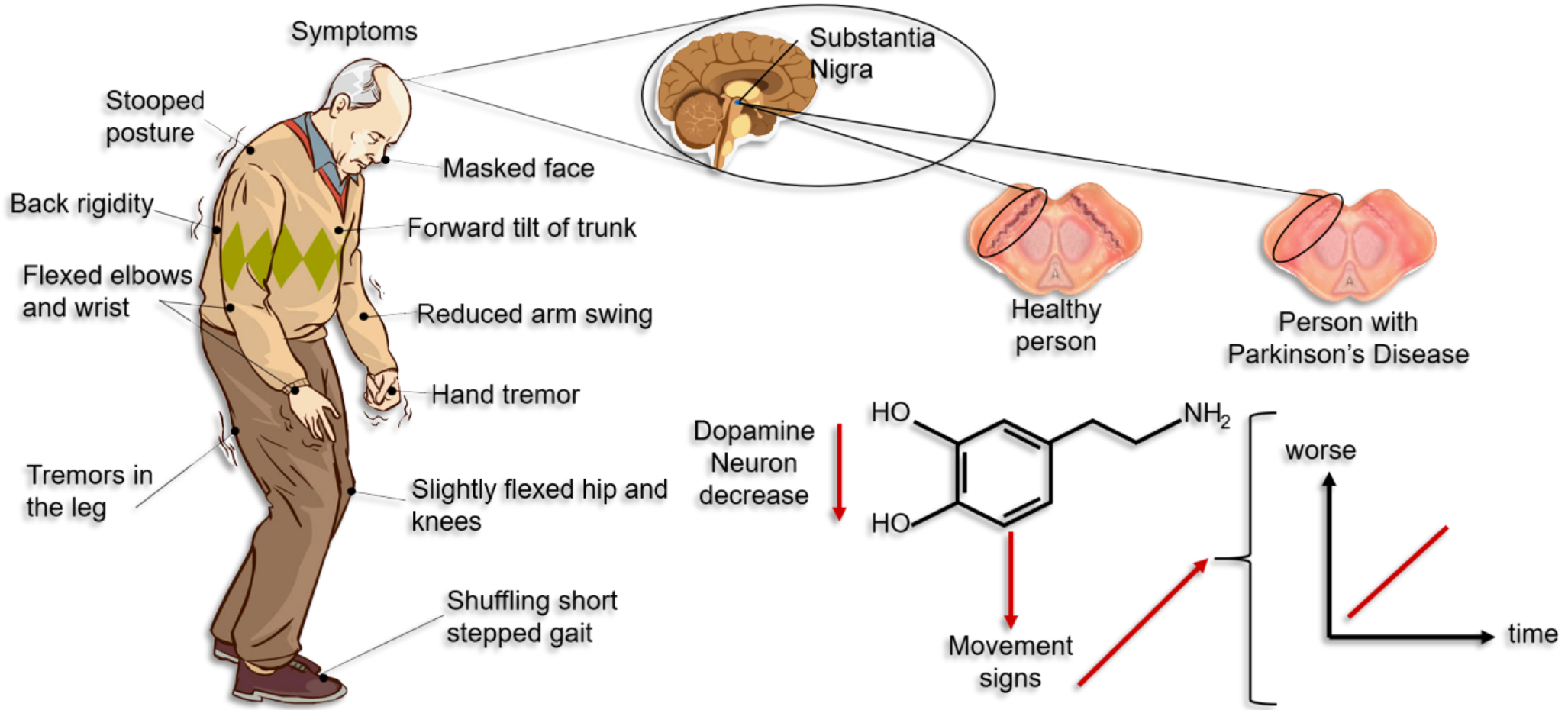
Introduction

Reference: https://goo.gl/9QvpMa

