Keynote: Smart health and wellbeing

M. PAVEL ***Smart health and wellbeing for the aging population.*** *Gerontechnology 2012;11(2):213;* doi:10.4017/gt.2012.11.02.464.00 **Purpose** This presentation will provide an overview of the program in Health and Wellbeing at the U.S. National Science Foundation. **Method** With dramatically changing demographics, care delivery for the aging and chronically ill is rapidly becoming one of the key global social and economic challenges. Supporting successful aging, i.e., maintaining independence and high quality of life, will require a disruptive change in caregiving as well as in healthcare delivery. However, transforming care to be evidence-based, individual-centred, and proactive will require substantial fundamental and technical advances. At the same time, there is a growing need to gather evidence pertaining to the efficacy of these technology-based approaches. Recognizing these challenges, the U.S. National Science Foundation has developed a program in Smart Health and Wellbeing[1] that is focused on stimulating relevant fundamental research in key scientific areas including computer science, engineering, and behavioural and social sciences, reflecting the multidisciplinary nature of the care-related problems. **Results & Discussion** One aspect common to many technology-based caregiving and healthcare scenarios is the reliance on continuous and unobtrusive monitoring for the purpose of assessment of individuals' health state and for subsequent intervention. A consequence of the unobtrusive and continuous nature of the monitoring processes combined with the heterogeneity of the environments, contexts and behaviours is the emergence of a variety of fundamental technical and scientific challenges in the realm of making inferences from 'Big Data' that would influence care-related decisions for a particular individual. Rigorous mathematical and computational approaches and quantitative models ranging from sensors to social networks are potentially the key ingredients in developing individual-centred predictive models. This presentation will illustrate some of the challenges and potential solutions using a small number of examples including assessment of mobility and medication adherence based on data from a study at the Oregon Health & Science University. The set of key problems include inference of activities from movements using state transition models, fusion of heterogeneous data streams, and detection of anomalies based on hierarchical categorization schemes. The presentation will also address important issues such as false alarm fatigue and its mitigation using context-based optimal decision processes.

References

1. National Science Foundation. Solicitation for the Smart Health and wellbeing program; www.nsf.gov/pubs/2012/nsf12512/nsf12512.pdf; retrieved April 10, 2012

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