Values in Computing

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Abstract
Whether it is in the form of software, system architecture or interface design, anything *digital* is inevitably affected by values: the organizational values of the project sponsor, the values of the research partners, and the values of each developer and designer. Some values (e.g. commercial success, academic prestige) are easier to quantify than others (e.g. social justice, care for the environment) with the latter often dismissed in decision making processes as lacking of measurable 'evidence'. However, less easy to measure values are not less real: they are simply less visible. The aim of this one-day workshop is precisely to investigate mechanisms which give more exposure to those values in computing that are less frequently considered. We do so by bringing together practitioners from different computing backgrounds (e.g. software engineering, interaction design, information systems) who have first-hand experience of trying to represent on an equal footing all human values in computing.

Author Keywords
Human values; values-theory; decision making processes; participatory design; societal computing; Ethics in engineering; requirements capture.

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous;

Background

In a keynote speech at ICSE 2015, Grady Booch put forward the notion that *"every line of code has a moral and ethical implication."* This has been starkly illustrated by recent events, such as the Volkswagen emissions software system scandal, which has been described as *"a complete abdication of law and social responsibility"* [11]. The realization of the far reaching impact of the digital on politics, society, and the environment is not new [3,16] and is shared across computing-related disciplines and practitioners: from cyber-security [18] to "*computer and information scientists, social scientists, designers, and philosophers of technology"* [8]. However, despite these efforts, it remains the case that the human values embedded into software or into the design of human-computer interfaces are usually invisible, except when the far-reaching consequences of their breach manifest [2].

These breaches are not always 'intentional': when writing software, often the platform obfuscates the process even to the software developer. For example, in the Android SDK, the geocoding of location is done by sharing of precise location with a third party organization (including Google). The implications of sharing this data, how it is stored, treated and reused is not fully explained to the developer in tutorials[1], in the SDK documentation[2] or in the IDE at the time of writing the code. Those simple lines of code for the developer could have an unseen impact on the encoded (and perhaps unintended) values of the software produced.

Values can be defined as the guiding principles influencing our decision-making processes as individuals, groups and organizations [16]; as such, they do often emerge from the design process, both for software and interfaces [13]. Values, in a sense, come 'before' ethics, which are a generally accepted set of moral principles and *"address any intentional action that impacts negatively or positively the lives and values of others"* [9]. Ethics provide moral guidance through abstract principles; morals describe the goodness or badness of actions; values describe what an individual or a group thinks is valuable or important and, as a whole, reflect the moral basis from which everyone operates [6].

There is a constant interplay between values, morals and ethics [22], making it challenging to study values in isolation. For example, Friedman's Value Sensitive Design (VSD) *"emphasizes values with an ethical import"* [8]; similarly, Van Den Hoven focuses on ethics and engineers' *"moral overload"* [22]. Instead, in this workshop we wish to also encourage discussion around values mapping processes done *independently* from moral judgements: ones that support the systematical discovery and representation all the values in a project, their potential conflicts and relations. In other words we aim to capture values structures before negotiating what values may be right or wrong.

We argue that as researchers and practitioners, we should at least explore ways to 'suspend judgement' when capturing values, and reflect on how we experience the process and its outcomes; in doing so,

[1] https://developer.android.com/training/location/display-address.html

[2] https://developer.android.com/reference/android/location/Geocoder.html

we should try to question, or perhaps *'bracket'* [12], all forms of knowledge including what we know is right or wrong [15]. In other words, one of the questions we wish to address is if it is possible to explore a *ground-zero* values-space *"where participants are equally inexpert and are encouraged to postpone judgement"* [4]. This approach has been explored in design to facilitate communication between disciplines; can it be applied to computing research to facilitate communication about values?

To keep the workshop grounded in practice, we will address such questions by (a) jointly reflecting on findings from data collected through a *'values in computing'* survey specifically designed for this workshop; (b) sharing research practices through 'value stories' [13]; (c) exploring the appropriateness of different design approaches or 'patterns' [19] in addressing identified key challenges. As an outcome, we will jointly distill actionable findings into a small set of guiding principles and combine the survey findings with the workshop contributions into a joint publication. Our ultimate vision is that every line of code that a programmer writes, or every decision that an interaction designer makes, is informed by and aware of all the values at play in computing research and development endeavors.

Organizers

Maria Angela Ferrario is a Lecturer in the School of Computing and Communications, Lancaster University, UK. She is a digital innovation specialist with a background in computer science (PhD), design (MSc), philosophy and social psychology (BA, MA). Her research interests lie in values-driven, participatory and agile innovation frameworks and in exploring the impact that digital innovation has on society, in particular on the most vulnerable communities. Maria Angela is experienced in leading complex distributed partnerships that include hard-to-reach groups such as the homeless, rural island communities and adult with autism. Before joining academia, she worked in a European agency supporting peace building and reconciliation in the Irish crossborder region through technology and economic development. Her work has been published in world-leading venues such as ICSE, IwC, and CHI.

