Conference Abstract

CuPiD Project – Closed-loop system for personalized and at-home rehabilitation of people with Parkinson's disease

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Abstract

CuPiD delivers three kinds of tele-rehabilitation services for people with Parkinson's disease (PD) in the home, monitored remotely by clinicians. These are:

External cues to manage freezing of gait: During freezing of gait (FOG) a person with PD may be completely unable to walk, reducing quality of life and increasing the risk of falling. FOG is episodic and currently unpredictable. A person can often break out of FOG if provided with external stimulation ("cues") to help trigger walking. Cues may consist of rhythmic audio, visual or tactile stimulation. In this service the user will be provided with wearable sensors to detect (or even predict) FOG and provide external cues as needed, inside or outside the home.

Biofeedback training for activities of daily living: Wearable sensors and equipment for audio, visual or tactile feedback guide the user as they exercise. This allows people with PD to train in activities of daily living such as standing, standing from sitting and reaching.

Virtual Reality simulations: Using Virtual Reality users can train in sitting, sitting from standing, standing and walking. The exercises take the form of games that combine motor and cognitive challenges. Virtual Reality is a powerful tool with which to provide the repetitive practice needed to develop motor function in a motivating and engaging way.

All the rehabilitation exercises instantiate a closed-loop: the user's performance affects the exercise, he exercise affects the user's performance.

All the exercises will be provided using a telemedicine infrastructure, so that CuPiD is available in the home to large numbers of users receiving remote support from clinicians.

Validation: CuPiD includes an 18 month validation phase which includes a multicentre trial. This will use repeated measures (pre-training, post training, one month follow-up) with a six week intervention designed to improve motor function. CuPiD will be evaluated in terms of operation, sensitivity, efficacy, user adherence and satisfaction. At least fifty users will be recruited at this stage. CuPiD will have started trials by July 2013.

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Expected Results: The overall outcome of CuPiD will be to establish the acceptability and long-term efficacy of closed-loop rehabilitation delivered to the homes of people with PD via telemedicine.

Keywords:

parkinsons, disease, pd

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