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Fig1. Person wearing the system: smartphone, headset and waist sensor.

MASPARK

FREEZING OF GAIT IN PARKINSON'S DISEASE: IMPROVING QUALITY OF LIFE WITH AN AUTOMATIC CONTROL SYSTEM

Motivation

Parkinson's disease (PD) is a degenerative and highly impairing disease with a great incidence around the globe.

Amongst the symptoms affecting quality of life for people affected by PD are the problems associated with walking: rate loss, slowing down, shuffling, and freezing. Freezing of Gait (FoG) is strongly related to the cognitive disorders that many of these patients show and may often lead to falls.

FoG responds poorly and irregularly to drug therapy and deep brain stimulation. To improve this, rhythmic sensory stimuli at frequencies related to the speed and cadence of the gait are already successfully being used.

Objectives

MASPARK was designed to tackle the problem of FoG and its associated consequences through automatic and real-time assistance to end-users.

In particular, it has the following objectives:

1. Determine degree of gait improvement for patients using the system of auditory stimuli;
2. Study the relation between patients' cognitive status and system benefits;
3. Demonstrate the positive impact of the system on users' quality of life;
4. Evaluate usability and technology acceptance towards system improvement.

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Project duration

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Partners

- Fraunhofer AICOS
- Fundación Teknon
- Universitat Politècnica de Catalunya

Funding



Fig2. User interfaces of the auditory cueing system

Elements

MASPARK is composed of three main elements: a smartphone, a headset and a waist sensor (Fig1).

The waist sensor will be monitoring the users' gait and transmitting signs of alert to the smartphone which, in turn, will order the auditory stimuli (cues) to start or stop.

The smartphone offers other applications beyond the auditory cueing: medication reminders, medication stock management, symptoms visualization, medical questionnaires and communications (messages, phone calls).

Benefits

Project MASPARK was designed to effectively assist people with PD. Therefore, technology must not only be effective and useful, but also accepted.

Fraunhofer AICOS is responsible for the auditory cueing system in the project, for the study of technology acceptance and for the assessment of the system's impact on people's quality of life.

The specific benefits of the auditory cueing system will be the personalization to each user's needs and the optimization of it towards maximum comfort.

By using Technology Acceptance Models (TAMs), Fraunhofer AICOS is also evaluating participants' attitude and experience with the system in order to assess whether it would be comfortable and acceptable to use on a daily basis.

In order to test the system, 25 people with PD will be involved in system trials that will happen in successive stages, ending in a long-term trial to determine the impact of the system on participants' lives.