

## Introduction to the Special Issue on the 50th Anniversary of IJHCS

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## **Abstract**

This special issue celebrates the 50<sup>th</sup> anniversary of the International Journal of Human-Computer Studies (IJHCS), which published its first volume in January 1969. The special issue comprises 15 contributions from a number of experts in Human-Computer Interaction (HCI) and other areas relevant to IJHCS. These contributions are best characterized as ‘landscape papers’, providing insightful analyses about the evolution (i.e., the past, the present and the future) of research areas relevant to IJHCS. The areas covered in this special issue include: the history and scope of the journal; foundational concerns in HCI; critical discussions about the issues surrounding digital living in a variety of areas, from healthcare and cybersecurity to digital games and art; the making of interactive products and services, as seen through the viewpoints defined by research in psychology of programming, end-user development and participatory design; and, finally, the issues associated with adapting to various novel emerging technologies, including automated systems, online personalisation, human augmentations, mixed reality, and sonic interfaces. In this short essay, we introduce the special issue, reflecting on the nature and evolution of the journal, before providing short outlines of each of the contributions to this special issue.

Keywords: IJHCS, Human-Computer Interaction, 50<sup>th</sup> Anniversary Issue.

## Introduction

50 years ago, in January 1969, the first volume of the International Journal of Human-Computer Studies (IJHCS), which was originally called “International Journal of Man-Machine Studies”, was published by Academic Press. As pointed out by the founding editors in their inaugural editorial, their aim was not actually to set up a new discipline of “Man-Machine Studies”, but, on the contrary to provide a “generic term” and a new venue to bring together research, which was at the time distributed in different journals drawn from a variety of disciplines. 50 years later, both this multidisciplinary element and the stated aim to provide a publishing venue for a variety of different strands of research still characterize the journal as it is today, a testament to the vision and correct intuitions of the IJHCS founders. It is also fascinating to read in the inaugural editorial that, to counter-balance the possible risks associated with publishing a rather eclectic set of contributions, the editors were planning two focused special issues in the first year of the journal, one on speech recognition and the other on interactivity in the medical domain, two topics that are still extremely important today and are also closely related to contributions included in this special issue.

To understand the evolution of the research topics published in IJHCS over time, Mannocci et al. report in this special issue a comprehensive analysis of every article ever published in IJHCS, finding that: “the DNA of the journal has remained rather stable over these 50 years, maintaining a core focus on Artificial Intelligence and Human-Computer Interaction as the main areas of interest”. Even more remarkably, as also pointed out by Mannocci et al, IJHCS predates the key specialized venues in both these areas, preceding the International Joint Conference on Artificial Intelligence (by a few months), the Artificial Intelligence journal (by one year) and the CHI conference (by 13 years).

The fascinating dialectics between evolution and stability is also discussed in the contribution to this Special Issue by Brian Gaines, one of the founders of IJHCS and its Editor-in-Chief for the first 36 years of the journal, who emphasizes that key concerns, such as information access and sharing, and the use of technology to support human networks, not only have remained constant throughout the evolution of IJHCS but have been pervasive throughout human history.

The story of IJHCS is one of the founding editors launching a journal that, as emphasized by Brian Gaines, is fundamentally concerned with timeless issues concerning the relation between humans and technology. This is probably one of the key reasons explaining its success: on the one hand, the journal focuses on fundamental socio-technological invariants, on the other end it evolves continuously, mirroring and in many cases anticipating

the most important developments relevant to human-computer studies, which have progressed from interaction through teletype interfaces in the 60s and 70s to graphic interfaces in the following decades, from personal computers to smartphones, from standalone machines to ubiquitous networked devices.

Building on this rich and fascinating scientific heritage, we celebrate the 50<sup>th</sup> anniversary of IJHCS by looking at the status of a number of topics relevant to the journal. To this purpose we contacted a number of authoritative members of the academic community asking them to provide ‘landscape papers’ on areas of interest and relevance to IJHCS. The result is a collection of essays that provide a snapshot of research in a variety of areas relevant to the journal, including: the history and scope of IJHCS; foundational concerns in HCI; critical discussions about the issues surrounding digital living in a variety of areas, from healthcare and cybersecurity to digital games and art; the making of interactive products and services, as seen through the viewpoints defined by research in psychology of programming, end-user development and participatory design; and, finally, the issues associated with adapting to various novel emerging technologies, including automated systems, online personalisation, human augmentations, mixed reality, and sonic interfaces.

