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The Theory and Practice of Social Machines

 Springer

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Preface and Acknowledgments

Social machines are a type of social interaction or enterprise that is, in one sense, as old as the hills, and in another, as novel as the technologies that underlie them—the World Wide Web, social networking, smartphones, and so on. We believe, in accordance with the interdisciplinary study of these technologies that has been called *Web Science* (Berners-Lee et al. 2006), that they deserve a place in our standard vocabulary of social cooperation and interaction, thanks in large part to the transformative effects of the increased penetration of society by technology, and to the feedback loops that result as that massive social uptake transforms the technology in return. We therefore focus in this book on the novelty of social machines, although we try not to forget that they are rooted in time-honoured forms of interaction.

This new, if not unprecedented, sociotechnical phenomenon has been the object of study of a programme grant awarded by the UK’s Engineering and Physical Sciences Research Council (EPSRC), entitled SOCIAM: The Theory and Practice of Social Machines, and this book describes the work of the Sociam project. The authors have all worked on, or been associated with, Sociam, from the award of the funding in 2012 until the close of the project in 2018, at its four partners: Electronics and Computer Science, University of Southampton; Dept. of Computer Science, University of Oxford; the Oxford e-Research Centre; and the Dept. of Informatics, University of Edinburgh. Our aim has been to map the space of social machines, to understand their development, and to produce an inventory of the skills required to analyse and engineer them and make them sustainable and effective. This is clearly a multidisciplinary imperative, and a complete picture of social machines will draw upon social science, law and regulation, network science, data science and computer science (Tiropanis et al. 2015). Our focus here is on the engineering and data elements of this coalition, but we should always remember that social machines are social as well as machines. They cannot be built; technology may suggest a certain type of interaction and provide a palette of communications, but without participants they are dead formalisms.

The authors were but a small part of Sociam. Shadbolt was its Principal Investigator, De Roure and Hall Co-Investigators, and O’Hara a postdoctoral researcher on the project. The authors are responsible for this book, and any mistakes

or errors contained within it, but the narrative draws on the work of dozens more researchers across the four sites over a six-year period. This work is referenced, so the originators of the ideas, experiments and studies should be clear; the sheer range and fertility of the research should make it abundantly clear that we four authors are reporting on a collective enterprise which would not have been possible without the far-sighted funding model of the EPSRC. We would like to acknowledge these researchers in this Preface.

To begin with, our thanks for the contributions and direction of the other Co-Investigators, Peter Buneman of the University of Edinburgh, Luc Moreau of the University of Southampton (now at Kings College, London), Dave Robertson of the University of Edinburgh, and Tim Berners-Lee of M.I.T. and the University of Southampton (now at the University of Oxford), the last of whom, as we shall see, originated the social machine concept in its modern form. Vital strategic input was provided by our critical friends on our international advisory board, which was chaired by Prof. Lynda Hardman of CWI and the University of Utrecht. The other board members were Prof. Avi Bernstein of the University of Zürich, Prof. Jon Crowcroft of the University of Cambridge, Prof. Juliana Freire of New York University, Prof. Fausto Giunchiglia of the University of Trento and Prof. Chris Welty of Google Research and the VU Amsterdam. Thanks as well to our EPSRC representatives on the advisory board, Lisa Coles, Ellie Gilvin and Richard Gunn, and particular thanks to our project administrator Susan Davies.

Faculty members associated with Sociam included Claudia Pagliari of Edinburgh, Chris Lintott and Ursula Martin of Oxford, and Jacek Brodzki, Les Carr, Adriane Chapman, Hugh Glaser, Elena Simperl, Steffen Staab and Thanassis Tiropanis of Southampton. Core postdoctoral researchers funded directly by Sociam included Alan Davoust, Adrià Gascón, Egor Kostylev, Areti Manataki, Dave Murray-Rust and Petros Papapanagiotou of Edinburgh, Reuben Binns, Megan Meredith-Lobay, Grant Miller, Kevin Page, John Pybus, Rob Simpson, Ségolène Tarte, Milo Ian Thurston, Max Van Kleek and Jun Zhao of Oxford, and Gianluca Correndo, Dominic DiFranzo, Laura Drăgan, Trung Dong Huynh, Markus Luczak-Roesch, Heather Packer, Paul Smart, Daniel Smith and Ramine Tinati of Southampton. Postdoctoral researchers who collaborated with the project included Joe Corneli, Jason Nurse, Petar Radanliev, Nate Rosenblatt and Pip Willcox of Oxford, and Aastha Madaan, Conor Smyth and Xin Wang of Southampton. Visiting researchers included Davide Ceolin at Southampton. PhD students funded directly by Sociam included Tom Cairns, Gianfranco Cecconi, Frode Hegland, Michał Hoffman, Vanessa Mathews, Philip Sheldrake and Henry Story of Southampton. PhD students who collaborated with the project included Amy Guy of Edinburgh, Ulrik Lyngs and Gatis Mikelsons of Oxford, and Ian Brown, Seyi Feyisetan, Darren Richardson, Peter West, Yang Yang and Michael Yip of Southampton. Student interns, who carried out important implementation work, included Keir Bowater, Andrew Francis, Sauyon Lee, Dean Ottewell, Michaela Peykovska and Adam Slack of Oxford, and Gustavo Buzogany Eboli, Yuki Ikuno, Daniela Mihai, Neal Reeves, Filip Stoyanov and Anna Weston of Southampton. The book you hold in your hands, or view on your screen, could not have been written without this excellent team.

We have on occasion reviewed unpublished work by fellow Sociam members, which makes it hard to acknowledge, except explicitly in a footnote. Peter Buneman’s ideas on communication and annotation, and also (in collaboration with Adriane Chapman) on social knowledge machines come under this category, as does work by Dave Robertson on expressing the properties of social machines (reported in the section on ethical functionalism in Chap. 4), and Jacek Brodzki’s work on topological data analysis reported in Chap. 5 as an important future direction for social machine research. Also, some of Sociam’s supporters and collaborators provided work that ‘filled in some gaps’ in our account, and upon which we have therefore drawn; this covers contributions by Joe Corneli of the University of Oxford, and Richard Giordano and Jeff Vass of the University of Southampton, whom we would like to thank and acknowledge. To reiterate, any errors that have crept into our reports of their research are our responsibility alone.

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David De Roure is professor of e-Research at the University of Oxford, UK, and was Director of the Oxford e-Research Centre from 2012 to 2017. He has strategic responsibility for Digital Humanities at Oxford within The Oxford Research Centre in the Humanities (TORCH). Focused on advancing digital scholarship, he works across multiple disciplines including social sciences, computational musicology, experimental humanities, the Internet of Things, large scale distributed systems and

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Dame Wendy Hall FRS FREng is Regius Professor of Computer Science at the University of Southampton, UK, and is an Executive Director of the Web Science Institute at Southampton. She was Dean of the Faculty of Physical Science and Engineering from 2010 to 2014, and was Head of the School of Electronics and Computer Science from 2002 to 2007. One of the first computer scientists to undertake serious research in multimedia and hypermedia, she has been at its forefront ever since. The influence of her work has been significant in many areas including digital libraries, the development of the Semantic Web, and the emerging research discipline of Web Science. She was elected a Fellow of the Royal Society in 2009, President of the British Computer Society (2003–2004) and President of the Association for Computing Machinery (ACM) in 2008, the first person from outside North America to hold this position. She was co-Chair of the UK government's AI Review in 2017, and became its first Skills Champion for AI in the UK in 2018.