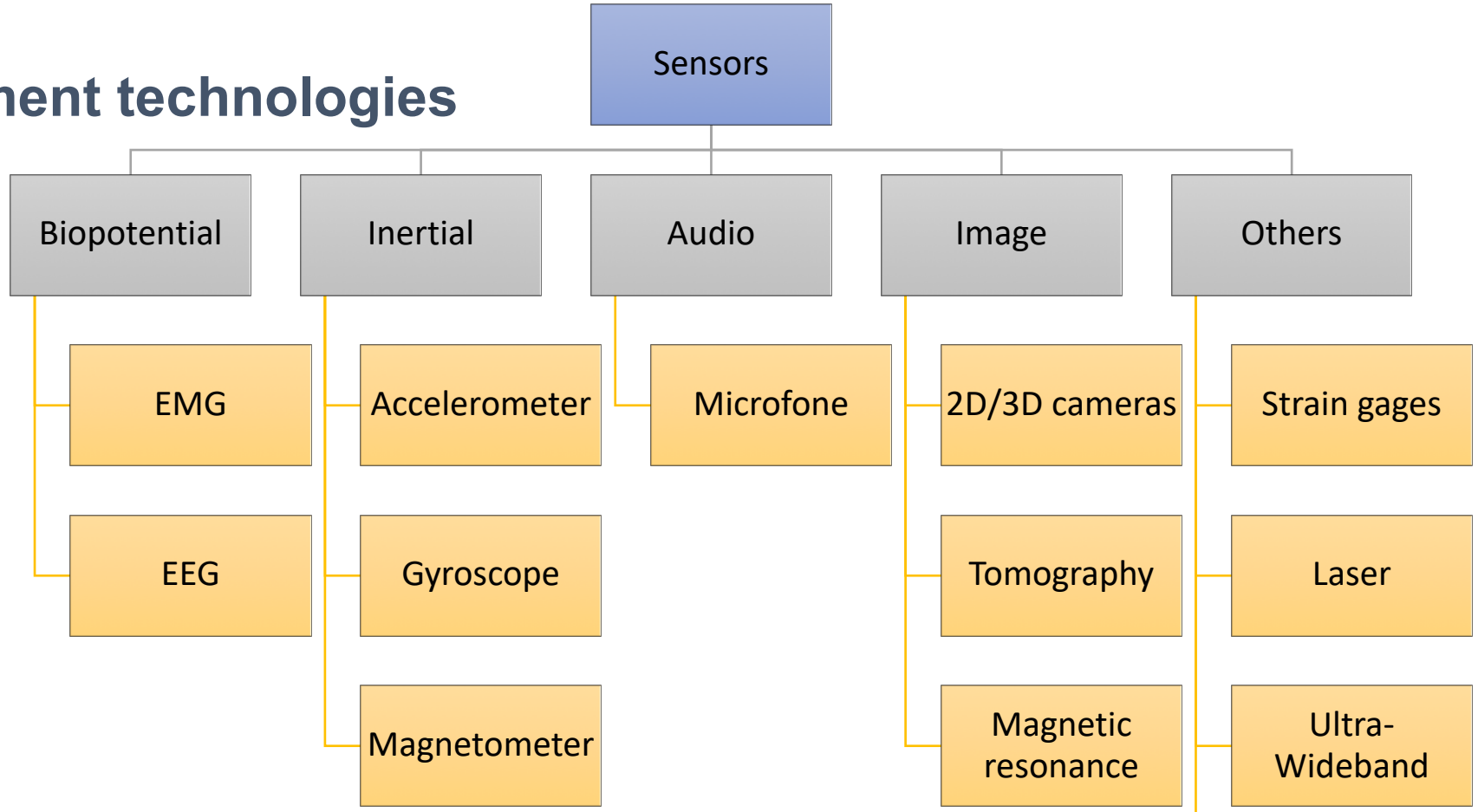


Problem

Unified Parkinson's disease rating scale

?

