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Mental Health Informatics

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Preface

Over the last years, the practice of delivering mental health services has changed dramatically. Information on mental health problems is widely available online and indexed for search, mobile devices are being used in large numbers worldwide, the consumers of health services self-organise by use of social networks, medical and psychological assessment is being automated step-by-step and consultation is increasingly conducted via the Internet. Given the prevalence of mental health disorders and the burden on economies worldwide, mental health informatics should be a dedicated branch of Information and Communication Technology (ICT) or applied computer science.

This book introduces a number of approaches that have the potential to transform the daily practice of psychiatrists and psychologists. This includes the asynchronous communication between mental health care providers and clients as well as the automation of assessment and therapy. Fully automated versions of cognitive behaviour therapy are currently available over the Internet and are being used by millions of users worldwide. While the origins of psychometric testing go back to the nineteenth century and the methodology of psychological measurement is highly developed, the Internet revolution has advanced the science of psychological assessment not significantly beyond paper and pencil tests. A significant number of psychological tests are based on self-report or the observation of parents and relatives as well as clinicians. While paper and pencil have been replaced by input devices and tests are scored automatically, the very nature of psychological and cognitive testing has not changed significantly.

This book offers a glimpse at the radical transformations that are awaiting the field of psychological assessment. Even in developing countries, many individuals use mobile phones (most people still have one mobile phone only, some have several devices for professional and private purposes). Mobile phones record and transmit speech, text and movement data. They store and communicate personal information, including search data, shopping behaviour and items identifying cultural, social and other beliefs. Mobile devices are essential for social networking—the organisation of social tribes—and, consequently, the participation of

individuals in physical or online groups. For the first time in history, the behaviour of hundreds of millions of individuals is being recorded, stored and analysed. For the first time ever, objective data about the behaviour of a significant portion of the worldwide population is available.

Most psychologists and psychiatrists would agree that these data are valuable for assessment purposes. Clearly, however, there are significant ethical and privacy concerns that must be addressed while methods for the computational assessment and treatment of mental health problems are being developed. Nevertheless, the information on movement and communication patterns, constantly recorded by mobile phones, has significant value beyond that of the traditional psychometric testing techniques. As in other areas of information technology, these data (with permission of the participants) can be used for the benefits of individuals and their families (i.e., assessment and treatment) and for a multitude of purposes in support of the health and personal interests of consumers.

Speech and language are particularly interesting from the viewpoint of psychological assessment. For instance, depression may change the characteristics of voice in individuals and these changes can be detected by a special form of speech analysis. Some psychological problems result in changes in the use of language, such as the use of certain words and the avoidance of others, the inappropriate introduction of new words to a language and a reduction of the overall vocabulary (e.g., schizophrenia). Computational screening methods that utilise speech and language can detect subtle changes and alert clinicians as well as individuals and caregivers.

The importance of speech and language is further emphasised by the redefinition of some mental health categories that is currently underway. This preface is written a few weeks before the introduction of DSM-5, the fifth edition of the American Psychiatric Association's (APA) Diagnostic and Statistical Manual of Mental Disorders (DSM). It is currently assumed that Aspergers will not be part of this edition, which will be published in May 2013. DSM-5 will introduce a new category, Social Communication Disorder (SCD), which is a language disorder and as such different from Autism Spectrum Disorder (ASD) as defined in DSM-5. While the exact criteria for SCD are still unavailable at this point in time, it is assumed that this disorder will focus on a "qualitative impairment in social interaction". This moves the pragmatic aspect of language—the use in social interactions—to centre stage. Hence, the analysis of social interactions by computational methods will be essential for research on SCD and the development of psychological tests.

As stated above, there is an abundance of data that can be used for the assessment and treatment of mental health problems. The use of these data, however, poses ethical problems that will occupy concerned individuals, governments and the wider public for a long time. Assuming that these ethical problems can be solved, it should be possible in principle to diagnose and treat

mental health disorders completely online (naturally, this excludes the use of medication). The long-term objective of this line of research is the assessment and treatment of individuals with mental health disorders within a virtual environment.

Brisbane, March 2013 Joachim Diederich

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