GHItaly18: Game-Human Interaction in research

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ABSTRACT

The 2nd Workshop on Games-Human Interaction (GHItaly18), held jointly with AVI 2018 (International Working Conference on Advanced Visual Interfaces), maintained its original spirit. Its aim was twofold. The first goal was to offer a common ground for scholars and practitioners either working on the topic or interested in approaching it. The second, long term goal was to establish a meeting venue to be held on a regular basis for researchers in a field that is still too underestimated in Italy, and that still presents high fragmentation also at international level. Of course, the intended scope of the workshop is not limited to a national event. Rather, the hope is to extend the international participation, to support wider collaboration in research activities and projects.

GHItaly18 extended the scope of GHItaly17 (held in conjunction with CHItaly17 in Cagliari) by focusing on the aspects related to the design and development of visual interfaces, a highly relevant issue for creating an engaging and satisfactory user experience in deeply multidimensional artefacts such as video games. Moreover, as for the former edition, the application range of video games that the workshop invited to explore had to be intended in its broadest sense: both entertainment and applied finalities.

Author Keywords

HCI; Game design; Level design; Human Computer Interaction applied to visual interfaces; Adaptive and Context-Aware Interfaces; Agency of objects; Artificial intelligence; Biometric measures for interaction; Critical or meaningful play experience; Distributed and Online systems; Full-body Interaction; Gamification; Immersive VR systems; Information Visualization; Interaction Design Tools; Interfaces for Social Interaction and Cooperation Motion-based Interaction; Moral choices; Multimodal and (Multi)Sensory Interfaces; Sensemaking; Player experience; storytelling; Usability and Accessibility.

ACM Classification Keywords

• **Human-centered computing** → Human computer interaction (HCI) • **Human-centered computing** → Interaction design • **Human-centered computing** → Graphical user interfaces • **Social and professional topics** → User characteristics • **Applied computing** → Arts and humanities • **Software and its engineering** → Interactive games • **Information systems** → Massively multiplayer online games • **Computing methodologies** → Artificial intelligence

INTRODUCTION

Video games design and development is a fascinating field, that represents a meeting point for very different disciplines, such as computer science, math, computer graphics, music, physics, industrial design, literature, history, economy, visual arts, semiotics, psychology and neurophysiology, etc. In practice, its foundations embrace both scientific research and humanities. Hence, its improvement can benefit from the advancements in the research of all these areas. Furthermore, video games represent a growing industrial field, whose revenues, impact on the job market and effect on people's everyday life has grown at a skyrocketing pace. One of the reasons is that video games are extending their scope from pure amusement to an increasing variety of applications, from learning to rehabilitation. In this panorama, Italy was – and still is – a quite "weird" phenomenon, since, as stated in [1], "[…] though resulting among the first consumers in Western countries, its investments and resources devoted to games production are quite irrelevant". Since a bunch of years this situation has – slowly – started to change, both at the academic and industrial level. And this quiet revolution reached to the point of introducing very specific classes about video game design and development in the master science degree in computer science in at least one Italian university. In any case, the field still presents a high fragmentation at international level too. As a matter of fact, at the moment, the research in the field of video games is scattered through many different and separated disciplinary

areas. Since its first edition [2], the GHItaly workshop aimed at trying to bridge this cultural gap and establishing a common ground on the topic and a crossroads for related research. Arisen from the consonance among Game Studies, Game Design and Human Computer Interaction, the GHItaly workshop series is a deliberate attempt to provoke debate, creating a space of interdisciplinary dialogue and exchange. In particular, it welcomes and encourages the presence of different and complementary perspectives. The peculiar focus of this edition has been to point special attention on the user experience from the perspective of the design and development of visual interfaces, which are of paramount importance for an artifact whose purpose is to entertain and elicit fun [3, 4, 5, 6]. We hope that the meaningful discussion and exchanges of ideas that occurred during the meeting will nurture and inspire new more holistic and informed ways of researching, teaching, and working on the design and development of video games.

GHITALY18 CONTRIBUTIONS
The workshop discussion has benefited from the enlightening keynote intervention "Collaborative Editing in the Cloud - First Steps and Challenges Ahead" by Prof. Fabio Pellacini (Sapienza Università di Roma – Italy), who discussed how to design and implement prototypes that allow seamless collaboration for editing meshes and game levels, and the challenges in developing these types of systems and underlying architectures. This approach could represent the basis for a huge leap in the way of distributing and coordinating development tasks not only in the video game industry, but also in its older sister discipline: visual effects development for cinema and TV.