Measurement technologies

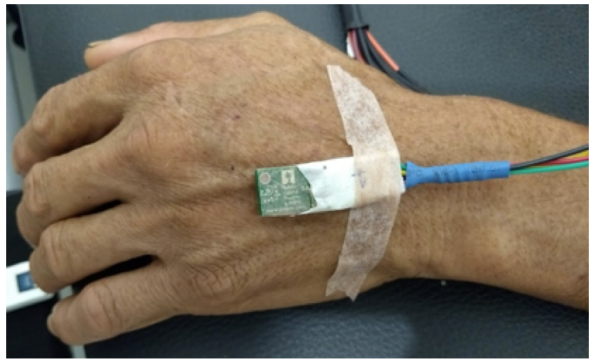


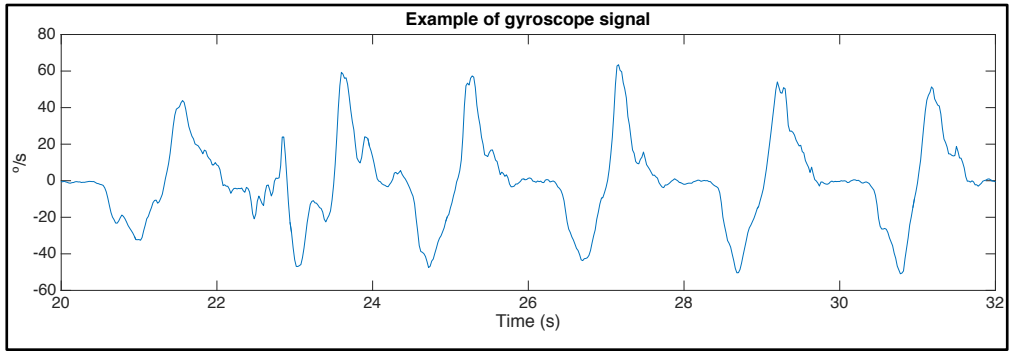
Reference: ANDRADE, A. O. ; MACHADO, A. R. P. ; MORAIS, C. R. ; CAMPOS, M. ; NAVES, K. F. P. ; PESSOA, B. L. ; PAIXAO, A. P. S. ; RABELO, A. G. ; OLIVEIRA, F. H. M. ; ZARUZ, M. J. F. ; VIEIRA, M. F. . Sinais e Sintomas Motores da Doença de Parkinson: Caracterização, Tratamento e Quantificação. In: Cicilia Raquel Maia Leite; Suélia de Siqueira Rodrigues Fleury Rosa. (Org.). Novas Tecnologias Aplicadas à Saúde: Integração de Áreas Transformando a Sociedade. 1ed.Mossoró: EDUERN, 2017, v. , p. 1-284.

