What to expect from IEEE 7000™
The first standard for building ethical systems

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Abstract—This September 2021 IEEE 7000™, the world’s first standardized model process for addressing ethical concerns during system design is published. It shows organizations how to do value-based engineering by identifying context-sensitive, philosophically grounded ethical value requirements for their systems and thereby change not only their business mission for the better, but – most importantly – their system architecture and design. First case studies show that following IEEE 7000™ has the potential to deeply change the narrative of tech companies’ mission; changing it from mere profit-oriented motives to public interest motives, social sustainability and wellbeing. This article gives a short overview of the standardization effort, its phases and what to expect from the standard from the perspective of its vice-chair.

Index Terms—ethics, values, standardization, risk-based system design, ethical computing

I. INTRODUCTION

IEEE 7000™ is a long awaited standard promising organizations the “ethical specs” [1] that seem to be overdue in engineering roadmaps. 154 experts were at some point involved in IEEE 7000™, 34 being Workgroup (WG) members. 77 experts balloted for its publication in 2021 (93% acceptance rate). In this commentary I want to give a short overview of what to expect from IEEE 7000™ and how it came about. The 79-page normative standard, involved hundreds of online discussions over five years, engaging self-selected individuals stemming from many cultures (Europe, Middle East, US, Australia, and Latin America) and a broad set of professional backgrounds (engineers, philosophers, theologists, consultants, etc.). There was one core question to be answered: How can tech-organizations of whatever size and industry build more ethical systems? But what is “ethical”? What laymen hear the word “ethics” they easily confound it with “morals”. This is not how the IEEE 7000™ WG refers to it. Instead, IEEE 7000 guides developers in making their products and services compatible with the ethical values of the communities in which technical products and services are placed and used. The standard gives step-by-step guidance to organizations on how to care for stakeholder values from the early conception of a system all through its development (and depending on its reading, during later deployment). Organizations that envision building technology for humanity (instead of only profit) get an answer to the Kantian question “How should I act”? I, the engineer and I the manager. How should the organization prepare for an IT project? How should it elicit and prioritize values? How can it ensure that prioritized values are ending up in the system-of-interest (SOI)? And how can the organizational and technical engineers transparently share their value mission and effort?

To answer these questions, the IEEE 7000™ WG has sought to respect prior scholarly work; especially Value Sensitive Design, Participatory Design, Privacy by Design, Virtue Ethics, Material Value Ethics and HCI. To elicit values of ethical relevance the standard applies utilitarianism, virtue ethics and duty ethics and recommends to also reach out to the culturally and spiritually founded ethical traditions of local cultures. Values in IEEE 7000™ are understood not only as critical issues that need to be fixed in order to not be evil. Instead, values are regarded in line with Max Scheler’s Material Value Ethics [2] and the post-phenomenological tradition: they are desirable qualities woven into our world and worthwhile to be borne by technology in order to positively enrich humans’ technical co-evolution.

II. THE COMING ABOUT AND THEMES ADDRESSED

Building a process framework like IEEE 7000™ hasn’t been an easy task. The development of the standard went through three phases. At the kick-off in 2016 the starting point was my textbook on “Ethical IT Innovation – A Value-based System Design Approach” [3] that already recognized Value Sensitive Design (VSD) [4], Risk-assessment based Design [5], Participatory Design and Mumford’s Ethics Method. This baseline implied that IEEE 7000™ would focus on how to embed value principles into systems (including virtues) and that a system can (of course) only be conceived of as a ‘socio-technical’ one. Due to VSD it seemed clear that IEEE 7000™ would need to include a bottom-up value exploration and conceptual analysis rather than embrace pre-conceived value principles’ lists.

During the first project months, WG members formulated their expectations on the standard through two surveys. Industry input, expert presentations and existing literature was consulted. Based on this input, we decided that IEEE 7000™ should not primarily be about “better AI”, algorithmic accountability or ethical algorithms. This would have

This article solely represents the views of the author and does not necessarily represent a position of either the IEEE P7000 Working Group, IEEE or the IEEE Standards Association. The author of this paper has been vice-chair of IEEE 7000™ throughout its entire coming about from 2016-2021. S. Spiekermann, Chair of the Institute for IS & Society, WU Vienna, Welthandelsplatz 1, 1020 Vienna (e-mail: mis-sek@wu.ac.at)
considerably reduced the mission of the standard. Instead, we sought to respect international value agreements (such as human rights frameworks) and regional laws in technology design and looked for a way to do so transparently, implying the need for an information management process. Many WG members emphasized the organizational conditions in which system and software engineers today are not given enough time or autonomy to work on non-functional value requirements. Furthermore, a normative standard needs to be sensitive to existing system and software engineering practice. Therefore, the ISO/IEEE/IEC 15288 standard was taken as an initial guidance to build processes. An important goal for the standard became to fix what we called “the two-domain problem”: How to bridge the gap between innovation management processes and engineering processes and end up with a product roadmap that integrates functional with ethical requirements. With these issues in mind (and many more), I wrote the very first draft in the summer of 2017.

The 2nd phase of IEEE 7000™ creation was about refinement and completion of Value-based engineering activities. Four sub-groups formed to discuss (1) the optimal process flow of the standard, (2) data control issues any organization faces that wants to launch an ethical system in today’s networked ecosystem of systems, (3) the risk-based design that can ensure the translation of value principles into system requirements and last but not least (4) the ethical foundations of the standard.

An interesting challenge was how to make moral philosophies verbally accessible to engineers. Are engineers supposed to understand philosophical terminology, such as “personal maxims” or “virtues”? And what are values? How can we grasp their existence and ontology correctly since they are invisible and immaterial? Can they be measured? The process group was challenged with the question how IEEE 7000™ can resonate with agile system development while still instantiating a proper value requirements’ elicitation phase and documentation?

The draft that resulted in 2018 was tested by various case studies on the effects of eliciting values with moral philosophies [6]. It was followed by two years of internal and external revisions (3rd phase) during which the WG replied to over a thousand comments received in three ballots. Finally, on June 16th, 2021, the 7th draft of the IEEE 7000™ standard was approved. The standard now has four primary processes to build ethical systems:

1. Concept of operations and context exploration,
2. Value elicitation and prioritization
3. Ethical value requirements identification
4. Risk-based design.

These are complemented by a transparency management process. The standard can be downloaded from https://standards.ieee.org/standard/7000-2021.html and is accompanied by case studies and background articles downloadable from WU Vienna’s Value-based Engineering portal: https://www.wu.ac.at/value-based-engineering

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