Will Simm is an experienced senior researcher at the School of Computing and Communications, Lancaster University, UK. He is a researcher-practitioner in participatory technology development, typically working in an agile, iterative, multi-disciplinary process. With a background in computing and engineering his research interests center on developing technologies for social impact which embed communities of users. His research reflects a values-driven approach of developing technologies for social good, working across domains with varied partners including extreme users and through award-winning projects addressing global challenges. Will's work has been published in top international conferences and journals such as ICSE, Interacting with Computers, Ubicomp, DIS and CHI.

Jon Whittle is a Professor in the School of Computing and Communications at Lancaster University, UK, and Chair of Software Engineering. Jon has initiated and led a number of large interdisciplinary research projects investigating how digital technologies (mobile computing, social networking, data analytics, etc.) can promote social change. His work has been published in world-leading venues in human-computer interaction,

software engineering, and social science. Jon has a passion for working across traditional disciplinary boundaries and interested in tackling challenging problems that can only be addressed by bringing together expertise from engineering, physical and social sciences. He enjoys working on problems of real societal significance using whatever disciplinary techniques are most appropriate for the job at hand.

Christopher Frauenberger is Senior Researcher at Vienna University of Technology and Principle Investigator of "OutsideTheBox- Rethinking Assistive Technologies with Children with Autism"[3]. He holds a PhD in Computer Science from Queen Mary, University of London and subsequently worked as Postdoctoral Fellow at Sussex University. In his academic research he focused on exploring interactive technologies in the contexts of people with disabilities. This included designing auditory displays for the visually impaired, investigating non-verbal communication in people with schizophrenia and technologically enhanced learning environments for children with autism. Methodologically he is committed to participatory design approaches and often interprets collaborative techniques from other fields in his work. He has published on ethics in participatory design and is member of the ACM SIGCHI Ethics Advisory Board.

Geraldine Fitzpatrick is Professor of Technology Design and Assessment and heads the Institute for Technology Design and Assessment and the Human Computer Interaction Group at TU Wien. She was previously Director of the Interact Lab at the Uni of Sussex, User Experience consultant at Sapient London, and Snr Researcher at the Center for Online Health/DSTC in Australia. Her research is at the intersection of social and computer sciences to support social interaction using mobile, tangible and sensor-based technologies in everyday contexts, with a particular interest in supporting collaboration, health and well-being, social and emotional skills learning, community building and active engagement for older people. She has a published book and over 180 refereed journal and conference publications in diverse areas such as HCI, CSCW, health informatics, pervasive computing. She sits on various advisory boards, and serves in many editorial roles, including associate editor of the CSCW journal, and program committee/chair in various CSCW/CHI/health related international conferences. She is also an ACM Distinguished Speaker.

Peter Purgathofer Peter Purgathofer is Associate Professor at the Faculty of Informatics, Vienna University of Technology, and works as a researcher, designer and teacher at the HCI Group. His research is focussed around the design of technology, notable questions of the role of design within software engineering, the use of design as an agent of change, the use of design as research, and the interaction between technological and societal development. His methodological approaches are more qualitative than quantitative, more explorative than experimental. He is co-founder of piglab.org and member of the board of trustees at the European Forum Alpbach.

Website

A website will be developed for the workshop, and will be accessible at this URL: www.valuesincomputing.org

[3] http://outsidethebox.at

The website will be used to advertise the workshop, and also serve as a repository for ongoing work, both before and after the workshop. It will include:

- Introduction & Overview
- Call for Papers
- Program of the Day
- Resources (related literature)
- Position papers (all papers submitted by participants)
- Action Principles & Joint publication

Pre-workshop plans

The preparation to the workshop is organized into two steps: a) fact-finding; b) community building.

(a) The *fact-finding* step involves the design and dissemination of a short survey on *values in computing*. The survey will be carried out primarily within the organizers' Departments (target response sample ~80). In addition, the link to the survey will be made available to the authors of the accepted contributions.

The prompts in the survey are a simplified and adapted version of the ten values groups identified by Schwartz [19] and extensively used by practitioners – e.g. campaigners [1] and HCI scholars [14,21]. The overall aim of the survey is to anchor the workshop discussion to empirical data that directly relates to the computing community. The main objectives of the survey are: (1) to map the values that our computing community holds at personal level; (2) to map the values that our computing community thinks that are held at Institutional level. The results of the survey will be introduced during the first Focus session - *Values Findings* – and used as base for discussion and reflection. During the workshop we will jointly evaluate the case for disseminating the survey to a wider community (e.g. the CHI community).