Materials and methods

Inertial

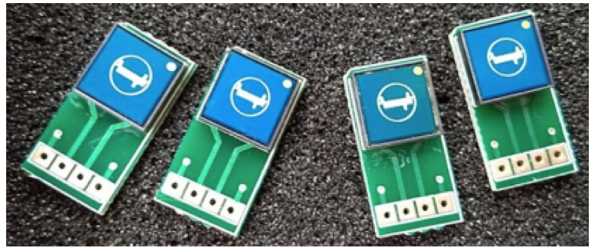
Gyroscope

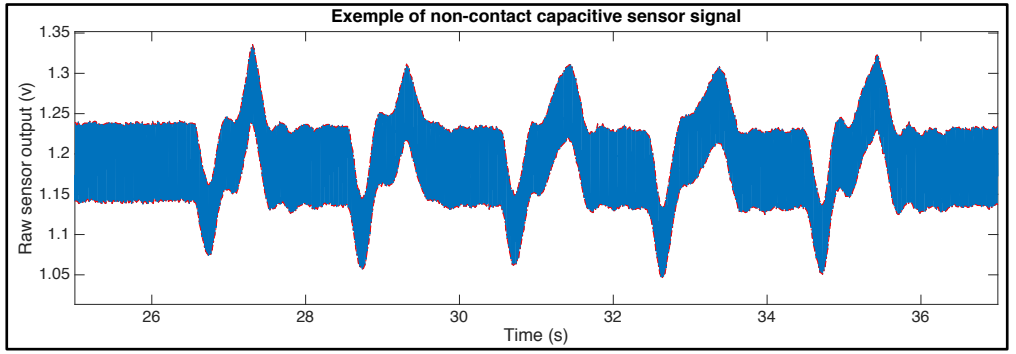




Other

