Developing a Home-Based Interactive Neurorehabilitation System Using Distributed Cognition Design

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Abstract

Stroke is the leading cause of disability in the United States and the most common neurological disorder worldwide. Although large scale studies point to the effectiveness of long-term therapy in facilitating recovery, the cost, availability of facilities and experts, as well as transportation to clinical facilities on a regular basis over a long period of time, limits the amount of supervised therapy that stroke survivors can receive in the clinic. In response, home-based therapy has emerged as a viable alternative, which can be effective in conjunction with therapy in the clinic or even as the primary mode of therapy. However, delivering long term, lightly supervised neurorehabilitation in the home is a complex challenge that requires robust, low cost, scalable and engaging solutions. In this talk, I will present our approach using distributed cognition design (DCD) to leverage the full network of interactions between environment, tools, artifacts, and people in delivering an effective interactive neurorehabilitation experience. We use DCD to guide our long-term goal in developing a computational therapy model via imitation learning in a semi-automated, adaptive system.

Speaker’s Biography

Aisling Kelliher is an associate professor of Computer Science at Virginia Tech, with joint appointments in the School of Visual Arts and the Institute for Creativity, Arts, and Technology. Previously, she was an associate professor in the School of Design at Carnegie Mellon University where she co-directed the Masters in Tangible Interaction Program.

Dr. Kelliher creates and studies interactive media systems for enhancing reflection, learning, healing, and communication. Her work is grounded within the fields of human-computer interaction, multimedia, and interaction design, and is motivated by a desire to integrate computational processes into everyday mediated experiences. Her current research explores the role of design in multiple interdisciplinary contexts including healthcare, learning cultures, and future studies. Findings from her research have been published at ACM MM, TOMCCAP, SIGCHI, ISEA, CIKM, ICWSM and WWW, and exhibited at leading national venues including SIGGRAPH, the ASU Art Museum and the DeCordova Museum. Her research is supported by grants from the MacArthur Foundation, NSF IGERT, NSF DR K-12, NSF EAGER and NSF CreativeIT programs.

She received a Ph.D. in Media Arts and Sciences from the MIT Media Lab in 2007. She also holds an MSc. in Multimedia Systems from Trinity College Dublin, and a B.A. in Communications Studies from Dublin City University.