(b) The *community building* step will follow traditional dissemination channels to attract submissions and interest in the workshop. All six organizers have extensive experience in the field and consequently have a large network of collaborators and academic peers. We intend to advertise the workshop through the usual mailing-lists (e.g., CHI-Announcements, BHCI, EUSSET etc.), but also target more specific channels, such as the EPSRC-funded "Framework for Responsible Research and Innovation in ICT" (FRRICT) network and the ICSE-Software Engineering in Society (SEIS) community. We will also make use of our extensive academic network to publicize the workshop and reach out to colleagues in the field more directly.

Workshop Structure

We propose a full day workshop with this outline:

9:00	Welcome
9:30	Introductions & Background
10:00	Focus Session 1: *Values Findings*
11:00	**Coffee Break**
11:15	Focus Session 2: *Values Stories*
12:15	Quick Synopsis: emerging themes
12:30	**Lunch Break**
13:30	Focus Session 3: *Values in Action*
14.30	**Coffee Break**
15:00	Synopsis and Discussion
16:00	**Break**
16:15	'The Denver Principles', Dissemination Plans
17:00	**Workshop end**

All three Focus Sessions will follow a similar structure: after 5 to 10 minutes of introduction, participants will break out into small groups of 2 to 3 people. This structure has been applied successfully to other workshops such as [5]. Participants will receive a series of guiding questions and be asked to discuss the topics and document their outcomes on flip charts. Before the break, each group will have 3 minutes to present their findings, stories, and suggestion for actions.

At the Quick Synopsis session before lunch, a first round of reflections will provide an overview of the major themes, challenges and leads that have been produced thus far.

The Synopsis and Discussion in the afternoon will provide the opportunity to develop emerging themes in more depth and work towards a succinct set of principles[4] which will be jointly identified as having high impact potentials in bringing 'lesser spotted' values to the center stage of computing research .

The final session will focus on an agreed draft of such principles and close by discussing possible avenues for dissemination. A social gathering and communal dinner at the end of the workshop is also on the agenda.

Post-workshop plans

The core '*values in computing'* principles will provide a key reference point for future research activities. In the spirit of the workshop, we will invite participants, to share their stories on how such principles may or may not have affected their work. Such stories will be published on the workshop website.

Finally, the data from the '*values in computing'* survey together with its analysis and the workshop contributions have the potential to be translated into a submission to venues with greater reach into industry and the general public, e.g., the SIGCHI Interactions Magazine and IEEE Software.

Call for participation

Whether it is in the form of software, system architecture or interface design, anything *digital* is inevitably affected by values: the organizational values of the project sponsor, the values of the research partners, and the values of each developer and designer. Some values (e.g. commercial success, academic prestige) are easier to quantify than others (e.g. social justice, care for the environment) with the latter often dismissed in decision making processes as lacking of measurable 'evidence'. However, less easy to measure values are not less real: they are simply less visible. The aim of this one-day workshop is precisely to investigate mechanisms which give more exposure to those values in computing that are less frequently considered. We do so by bringing together practitioners from different computing backgrounds (e.g. software engineering, interaction design, information systems) who have first-hand experience of trying to represent on an equal footing all human values in computing.

We will do so by (a) jointly reflecting on findings from data collected through a *values in computing* survey specifically designed for this workshop; (b) sharing research practices through dialogue and 'value stories'; (c) exploring the appropriateness of different design

[4] 'The Denver Principles' are conceived to be in the style of the succinct 'Bermuda principles' of the Human Genome project, which has had far-reaching impact on research and industry. http://mondediplo.com/2002/12/15genome

approaches or 'patterns' in addressing emerging key challenges. As an outcome, we will jointly distill actionable findings into a small set of guiding principles, and combine the survey findings with the workshop contributions into a joint publication.

We invite submissions which engage with the workshop topic and can take one of the following forms:

- Position papers that discuss the roles of values in software and interfaces, or their designing processes
- Case studies in which authors retrospectively reflect on the values as the driving decision making
- Surveys of the value base within the authors own institutions on the basis of the survey used by the organizers (made available on the website)

Submissions should not exceed 4 pages (ACM Extended Abstract format, excluding raw data tables). There are ***two*** rounds of acceptance:

- Early deadline: 19 Dec (notification 21 Dec)
- Final deadline: 17 Feb 2017 (12pm PDT, notification 24 Feb)

The early deadline is designed to enable participants to draw on 2016 budgets, if necessary. Submissions to the early deadline should include a short statement in the email explaining the case. All submissions should be sent via email to m.ferrario@lancaster.ac.uk

The selection process will ensure that high quality contributions from a range of different perspectives are invited to participate. Additional resources, related literature and further practical information is available at the workshop's website: www.valuesincomputing.org

At least one author of an accepted submission is required to attend the workshop, and participants must register for both the workshop and at least one day of the main conference.