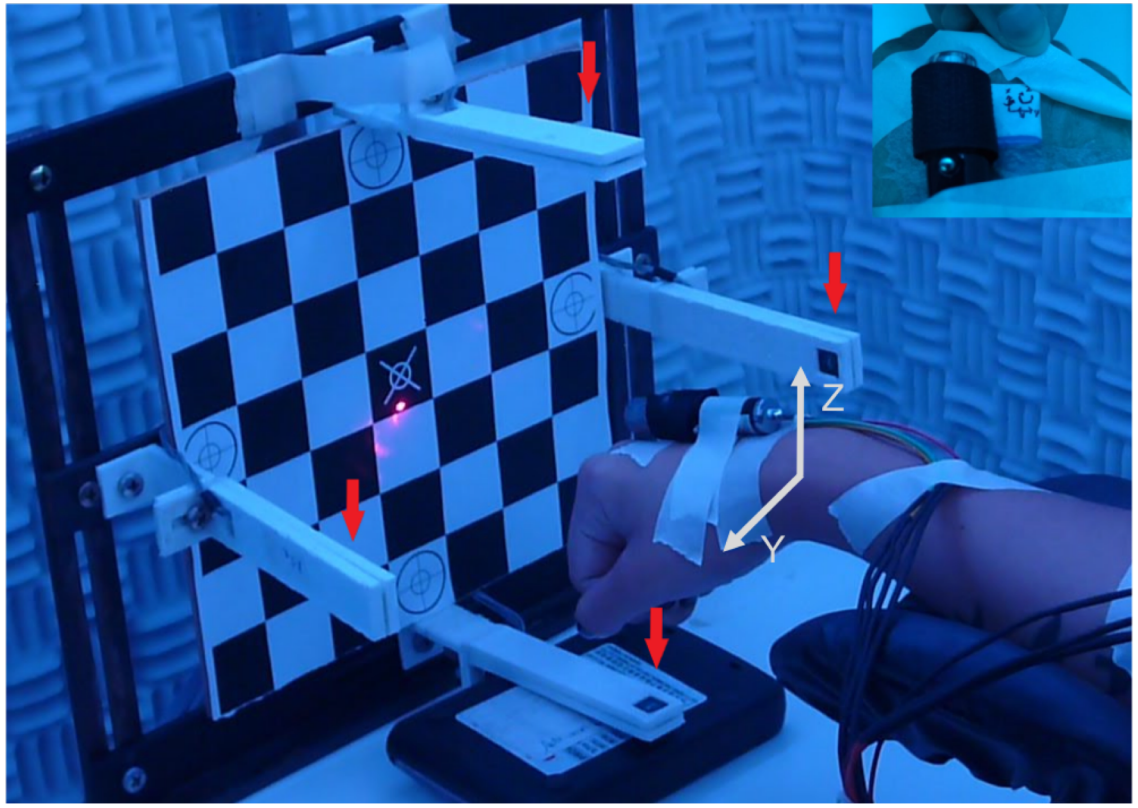
Capacitive

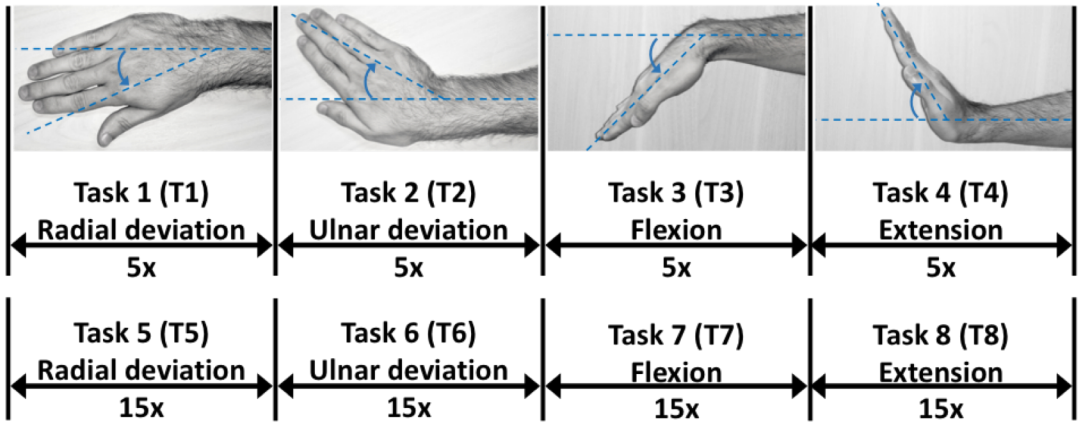




Materials and methods

