GUEST EDITORIAL PREFACE

Special Issue on Turing on Emotions

Huma Shah, Systems Engineering, University of Reading, Reading, UK

Alan Turing is one of those towering pioneers under whose striding shadow researchers in many fields amble. He accomplished and contributed more in his 41 years than many of us could hope to in twice that lifetime. His prescient and inventive ideas included an important 1948 paper *Intelligent Machinery* unpublished for twenty years until 1968. He explained his thoughts in such a manner that his ideas have crossed disciplines and influenced many. Even his mother, not a scientist herself said that Turing could write "with such lucidity as to bring the matter within the comprehension of the uninitiated" (Sara Turing, 1959, p. 13). The "conversational style" of the 1948 paper "reflected the discussions [Turing] had pursued, mainly at Bletchley Park" to spearhead the notion of machines behaving intelligently (Hodges quoted in Gesslar, 2013, p.523).

Fifty-five years after his death in 2009 then British Prime Minister, Gordon Brown, issued a public apology for the way Alan Turing was mistreated (through chemical castration following his conviction for gross indecency with another man):

A unique combination of anniversaries and events have stirred in us that sense of pride and gratitude which characterise the British experience.... code-breaker Alan Turing was a quite brilliant mathematician, most famous for his work on breaking the German Enigma codes. It is no exaggeration to say that, without his outstanding contribution, the history of World War Two could well have been very different... on behalf of the British government, and all those who live freely thanks to Alan's work I am very proud to say: we're sorry, you deserved so much better. (BBC, 2009)

In Turing's 1948 *Intelligent Machinery* article, he warned that the concept of 'intelligence' was an emotional one rather than a mathematical one (Turing, 1948, in Cooper & van Leeuwen, 2013, p. 502). Turing's blueprint for interdisciplinary work underlined his "freedom to move freely between the conceptual world of mathematics with the physical world of engineers", it was dismissed by his superiors at the National Physical Laboratory (NPL). Charles Darwin's grandson (no less!) the Director at NPL, at the

time Turing was employed there, considered *Intelligent Machinery* a "schoolboy essay" and "not suitable for publication" (in Copeland, 2004, p. 401). Turing had a "passion to bridge the gap between theory and practice" (Gesslar, 2013, p. 524), and he conveyed this to his detractors like a 'red rag to a bull' right at the beginning of *Intelligent Machinery*: "I propose to investigate the question as to whether it is possible for machinery to show intelligent behavior. It is usually assumed without argument that it is not possible" (in Copeland, 2004, p. 410).

Turing pointed to the problem of subjectivity: "The extent to which we regard something as behaving in an intelligent manner is determined as much by our own state of mind and training as by the properties of the object under consideration … With the same object … it is possible that one man would consider it as intelligent and another would not; the second man would have found out the rules of its behaviour" (ibid, p. 431).

Intelligent Machinery is "more than ever current, influential, and deeply fascinating" (Christof Teuscher, 2013, p. 520). Indeed Jack Copeland considers the paper as "the first manifesto of Artificial Intelligence" (Copeland, 2004, p. 401). For Rodney Brooks, CTO, Chairman of Rethink Robotics, Turing's 1948 paper, *Intelligent Machinery* is "more important than his [Turing's] 1950 paper *Computing machinery and intelligence*" (2013, p. 499). For Brooks, the importance of *Intelligent Machinery* comes from Turing's "distinction between embodied and disembodied intelligence" and from "the notion of 'cultural search', that people's learning largely comes from the culture of other people in which they are immersed" (ibid) ….the way in which interactions with others contributes to the development of intelligence …. using social robots, has only now become practical in the last fifteen years, and is a rich source of both theoretical and practical learning systems for robots" (p. 500).

Brooks, like many, wonders how different our technological world might be if Turing had lived to fully develop his set of ideas explained in *Intelligent Machinery* (p. 499). The impact of Alan Turing's sad departure with its "tragic end" (Papadimitriou, 2013, p.14) was felt by his colleagues and friends. Max Newman, his superior at Manchester University wrote: "The sudden death of Alan Turing on 7 June 1954 deprived mathematics and science of a great original mind at the height of its power …. In conversation he had a gift for comical but brilliantly apt analogies, which found its full scope on the discussions on 'brains *v.* machines' of the late 1940s" (in Cooper & van Leeuwen, 2013, p.5-6). Stephen Wolfram stated "Turing created the concept of a universal computer - which in time led to the notion of software, the computer revolution, and an increasing fraction of all our technology today ….. it was only in about the 1980s that Turing's work began to become more widely known" (2013, p. 44). Turing's "collective power and energy" is "in the theoretical coherence of diverse writings … in content, in style in discipline, conveying different facets of a basic quest for understanding 'how the world computes' … people touched in many different ways by this strangely appealing man" (Cooper & van Leeuwen, 2013, p. xi).