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References

1. Common Cause Foundation. 2016. Perceptions Matter: *The Common Cause UK Values Survey*, London: Common Cause Foundation
2. Maria Angela Ferrario, Will Simm, Stephen Forshaw, Adrian Gradinar, Marcia Tavares Smith, and Ian Smith. 2016. Values-first SE: research principles in practice. In *Proceedings of the 38th International Conference on Software Engineering Companion*. p 553-562.ACM, New York, NY, USA, 553-562.
3. Maria Angela Ferrario, Will Simm, Peter Newman, Stephen Forshaw, and Jon Whittle. Software engineering for 'social good': integrating action research, participatory design, and agile development. In *Proceedings of the 36th International Conference on Software Engineering Companion*, pp. 520-523. ACM, 2014.
4. Forshaw, Stephen, Leon Cruickshank, and Alan Dix. 2012. Collaborative communication tools for

designing: Physical-cyber environments. In *Fourth International Workshop on Physicality*, p. 47. 2012

5. Christopher Frauenberger, Good, J., and Nunes Parés. 2016. Autism and Technology - Beyond Assistance & Intervention. In CHI '16 *Extended Abstracts on Human Factors in Computing Systems*. San Jose, California, USA: ACM Press
6. Christopher Frauenberger, Rauhala, M., and Geraldine Fitzpatrick. 2016. In-Action Ethics. *Interacting with Computers*. https://doi.org/10.1093/iwc/iww024
7. Batya Friedman, David G. Hendry, Alina Huldtgren, Catholijn Jonker, Jeroen Hoven, and Aimee Wynsberghe. 2015. Charting the next decade for value sensitive design.*Aarhus series on human centered computing* 1, no. 1.
8. Batya Friedman, Peter H. Kahn Jr, Alan Borning, and Alina Huldtgren. 2013. Value sensitive design and information systems. In *Early engagement and new technologies: Opening up the laboratory*, pp. 55-95. Springer Netherlands, 2013.
9. Batya Friedman. 1996. Value-sensitive design. *interactions* 3, no. 6 (1996): 16-23.
10. Donald Gotterbarn. 2011. Software engineering ethics. *Encyclopedia of Software Engineering* (2001).
11. Hackaday. Ethics in engineering: Volkswagen's diesel fiasco, 2015. http://hackaday.com/2015/09/23/ethics-in-engineering-volkswagens-diesel-fiasco
12. Edmund Husserl. 2012. Ideas: *General introduction to pure phenomenology*. Routledge, 2012. Translation of the *Ideen zu einer reinen Phänomenologie und phänomenologischen Philosophi*e (1913)
13. Ole Sejer Iversen, Kim Halskov, and Tuck Wah Leong. 2010. Rekindling values in participatory design. In *Proceedings of the 11th Biennial Participatory Design Conference*, pp. 91-100. ACM, 2010.
14. Bran Knowles.2013. Re-imagining persuasion: designing for self-transcendence. In *CHI'13 Extended Abstracts on Human Factors in Computing Systems*, pp. 2713-2718. ACM, 2013.
15. Uriah Kriegel 2008. Moral phenomenology: Foundational issues*. Phenomenology and the Cognitive Sciences*, 7, no. 1 (2008): 1-19.
16. Noëmi Manders-Huits and Michael Zimmer. 2009. Values and pragmatic action: The challenges of introducing ethical intelligence in technical design communities. *International Review of Information Ethics* 10, no. 2 (2009): 37-45.
17. Public Interest Research Centre. 2011. The common cause handbook: a guide to values and frames http://valuesandframes.org/download/reports/Common-Cause-Handbook2.pdf
18. Phillip Rogaway 2015. The moral character of cryptographic work. URl: http://web.cs.ucdavis.edu/~rogaway/papers/moral.pdf
19. Douglas Schuler. 2008. *Liberating voices: A pattern language for communication revolution*. MIT Press, 2008.
20. Shalom H. Schwartz. 1992. Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in experimental social psychology*, 25(1):1 65, 1992.
21. Vanessa Thomas, Ding Wang, Louise Mullagh, and Nick Dunn. Where's Wally? In Search of Citizen Perspectives on the Smart City. *Sustainability* 8, no. 3 (2016): 207.
22. Jeroen Van den Hoven, Gert-Jan Lokhorst, and Ibo Van de Poel. 2012. Engineering and the problem of moral overload. *Science and engineering ethics* 18, no. 1 (2012): 143-155.