

Cloud Computing Support for Quantifying Parkinson's Essential Tremor

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Essential tremor (ET) relates to the uncontrollable muscular shaking of some part of the human body. Studies in the elderly suggest that the prevalence of ET is higher than Parkinson disease and around 50-70% cases are estimated to be genetic in origin. Such temblor is more common in the hands and, although it can occur at any age, it most commonly affects people older than 45 years old.

The diagnosis of the ET is usually done through requiring to the person to make some muscular actions such as drinking from a glass, holding arms outstretched or drawing a spiral. The latter benefits from being simple and from allowing an easy quantitative analysis to characterize the pathology. In this sense, Archimedes' Spiral drawing can be considered the Gold Standard test.

Such tests must be done through several sessions with the participation of the physician and the patient, and all data must be properly stored to evaluate the evolution of the disease.

Currently, it is hard to perform quantitative diagnoses on ET and its temporal evolution by using existent technologies. This kind of diagnoses involves large data sets and requires non-trivial computational storage and processing capabilities.

In this contribution, we propose an user-friendly Cloud computing toolkit to assist physicians during the early diagnoses of Parkinson essential Tremor based on both qualitative and quantitative Achimedes' Spiral drawings.

The proposed toolkit is able to store and load image data sets and process them by using existent or customized algorithms. The system is also able to automatically keep all the analysis steps in order to enable reproducibility. Furthermore, the system provides worldwide physician-patient interactivity through the Cloud interface while accomplishing with standard privacy medical protocols.