In Part 1 of this 2014 special volume of IJSE, we remember Alan Turing, in the 60th anniversary year since his death, with different perspectives on emotions in four original papers:

1. In Max Talanov and Alexander Toschev's invited paper 'Computational Emotional Thinking', the authors propose an interdisciplinary approach to a theoretical basis for computational emotional thinking. They draw on Marvin Minsky's 2007 book *The Emotion Machine* with Robert Plutchik's 'wheel of emotions' and its 8 basic emotions model, and neuromodulation from neuroscience. Talanov and Toschev's ideas can be embedded in fields as varied as building intelligent assistants, in computer games and nursing software. The paper is as a result of discussions between Max Talanov and guest editor Huma Shah following Talanov's talk in Russian (slides were in

English!) at the 2nd Artificial Intelligence and Natural Language (AINL) conference in St. Petersburg, 18 May 2013 (Toschev & Talanov, 2013);

2. Bruce MacLennan advocates ethical treatment of robots. This is welcome timing; Cambridge University, UK created a new centre to raise awareness of the risk to humanity from super-intelligent automata (CSER, 2013). The use of advanced machines in defence may increase, and confirm in the mind of the general public the idea that these systems are 'out to get us', as felt by Sigourney Weaver's character in *Aliens*, the second in the series and the first directed by James Cameron. Initially suspicious, resentful of the humanoid Bishop, Weaver's Ripley learnt the artificial human was there to help and protect;

3. The second invited paper is from Robby Garner, natural language programmer and software developer. Garner's systems have twice won the Loebner Prize for Artificial Intelligence, in 1998 and 1999. In Alan Turing's 100th anniversary year Garner's system, JFRED, achieved a deception rate of almost 21% in Reading University's marathon Turing test experiment, Turing100 at Bletchley Park, on 23 June 2012. Here for this special IJSE volume Garner relates the usefulness of 'Film Theory' and how it befits the design of conversational systems in exhibiting appropriate emotions during interaction with human interlocutors;

4. The last paper in Part I of this special volume looks at the emotions of Alan Turing. The account of his early life by his mother, Sara Turing, the definitive biography by Andrew Hodges (used as basis for Hollywood movie *The Imitation Game* starring BBC's Sherlock Holmes, Benedict Cumberbatch as the codebreaker), and David Leavitt's Turing story were explored to find the man behind the ideas on emotions in intelligent machines.

The Editor-in-Chief and Guest Editor would like to thank the authors for their time in preparing papers for this volume and hope readers find it a worthy contribution to the field of synthetic emotions and affective computing. We would also like to thank the Reviewers for their time reviewing papers in this issue:

Daniel Burke: AI Systems Designer, Energy Solutions Ltd.
Ian Harrison: Research Scientist in Human Enhancement & Sensory Augmentation, The University of Reading
Octavian Repoloschi: Academic & Philosopher of science, and philosopher of mind, West University of Timisoara
Patrick Rosenthal: CEO & Founder of EMOSHAPE Ltd.
Chris Shackleton: Research Scientist, Advanced driver assistance systems, The University of Reading

Huma Shah
Guest Editor
IJSE

REFERENCES

BBC. (2009). *PM Apology after Turing petition*. Retrieved from http://news.bbc.co.uk/1/hi/8249792.stm

Brooks, R. A. (2013). The case for embodied intelligence. In S. B. Cooper, & J. van Leeuwen (Eds.), *Alan Turing: His life and impact. Part III Building a brain: Intelligent machines, practice and theory* (pp. 499–501). Oxford, UK: Elsevier.

Cameron, J. (1986). *Aliens*. Retrieved from http://www.imdb.com/title/tt0090605/?ref_=nv_sr_1

Copeland, B. J. (2004). *The essential Turing: The ideas that gave birth to the computer age*. Clarendon Press.

CSER. (2013). *Centre for the study of existential risk*. Cambridge University. Retrieved from http://cser.org/

Gesslar, N. (2013). The computerman, the cryptographer and the physicist. In S. B. Cooper, & J. van Leeuwen (Eds.), *Alan Turing: His life and impact. Part III Building a brain: Intelligent machines, practice and theory* (pp. 521–530). Oxford, UK: Elsevier.

Papadimitriou, C. (2013). Alan and I. In S. B. Cooper, & J. van Leeuwen (Eds.), *Alan Turing: His life and impact. Part III Building a brain: Intelligent machines, practice and theory* (pp. 13–16). Oxford, UK: Elsevier.

The imitation game. (2013). Retrieved from http://www.imdb.com/title/tt2084970/?ref_=nv_sr_1

Toschev, A., & Talanov, M. (2013). Thinking model and machine understanding of English primitive texts and its application in infrastructure as service domain. In *Proceedings of the 2nd Conference on Artificial Intelligence and Natural Language (AINL)*, St. Petersburg, Russia. Retrieved from http://ainlconf.ru/node/view/material201303

Turing, A. M. (1948). Intelligent machinery. In S. B. Cooper, & J. van Leeuwen (Eds.), *Alan Turing: His life and impact. Part III Building a brain: Intelligent machines, practice and theory*. Oxford, UK: Elsevier.

Turing, S. (1959). Alan M. Turing (Centenary ed.). Cambridge, UK: Cambridge University Press.

Wolfram, S. (2013). The importance of universal computation. In S. B. Cooper, & J. van Leeuwen (Eds.), *Alan Turing: His life and impact. Part III Building a brain: Intelligent machines, practice and theory* (pp. 44–49). Oxford, UK: Elsevier.

Huma Shah is currently Research Fellow on the EU FP7 funded 'science in society' RoboLaw project at Reading University. She has a PhD in 'Deception-detection and machine intelligence in practical Turing tests'. Her previous work includes co-organising the 2006 and 2008 Loebner Prizes for Artificial Intelligence. In Alan Turing's centenary year 2012 she led the Turing100 Turing test experiment at Bletchley Park.