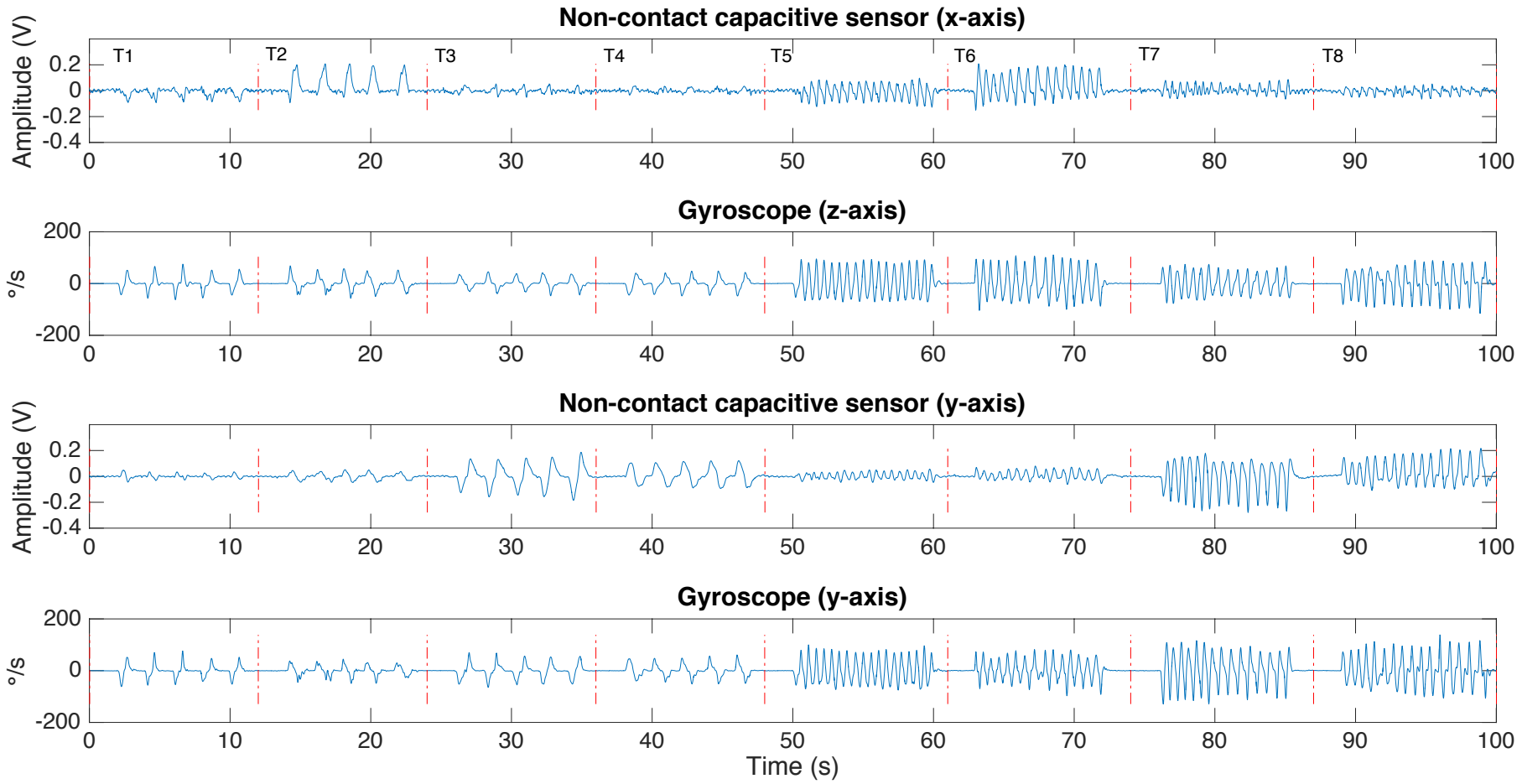
Experimental setup





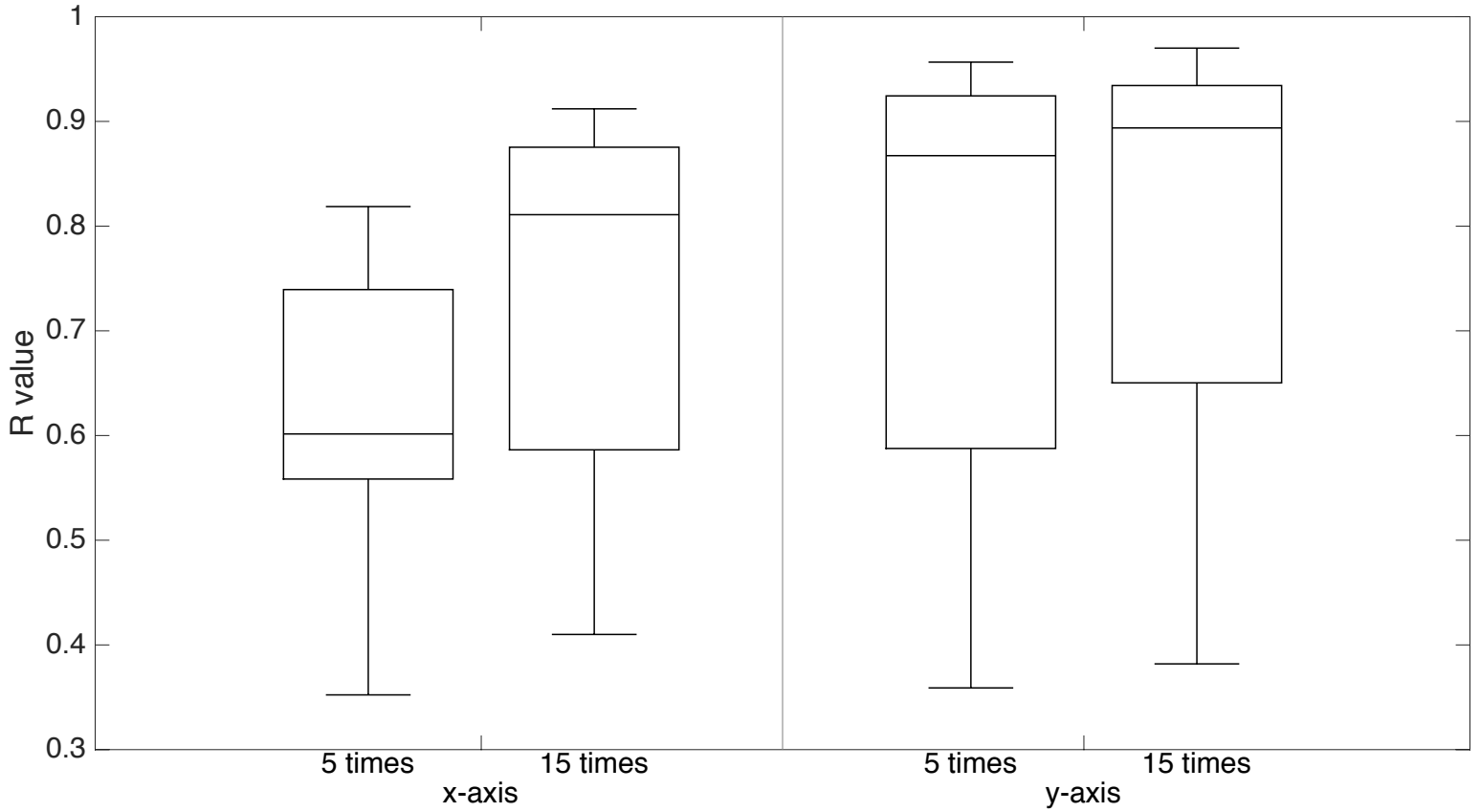
Ethics committee approval: 65165416.4.0000.5152

