

Editorial Preface

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To complicate is simple, to simplify is complicated. ... Everybody is able to complicate. Only a few can simplify. (Bruno Munari, 1907-1998)

One day, the virtual world might win over the real world. (Paul Virilio, a French cultural theorist, urbanist, and aesthetic philosopher)

Design creates culture. Culture shapes values. Values determine the future. (Robert L. Peters, Graphic Designer)

INTRODUCTION

This annual issue embraces articles from three sets of sources: the first covering the topic Virtual Environments and Interaction Design Research at the University of Saint Joseph, Macao SAR, China, works selected and guest edited by Carlos Sena Caires and Gerald Estadieu; the second set are three extended articles from the International Conference on Graphics and Interaction (ICGI'2021), selected and guest edited by Daniel Mendes and Nuno Rodrigues; and, finally, two articles from the regular pipeline.

SELECTION OF ARTICLES ON “VIRTUAL ENVIRONMENTS AND INTERACTION DESIGN RESEARCH AT THE UNIVERSITY OF SAINT JOSEPH, MACAO SAR, CHINA”

In recent decades, mixed environments, virtual and augmented reality, and interaction design have undergone several revolutions and modifications. Digital and computational development increasingly demand new interaction, participation, and exploration models, which imply different ways of thinking, conceptualising, and experiencing the digital world. These new ways have also narrowed the gap between the computational world and other digital arts, video games and interactive simulations. If virtual environments and interactive design were already in the process of assimilation and unification, the last years have forced these fields to review their technological and theoretical foundations.

The development of new technologies to simulate and duplicate the (real) world, the redefinition of terms and the search for new concepts have brought these fields of studies a redoubled interest. The constant search for innovation and experimentation allowed progress in the technological field and

the ways of operating and thinking about these new realities: the real and the virtual, the continuum in between and their correlations.

In *Matter and Memory* (1896), Henri Bergson developed the concept of the virtual (or virtuality) as a representation of the harmony of mind and matter, of the affirmation of time over space, and the living, creative power of difference. Thus, a representation for Bergson is always an image of certain “virtuality”. Later, Gilles Deleuze will come to question Bergson’s concept, which raised the notion of the virtual to the highest degree. In his book on Bergsonism (1988), Deleuze argues that the ‘virtual’ does not oppose the ‘real’ but instead the ‘actual’, where the ‘real’ is the opposite of the ‘possible’. Thus, we understand that the virtual, for Deleuze, is a reality that needs to be actualised to become present, actual. He says, “The characteristic of the virtual is to exist in such a way that it is actualised by being differentiated and is forced to differentiate itself, to create its lines of differentiation to be actualised” (Deleuze, 1988: 97). In *Simulacra and Simulation* (1981), Jean Baudrillard tends to refer to these new realities as simulations, claiming that our society has replaced all reality and meaning with symbols and signs. He will argue that human experience is nothing more than the simulation of reality.

On the other hand, Paul Virilio (Wilson, 1994) will come to replace Baudrillard’s word “simulation” with the word “substitution”. He will state, “when I hold a virtual glass with a data glove, this is not a simulation, but a substitution”. Here lies a significant difference between Baudrillard’s and Virilio’s thesis; the latter believes simulationism is wrong and that virtual realities are new technologies replacing the virtual with the “real” reality. Simulation becomes substitution, the virtual opposed to the real, and the real is opposed to the possible.

In this sense, we tend to believe, as Virilio claims, that “we are entering a world where there will be not one but two realities”, the real and the virtual realities. According to Gottfried Leibniz’s philosophy, that is, a set of compossible things: a set of items, finite things, that can exist together (Look, 2013). If the real and the virtual are possible together, they are possible. But it must be demonstrated that these two worlds, considering they are two realities that exist simultaneously, are still compossible: the virtual transformed into a new reality, another world when actualised. Leibniz will argue that not all possibilities are compossible. It would be interesting to review this philosophical approach and Leibniz’s thesis that our world is only one among many possible worlds; in other words, to confirm if some possibilities (or sets of compossible) are *impossible*.

Possible and compossible, here we are in the dichotomy of the binary world of the digital. Shouldn’t all the Digital be considered Virtual, since in its existential core is latent the idea of “actualisation”, as Deleuze referred to it? And it is in this precise fleeting moment of the digital/numerical “actualisation” that the whole question of interactivity (understood here as the aesthetics of the man-machine, machine-machine relationship) comes to the surface. One could say that interaction design’s primary mission is to solve this aestheticising relation’s significant problem; graphical interfaces, (in)tangible devices, computational worlds - a relational device - that endeavours to bring to the present (the actual) that virtuality is waiting to be actualised.