In the next section, we provide a brief outline of the contributions to this special issue.

### **Contributions to the Special Issue**

While this special issue, necessarily, can only cover a subset of the variety of topics which are relevant to IJHCS, nonetheless we believe that it succeeds in providing an exciting range of contributions, showcasing the broad scope of the journal.

The paper by Brian Gaines, “From facilitating interactivity to managing hyperconnectivity: 50 years of human-computer studies”, focuses on the emergence of hyperconnectivity not just as a technological trend but as an economic and social driver. The scope of this paper, which is written by the founding editor of the journal, is breathtaking, encompassing a wider analysis of the evolution of human society and in particular emphasising how the fundamental human needs that are addressed by hyperconnectivity have not changed throughout recent human history. This is a very important point and, as a result of this specific stance, the reader is offered a particularly robust analysis focusing on the concrete social, biological and psychological invariants characterising these human needs and showing how different technologies in different eras have supported them.

In “The Evolution of IJHCS and CHI: A Quantitative Analysis”, Mannocci et al. focus instead on IJHCS as a domain of analysis, using data analytics techniques to

characterize its evolution over the past 50 years. As mentioned earlier, the analysis shows that the core topics of the journal have remained remarkably consistent throughout the lifetime of the journal, a testament to the amazing vision of the founding editors and the fundamental importance of the core issues tackled by IJHCS. In addition, the analysis also highlights some key recent trends, illustrating which topics have particularly grown in the past 10 years. Finally, it also discusses some broader issues concerning the differences between journal and conference publications and also focusing on the key geo-political issues relevant to IJHCS. As it is the case also with other top journals and conferences, only a relatively small number of countries have a consistent presence in the journal, a pattern that persists even though online publishing should in principle remove traditional barriers to accessing and contributing to the scientific literature.

The paper by Blackwell et al., “Fifty years of the Psychology of Programming”, provides a broad overview of the Psychology of Programming field, looking at the key phases in the evolution of this discipline, as reflected in IJHCS as well as other publishing venues. The authors show how research concerns have evolved over the years, mirroring the evolution of programming languages and practices, and conclude the paper by providing some “crystal ball-gazing” – i.e., discussing some of the key issues that need to be tackled in future work.

The paper by Blandford, “HCI for health and wellbeing: challenges and opportunities” focuses on interactivity in health systems. The author surveys the changing landscape of healthcare systems and highlights the key risks and opportunities associated with the emerging healthcare scenarios. Risks include “threats to privacy, patient trust and experience”, while at the same time these new scenarios provide “opportunities to deliver healthcare and empower people to manage their health and wellbeing in ways that better fit their lives”.

In “A design vocabulary for accessibility in digital games”, Cairns et al. highlight the economic and social role played by games, while critiquing the use of guidelines as a way to help designers create games accessible to users with different types of disabilities and needs. To address this problem, Cairns et al. propose a new design vocabulary to characterise game accessibility, which covers a broad range of design elements and can be used effectively to support designers.

The paper by Detienne et al, “Ideologically-Embedded Design: Community, Collaboration and Artefact”, proposes a new approach to participatory design characterised by a shift from “designing for target users to a vision of designing for and with ethical

communities”. The approach is illustrated in two different scenarios, which show not only the importance for the design process to take into account the values associated with a community, but also its dynamic nature, which requires a design to evolve to reflect the changing values of a community over time.

“Revisiting Collaboration through Mixed Reality: The Evolution of Groupware” is the title of the contribution by Ens et al., which focuses on Collaborative Mixed Reality systems, a technology that is reaching maturity and is therefore likely to become commonplace in the next few years. The authors describe the evolution of the technology and point out that the traditional frameworks used to characterize Computer Supported Collaborative Work are no longer adequate for this new class of systems. In addition, they also highlight a number of key areas of research, in particular highlighting the importance of tackling the social and ethical issues associated with this emerging technology.

The paper by Janssen et al, “History and Future of Human-Automation Interaction”, provides a review of research on human-automation interaction, characterises its current status, and highlights key directions for future research. In particular, the authors identify trends in the evolution of the field, e.g., the emergence of non-professional users, which call for new research on the ethical and social concerns associated with increased automation and for the design and development of novel systems with better explanation facilities.