Results

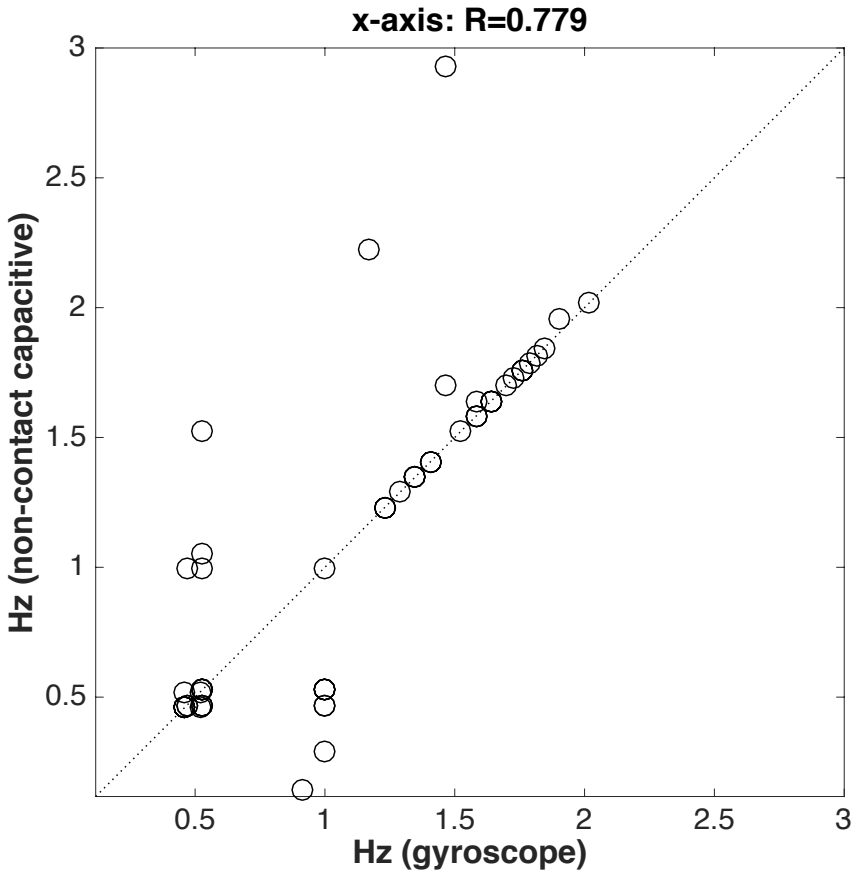

Non-contact capacitive sensor (x-axis)
Amplitude (V)
T1
T2
T3
T4
T5
T6
T7
T8
Gyroscope (z-axis)
°/s
Non-contact capacitive sensor (y-axis)
Amplitude (V)
Gyroscope (y-axis)
°/s
Time (s)