A SHORT INDIVIDUAL INTRODUCTION TO THE SELECTED PAPERS OF THE SET VIRTUAL ENVIRONMENTS AND INTERACTION DESIGN RESEARCH AT THE UNIVERSITY OF SAINT JOSEPH, MACAO SAR, CHINA

This special set of articles reflects the research carried out by scholars and student researchers of the Faculty of Arts and Humanities at the University of Saint Joseph in Macao, China. We want the set of articles selected in this publication to be understood as a forum for an extended discussion on new practices, experiments and results of the research carried out in the last two years in our institution. But before presenting the selected articles, we also want to highlight the excellence of the research, the contributions of all reviewers and authors, and the achieved results explained in the eight papers that make up part of this annual issue.

The first three articles focus mainly on the discussion of virtual environments and virtual and augmented reality: on the one hand, **Miguel Rosa Duque** focuses his research on the possibility of bringing the game of Mahjong to the virtual gaming market in casinos. While Blackjack and Poker are already globally accepted and played in virtual reality environments, Duque's research has the merit of questioning this potential for the Asian game of Mahjong. On the other hand, **Chau Iok Fong** (Justin) explores the possibilities of 3D printing objects as Tangible User Interfaces (TUIs) based on visual markers for smartphone-based extended reality. In an attempt to bring tangible 3D objects to processes of exploration of virtual and augmented reality, Fong's findings report on the creative and operational strategy of such tangible and virtual devices. Finally, and still in this set of articles on virtual reality, **Ng Ka Man** (Sandra), in Memorial and Serenity, introduces the notion of virtual reality for grave moaning in Macao. Through a case study at the Saint Michael's Chapel in Macao, Ka Man proposes an immersive virtual experience as an experimental mode for the recollection and reconnection of interactors with their loved ones.

The second set of articles reflects the problematics of Interaction Design in the context of virtual environments applied to the real world of teaching and learning, creativity and visual generative experimentation and exploration. First, **Filipa Martins de Abreu** brings to discussion an innovative multimodal game design framework to foster Macao's educational system through digital and tangible games. Abreu emphasises the importance of digital activities, through playability, in the learning experience as a fundamental factor in young learners' behaviours and actions. On the other hand, **Um Man Cheng** (Rachel) proposes an integrated learning platform where children, teachers and parents can learn simultaneously and in real-time. "Fries Lab" is a learning platform that Cheng developed based on blended learning and designed for a multicultural and multilingual environment. Her research findings indicate that a better understanding of a collaborative and creative learning platform increases children's learning motivation and improves parent-child relationships. Finally, throughout a case study, **Lau Ching Man** (Paul) examines Macao designers' perceptions of the adoption of generative design in their visual creations, namely in the graphic design for posters and logos. Revisiting the "2019 Macau Design Award" event, Man proposes an exploratory study through questionnaires and interviews with Macao designers, resulting in a set of recommendations for interaction and generative design and the future of design education in Macao.

The last two articles address unique issues related to, on the one hand, the adoption of blockchain technology and, on the other, the computational reconstruction of the wooden houses of the Chinese minority community of Yao. **Daniel Filipe Farinha** reviews and classifies state of the art in interactive blockchain NFTs (Non-Tangible Tokens) and analyses the opportunities and threats presented by this technology. In a direct appropriation of interaction design by Generative Art, Crypto Art and Creative Code, Farinha acknowledges the importance that "interactive artists" have given to this new computational and digital language. Finally, **Filipe Afonso** proposes the generative creation of alternative design methods for the generation of residential building structures using advanced computer graphics applications as a result of his research in the area of computational architecture. Afonso's study aims to develop the traditional construction structures of Yao village in Guangxi province and propose a new housing prototype. The reinterpretation of conventional construction methods, using digital technologies with generative design and advanced 3D fabrication, aims to provide new housing solutions adapted to the contemporary life of Guangxi inhabitants.

