of Cain', as is reported of Dalit ('Untouchable') identity in one of Rourkela's sister steel plants. Disappointingly, Strümpell takes the comparison no further, and we must speculate whether the two cases are as similar as he implies. Of Rourkela *Dalits* we hear very little; and – unless by class – little more about the way in which the category 'Adivasi' is internally differentiated today, though we do learn that the RSP workforce includes representatives of a dozen different 'tribes' which in the past were to some degree hierarchized. The impression one gets from Strümpell's account, however, is that such differences no longer count for much – at least not in the face of the wider society. But how true would that be of urban Dalits? Is there not much in the comparative literature that might suggest more intractable differences between them? The political implications of that would matter.

Inevitably there are gaps, but overall this is an impressive book and essential reading for anybody with any interest in industry and inequality in South Asia. A pity about the quality of the copy-editing and proof-reading.

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Vepřek, Libuše Hannah: At the Edge of AI. Human Computation Systems and Their Intraverting Relations.
330 pp. Bielefeld: transcript, 2024. ISBN: 978-3-8376-7228-2

Given the overwhelming number of publications on the rise of AI as the most recent instance of sweeping digital transformation, why should you read this particular book? The answer is that Libuše Vepřek's *At the Edge of AI: Human Computation Systems and Their Intraverting Relations* not only provides a comprehensive and up-to-date overview of perspectives on technology and AI from cultural anthropology and from Science and Technology Studies (STS), it also introduces the concept of 'intraversions' in a thoughtful consideration of the complexities and transience of human–machine configurations. This makes her work a meaningful contribution also to the sociology of technology, as it addresses one of its hardest problems: how to capture agency in complex, changing systems whose future is hard to predict. Vepřek also offers valuable insights into the everyday practices of the many actors involved in human computation (HC). These systems, which are often situated within citizen science and feature game-like elements, rely on networks of both human and non-human actors. They aim to solve complex problems with a level of accuracy and scale that would be impossible without such hybrid collaboration.

The book comprises eight chapters, beginning with a thorough grounding in theories of human–nonhuman agency and technology assemblage, followed by an overview of the methodology and an in-depth ethnographic analysis of three HC case

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studies: *Foldit* (University of Washington), *ARTigo* (LMU Munich), and *Stall Catchers* (Human Computation Institute, Ithaca, New York).

Vepřek's approach is grounded in the writings and thinkings of German empirical cultural studies and European ethnology. Central to her theoretical framework is thus the conceptualization of technology as a "cross-cutting phenomenon" (Klaus Schönberger), emphasizing its pervasive influence across various domains of social life (cf. Manfred Faßler). Additionally, Vepřek builds on the understanding that human experience is inherently shaped and mediated by technology (cf. Thomas Hengartner). A key analytical and methodological anchor in her research is Stefan Beck's complex situational analysis of technology use as influenced by both practice and meaning. Vepřek also draws on Anne Dippel and Sonia Fizek's notion of *interferences* to describe the overlapping dynamics of work and play in digital environments.

From there, she integrates writings from scholars such as Lucy Suchman, Donna Haraway, and others in Science and Technology Studies. Her concept of intraversions is based on the notion of *assemblage*, and she applies a *co-laborative* ethnographic method (cf. Jörg Niewöhner) that involves and engages not only with the participants in these systems, but also with their designers and maintainers.

In *Stall Catchers*, a citizen science game, participants analyse Alzheimer's disease research data presented as short video sequences in a game format. They inspect blood vessels in the videos for blockages, characterizing them as either "flowing" or "stalled." Here, humans and computers are combined in novel ways to solve a data-analysis problem. The introduction of AI into the system reshapes these relations further, creating partnerships between humans and AI and redistributing roles and responsibilities. These shifts rely as much on the designers' and developers' imaginations as on the participants' active engagement and the technological affordances available to them. It is precisely this complex and evolving assemblage that Vepřek is interested in:

> "As a concept, intraversions refer to the processual forward movements and shifts within relations between humans and technology. These movements and shifts result from the introduction of new computational capabilities and through the potential arising from existing relations directly forming based on human actors' practices or algorithmic and material affordances." (p. 16)

Together, human and non-human actors form dynamic and contingent relations that constitute HC systems. These movements, it is shown, involve redistributions of agency, shifting role assignments between subjects and objects, and reconfigurations of tasks and practices between human and non-human actors.

The research question guiding the book is how HC systems in the field of citizen science

> "are formed in the interplay of different human (…) and nonhuman (or more-than-human) actors to determine how they are 1) imagined and developed as new forms of hybrid intelligence (HI) and 2), at the same time, negotiated in everyday life and

ethical practice in the entanglements of play and science. 3) I investigate the role of trust in the continuous formation processes." (p. 15)

While this might initially appear to be a collection of incommensurable themes, Vepřek skilfully weaves them together through the concept of *intraversions*, showing how volatile and flexible human–machine relations coalesce over time to form functioning HC systems.

Non-human actors in HC systems are, she states, "neither neutral nor passive objects only acted upon" (p. 16). While acknowledging their agency, she treats it as asymmetrical to human agency, following Karen Barad. The dynamic interactions between human and non-human actors lead to very diverse human–technology relations that result in the formation of HC systems such as *Stall Catchers*, which in turn reshape these very relations. This continuous becoming of the assemblage takes place in a space marked by both productivity and tension, due to the differing "affordances, expectations, and goals" inherent in play and science within citizen science games.

Various processes then influence the ever-changing assemblages, sometimes strengthening them, sometimes pulling them apart. One such process Vepřek identifies is the development of trust mechanisms, which must evolve alongside the intraverting relations in the systems.