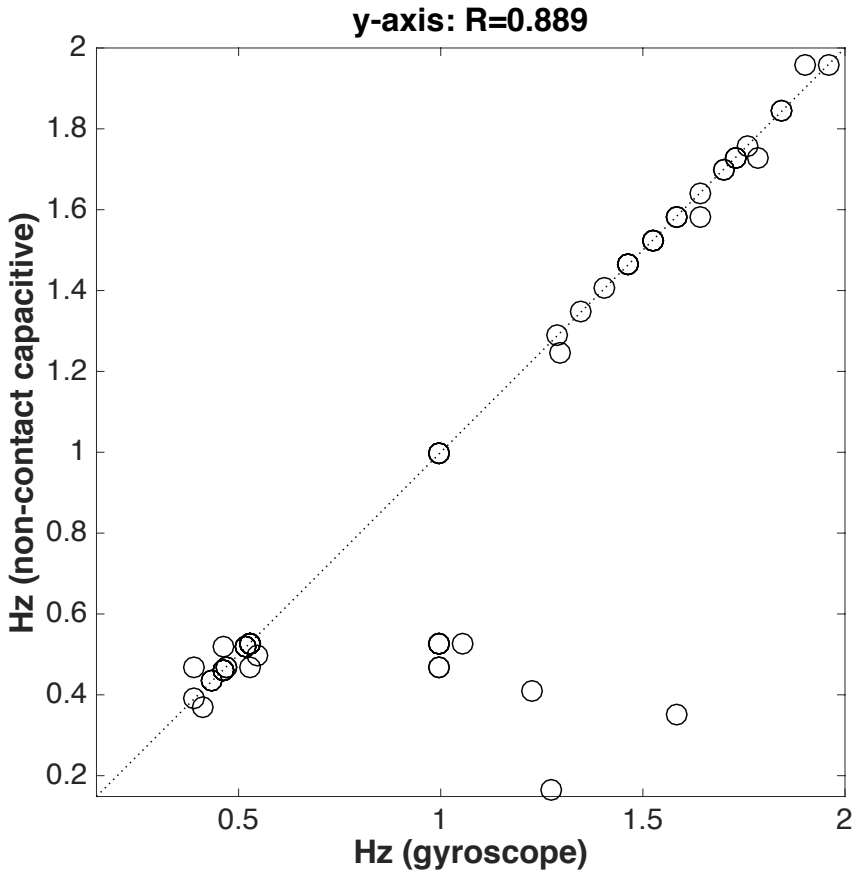
Correlation analysis

Gyroscope sensor x Non contact capacitive sensor



Frequency analysis





Conclusion

- In **100%** of the cases the **correlations** were **significantly different** from zero, which confirms the ability of NCC sensor aimed at **quantifying movements**

- **NCC sensor** showed relevant **behavior** that could be used to quantify the **cardinal signs of PD** as bradykinesia (slowness of movement), postural and resting tremor (oscillatory movement)

Work in progress

- The **NCC sensor** must be deeply investigated for the context for quantification of motor signs of PD by including **subjects with PD**

- The **number of subjects** will be **increased**, so that all the methods can be further evaluated

Acknowledgements

The present work was carried out with the support the National Council for Scientific and Technological Development (CNPq), Coordination of Improvement of Higher Level Personnel (CAPES - Program CAPES/DFATD-88887.159028/2017-00), Foundation for Research Support of the State of Minas Gerais (FAPEMIG -APQ-00942-17) and Foundation for Research Support of the Federal District (FAPDF). A. O. Andrade is a Fellow of CNPq, Brazil (305223 / 2014-3). The authors are thankful to the volunteers for their participation in this study.

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