SET OF EXTENDED ARTICLES FROM THE "INTERNATIONAL CONFERENCE ON GRAPHICS AND INTERACTION (ICGI'2021)"

The Portuguese Group for Computer Graphics (*GPCG - Grupo Português de Computação Gráfica*), the Eurographics Portuguese Chapter, is the leading promoter for research dissemination in the

areas of Image Processing, Computer Vision and Human-Computer Interaction in Portugal. The International Conference on Graphics and Interaction (ICGI) is the main event of the GPCG, allowing the dissemination of concluded or ongoing work, as well as the exchange of experiences between the academic, industrial and end-user communities. The conferences are organised locally by Universities, Polytechnic and Research Institutes in full cooperation with GPCG, providing full national coverage throughout the years. This special issue covers the International Conference on Graphics and Interaction 2021 (ICGI'2021), which took place in Porto, Portugal, on November 4th-5th, 2021. The ICGI'2021 was a joint organisation between the Faculty of Engineering of the University of Porto and the Eurographics Portuguese Chapter. The conference had 27 paper presentations from several countries, arranged in six sessions: Education, Virtual Reality/Augmented Reality, Health, Computer Graphics and Visualization, Applications and User Experience. We also had the privilege of having two outstanding invited talks, by Pedro Lopes, Assistant Professor in Computer Science at the University of Chicago, focusing on integrating computer interfaces with the human body—exploring the interface paradigm that supersedes wearable computing, and by Beatriz Sousa Santos, Associate Professor at the Department of Electronics, Telecommunications and Informatics (DETI/UA), University of Aveiro, Portugal, and a researcher at the Institute of Electronics and Informatics Engineering of Aveiro (IEETA), focusing on recent Augmented Reality applications to industry.

A SHORT INTRODUCTION TO THE SELECTED EXTENDED PAPERS FROM THE “INTERNATIONAL CONFERENCE ON GRAPHICS AND INTERACTION (ICGI'2021)”

To contribute to this annual issue, we invited three authors to submit an extended and updated version of their previously presented work at the ICGI'2021.

The first article, titled “A Virtual Reality Game as a Tool for Psychotherapy With OCD Patients”, by Frutuoso Silva et al., presents a solution based on the use of a serious virtual reality game targeted at adolescents and younger adults for the treatment of various types of obsessions/compulsions for people with Obsessive-Compulsive Disorders (OCD). The authors present a preliminary evaluation of the game by a small group of experts, which provided promising results on the feasibility of VR interventions for OCD in clinical practice.

In the following contribution, “Immersive Technologies for Vestibular Rehabilitation: Comparing Solutions for Clinical and Home Use”, Bruno Ferreira et al., presents the development of Virtual Reality Serious Games aimed at increasing motivation in patients with loss of vestibular function, specifically during telerehabilitation using a prescribed set of exercises. The authors performed a preliminary evaluation using a smartphone-based set and a standalone head-mounted display to compare the users' experiences.

The contribution “Knowledge-Based Generation of Plausible Air Quality Maps in the Absence of Sensor Data”, from Pedro Mariano et al., focuses on monitoring air pollution sources related to Industrialization. In this sense, the paper introduces a new graphical tool that draws on a new source of information: expert knowledge of air pollution sources. The usability and feasibility of the proposed tool have been tested with several users, including some environmental experts, showing itself as a promising complement to sensor-based mapping approaches.

A SHORT INTRODUCTION TO THE REGULAR PIPELINE ARTICLES

In “Smart Fruit Basket: Towards Multi-View Fruit Recognition”, Pulkit Narwal and Ipsita Pattnaik discuss smart retailing solutions with a special focus on self-checkout stores. The authors propose an intelligent basket to facilitate a self-checkout mechanism for fruits and vegetables based on multi-view image recognition and a weight sensor. The user places fruits inside the basket, and multiple

cameras are installed to provide different views inside the basket and capture this fruit-placing activity. Different views are then processed for image recognition.

Finally, in “Perception of Clients Towards the 2D and 3D Types of Design Presentation of the Projects in Interior Design”, Sucheta Nigam and Vibha Kapoor bring interior design and novel ideas to approach clients effectively. The authors present a study investigating a method for perceiving and persuading clients to accept a creative idea without wasting time by exploring mixed approaches based on 2D and 3D. The designers and institutes can use the study’s outcomes to focus on this skill.

We hope this selection of articles can promote functional and playful reading moments about current and future technological developments, computer graphics, science and arts in different parts of our world, from Brazil, India, Portugal, Macao and Mainland China.

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