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Steer your Mind

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2017

document version

Publisher's PDF, also known as Version of record

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citation for published version (APA)

Abro, A. H. (2017). *Steer your Mind: Computational Exploration of Human Control in Relation to Emotions, Desires and Social Support*. [PhD-Thesis - Research and graduation internal, Vrije Universiteit Amsterdam].

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Abstract

The evolution of computational technologies for the development of smart applications capable of providing help and support to vulnerable persons has strengthened the need to study and incorporate the underlying mechanisms of human mental and social processes. These mechanisms are a basis for robust intelligent systems that are able to help and support behaviour and lifestyle change. In the field of Artificial Intelligence knowledge and understanding about human mental processes and behaviours play a crucial role in the design and development of human-aware or socially-aware applications. Therefore it is essential to understand the important elements of human mental processes and behaviours in relation with environmental and societal aspects of human routine and lifestyle. Although gaining knowledge and understanding of human mental processes may be complex, getting insight about how these processes relate with human behaviour contributes to better design and development of intelligent application in various domains. Persons who have lack of control or have dysregulation are more sensitive for and dependent on stimuli, as well as more vulnerable to the varying environmental situations. This may lead to various health issues, including emotional instability, depression, overweight and obesity, to mention a few. Conversely, having good control helps the person to cope with stressful situations and to regulate the environmentally related affects. In this research the role of regulation has been explored computationally for a number of aspects of human behaviour. To study the important aspects of human regulation of mental processes, dynamic computational models have been proposed and explored as a tool to simulate mental processes in relation to human behaviour. These computational models have been developed by incorporating the most relevant aspects of the human mental and social processes considered, based on literature and theories from the relevant domains of cognitive, affective and social (neuro) science. In this way, insight in these aspects is obtained which is represented in computational models which are then used to simulate different scenarios. In line with the main theme of the thesis, different domains have been explored computationally, in particular mechanisms involving emotion, desire and mood regulation, as well as the influence of social relations on an individual's life. The proposed computational models are based on the knowledge of various aspects of human mental processes and behaviour and provide a basis for the development of intelligent support systems to help and support people in their daily lives.