The paper by Jeon et al, “From Rituals to Magic: Interactive Art and HCI of the Past, Present, and Future”, provides an interesting analysis of the connections between Art and Human-Computer Interaction and in particular emphasises how the relationship is mutually beneficial, both to provide new forms of interaction to the art experience and also, conversely, to facilitate the development of “emotionally intelligent and interactive systems”. The paper also provides an interesting overview of interactive art, in particular illustrating how AI and Robotics are informing current developments in this field.

In their paper, “End-User Development for Personalizing Applications, Things, and Robots”, Paternò and Santoro discuss the evolution of End-User Development, in particular highlighting how the pervasiveness of information technologies, and in particular the emergence of robots and Internet of Things applications, have dramatically expanded the user base and increased the need to empower people to customise or even create their own applications. The authors conclude their analysis by discussing the main challenges in the area and proposing a research agenda for End-User Development.

The paper by Raisamo et al, “Human augmentation: past, present and future”, focuses on Human Augmentation, a field of research which aims to enhance “sensing, action and/or

cognitive abilities of a human” by means of technology. In their paper the authors provide both an overview of the field and a research agenda and, in particular, highlight the potential for these technologies to improve quality of life significantly, especially in elderly people. As the authors point out, these technologies have the potential to “revolutionize the meaning of being human”. At the same time, these opportunities must be weighed against the ethical and societal concerns related to the deployment of intrusive technologies and the many unethical uses that are becoming possible.

In “Talking about interaction\*”, Reeves and Beck focus instead on the fundamental concept of “interaction”. As the authors explain, there is no shared definition of interaction in the HCI community and indeed some researchers even see the term as confusing and potentially counter-productive, given the myriad ways in which it is used in the literature. In their interesting and entertaining essay the authors emphasize that they are talking about “interaction\*” as a meta-level concept (the way different conceptualizations of interaction can be found in the literature) rather than about “interaction” itself. After discussing the different notions of interaction in the literature, the authors propose a therapeutic approach, whereby we resist the urge to resolve “epistemic differences” and we accept the multi-faceted nature of the term, just as we do with other common terms in the scientific language.

In “Interaction by ear”, Rocchesso et al focus on Sonic Interaction, the use of non-speech sounds in interactive systems. In their paper the authors provide an overview of the field and also highlight key issues for future research, in particular discussing the rapid growth of sonic interaction deployments and emphasising that this area will become ever more pervasive and sophisticated, being used in a variety of types of applications, such as navigation, virtual reality, product design, and others.

In “Measuring the Impact of Online Personalisation: Past, Present and Future”, Zanker et al point out that research on personalization is currently spread among different areas, including HCI, Cognitive Science, AI, User Modelling and Information Systems. Hence their aim is to provide an integrated overview of all these different strands of research, in order to formulate an integrated research agenda.

The paper by Zimmermann and Renaud, “Moving from a "Human-as-Problem" to a "Human-as-Solution" Cybersecurity Mindset” analyses the current state of the art in cybersecurity systems and advocates a fundamental paradigm shift away from conceptualizations and design practices that essentially see humans as ‘the problem’ and try to develop systems that limit their behaviour. The authors show that this approach is unsatisfactory and propose instead a new paradigm, "Human-as-Solution", where humans in

the system are treated by default as well-intentioned. The result is an approach which focuses on “enhancing factors that contribute to positive outcomes and resilience” in the wider socio-technological system.

## **Conclusions**

A 50<sup>th</sup> anniversary is an important one for both humans and scientific journals, and should be appropriately celebrated. We believe that the 15 contributions comprising this special issue define an excellent way to celebrate this important milestone for the journal, providing us both with an opportunity for reflecting on the evolution and the current issues associated with several important areas relevant to IJHCS, as well as defining exciting research agendas for the future.

The IJHCS trajectory has been one of sustained excellence over five decades and, judging on the basis of the exciting research agendas presented in the contributions included in the special issue, it is a given that the next 50 years will no doubt be as rich and stimulating as the first half century of the journal.

Happy Birthday, IJHCS!

## **Acknowledgements**

We would like to thank all the contributors to this special issue and especially Brian Gaines, one of the founding editors of IJHCS, who steered the journal throughout the first 36 years of its life. If it weren't for him, we would not be here today celebrating the 50<sup>th</sup> birthday of IJHCS and the world would certainly be scientifically much poorer for it. Hence, in celebrating IJHCS, we also celebrate Brian's vision and intellectual achievements.

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