The methodological approach employed in this study is a praxiographically inspired co-laborative ethnography, drawing on the conceptualization of praxis articulated by Beck, Niewöhner and Sørensen (2012), who define praxis as a form of human existence that is manifoldly situated. This ethnographic practice emphasizes direct experience while remaining attentive to the material, historical and cultural conditions that shape it. In addition to this ethnographic orientation, Vepřek incorporates experimental approaches to digital data, including code analysis and the examination of game chat interactions.

Like other sociotechnical systems, HC systems "are constantly in a state of becoming" despite the often linear narratives behind their design. The systems come into being through the interactions and negotiations of multiple actors, both human and non-human, leading to the systems never being closed or completed. This was clearly observed in HC games, where participants actively reconfigured the systems through creative engagement – tinkering, modding (i.e. modifying hard- and software), and other forms of appropriation – thus forging new forms of human–technology relations beyond what the designers envisioned.

While such dynamics may characterize many sociotechnical systems, HC systems are particularly intriguing in that they are not meant to be complete. They are conceived as open-ended, experimental spaces where new ideas about human–technology interaction can be tested. Neither the human nor the AI is merely an assistant in these hybrid systems, which are continually undergoing *intraversions*. As such, systems like

Stall Catchers and *Foldit* serve as laboratories for the co-evolution of human–technology relations.

An analysis of these systems shows that human–technology relationships evolve alongside system development. In *Foldit*, for example, participants progressed from passive users of automated protein models to active collaborators, working symbiotically with scripted tools and AI. Similarly, in *Stall Catchers*, participants initially supported machine processes, then trained machine-learning models, and eventually engaged in collaborative – or competitive – interactions with AI components.

Importantly, Vepřek's notion of *intraversions* includes not only participant–technology relations but also those involving developers and researchers. These relationships, too, evolve and "change and intravert as projects evolve, often in mutually reinforcing ways."

Does Vepřek's analysis address issues of power? While she does not offer an explicitly political critique of how these assemblages are used, by whom and to what ends, she lays the theoretical groundwork for such an analysis. By conceptualizing HC systems as non-monolithic and in constant flux, she shows how transformation always does happen – and once it does, it allows for interventions:

> „As the examples illustrate, intraversions are processes that, even when stabilized for a certain period of time, eventually present openings for new tweaks and improvements; the circumstances in which they occur tend to actively invite, almost require, such change." (245)

In line with this insight, Vepřek considers it crucial for digital anthropologists and STS researchers to move beyond merely advising on ethical or cultural questions. Instead, they should actively engage in shaping the very socio-computational systems they study.

Vepřek's analysis shows that the raison d'être of HC systems is to remain at the edge of both scientific research and technological innovation. They act as laboratories to experiment with possibilities for human–machine interactions. However, the systems she studies are shaped not only by their everyday becoming, but also by the continuous pursuit of pushing the systems toward a goal, an abstract idea of ideal human–technology relations that has yet to be materialized (and may or may not be reached, one guesses). In this sense they are also "at the edge" of becoming something that is, as yet, still imagined.

In addition, the book offers an impressive synthesis of key contributions in STS, the sociology of technology and anthropology, bringing together German and international thought in a compelling way. Vepřek demonstrates how relational conceptualizations of technology from German empirical cultural studies and broader STS scholarship can be fruitfully aligned, offering a situated, nuanced analysis that connects the everyday with questions of infrastructuring and sociotechnical assemblage.

This book not only provides an insightful analysis of a highly innovative field of human–machine interaction, it also leaves us with a powerful conceptual tool to continue thinking about agency in human–technology interactions. I am looking forward to seeing the concept of *intraversions* applied in future research across a wide range of other fields of practice.

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Whitehouse, Harvey: Inheritance: The Evolutionary Origins of the Modern World. 358 pp. London: Hutchinson Heinemann, 2024. ISBN 978-1-529-15222-7

In this book, Harvey Whitehouse sets forth a tantalising proposition: that by learning how humanity has evolved, we might be able to use our natural biases to reduce friction among ourselves and with the environment we are a part of. Our current path, Whitehouse says, is like a herd stampeding towards a cliff: it is up to us if we end up falling or if we change course before it is too late. The content relating to the subtitle, the evolutionary origins of the modern world, is the basis on which his proposal is built. Only by knowing how we got here can we envision a way of using the same traits that brought us here to alter our direction. Whitehouse builds his ambitious argument as an anthropological jigsaw puzzle, not limited to a single site or society, but combining his own observations and studies from different corners of our world.

Weaving together insights from several decades of research that combines ethnographic observations with experiments, Whitehouse pieces together a *longue durée* portrait of our species' cultural evolution. He argues that three natural biases – which have been repeatedly observed in all human societies – explain our path up until now: conformism, religiosity and tribalism. He calls them natural biases because they describe deep-rooted cognitive needs to conform, to believe and to belong (p. 4). Conformism refers to how we avidly copy others in order to fit in or be accepted. Religiosity designates our inclination to acquire and spread ideas about supernatural beings, influences or meanings. Tribalism is a profound feeling of belonging to a group that may lead to a willingness to risk life and limb on battlefields. These three biases, Whitehouse argues, have enabled us to cooperate and function in increasingly large-scale societies.

The structure of the book develops the three biases in three different sections: the first explains the mechanics of the evolution of each bias; the second shows how each bias is relevant in our lives; and the third suggests potential adaptations that could improve our relations among ourselves and those with other species and our planet. Whitehouse also adds an epilogue to explain that the scale of our social world is of crucial importance, arguing that, having lived in megasocieties, with millions of in-