The remaining contributions collected by GHItaly18 can be grouped into three main areas: "assessing player experience in VR", "interface design impact on user experience" and "applied games and gamification".

The first area includes papers that especially focused on how and to what extent the introduction of *Virtual Reality-based interfaces* could affect the experience of the user. Research in this area is highly relevant, due to the rampaging diffusion of VR-based devices and their related applications (mainly video games). Such applications too often seem to have been developed mainly to emphasize the opportunities offered by the technology, rather than to effectively entertain and amuse the player. Two synergic contributions dug into the aspects related to the definition of standardized approaches to evaluate the user experience in VR-enhanced environments. In particular, Norman, in its work "Evaluation of Virtual Reality Games: Simulator Sickness and Human Factors" [7] tackled the problem of assessing which are the appropriate drivers of discomfort to measure the impact of playing a game in VR; the scope of this work has been to define and validate a standardized questionnaire to evaluate the (negative) impact of VR on the gaming experience. In a similar vein, Barricelli et al., in

their paper titled "Semiotic Framework for Virtual Reality Usability and UX Evaluation: a Pilot Study" [8] presented a pilot study aimed at validating the Semiotic Framework for Virtual Reality (VR) usability and user experience evaluation (UX). The framework offers a theoretical model for VR applications classification, together with a combination of evaluation methods and a study protocol to be used for testing usability and UX in the VR field.

The second group of works has dealt with the impact of the *user interface design* on the player experience. This topic is extremely relevant in the field of video games, since the interface is the media through which the players interact with this special form of art that is intended to entertain them. The common point of the works presented at the workshop, explored from different angulations, has been to investigate at what extent the endeavor to take the quality of user experience into account in designing a game user interface can affect how the player enjoys the overall gaming activity. Following the outcomes of these studies, some sort of key lines or best practices to follow when approaching this type of design are proposed. The contribution titled "The impact of user interfaces for the enhancement of narrative elements of a video game" by Bellini [8], a researcher with a background in humanities, aimed at shedding some light on the impact of the interface on the narrative elements of a video game. Actually, user interfaces are substantial parts of the gamer's experience. They do not only show useful information to the player: they can also be used to enhance storytelling; hence their design should also rely on a sufficient awareness of issues related to the narrative theory. A slightly different perspective was that adopted by Mariani and Mattiassi in the work "Things from Another World. VR, UI and UX through Run of Mydan" [10]. The authors focused their attention on the user experience in VR-based games, putting a special accent on how an effective diegetic interface facilitates the player in effortlessly understanding the virtual world and in reaching the complete immersion in the game world.

The growing diffusion of video games focused on the mere entertainment, and the related designing techniques, also impact on both the development of games aimed at less "frivolous" ends, and on the production processes of neighboring sectors. The last, more numerically consistent, group of works concentrated on issues concerning the so-called *applied games* (that is to say, video games whose main aim is not necessarily the entertainment, such as educational games, exergames, and the like) and/or on *the use of games-related technologies in other fields*. Celata et al. in the work "G.E.M.I.X.: Game Engine Movie Interaction eXperience" [11] tackled the technical convergence of the movie and gaming industries. They described the design and implementation of a tool for the interactive production of previsualizations, implemented as an extension of the Unreal 4 game engine. The previsualization step of the movie production pipeline helps

to visually evaluate the potentiality of a scene before its final production, hence it has a crucial importance in the productive process. Nonetheless, the current state-of-the-art approaches require that each time a change or an edit needs to be done on a scene, this has to be rendered again in order to be evaluated by the movie or commercial director. This implies frequent waste of time and potential very long useless interruptions introduced in the process. Hence, the adoption of tools optimized for the real-time rendering, such as game engines, could be of great help, if appropriately personalized to suit the needs of the movie sector. A totally different perspective is that assumed by Liberti et al. in "EmoBrain: Playing with Emotions in the Target" [12], whose purpose has been to implement a platform able to recognize and employ human emotions during an interactive game. The EmoBrain Interface (EI), which has been used in the context of a serious game, aims at allowing players to manage their own emotional state. In particular, the EI exploits a cycle of stimulus and feedbacks: the users receive a visual input and complete their tasks, just controlling their emotional state by activating self-training. Another interesting work has tackled the topic of offering some partial solution to the growing problem of the long-term care needed by the increasingly ageing of western population. Among the many problems deriving from this disequilibrium in the distribution of the age groups, there is the necessity to support seniors in their everyday physical exercises. The work "Creation of Physiatric Exercises for Remote Use in Rehabilitation Exergames" presented by Maggiorini et al. [13] tried to define a viable solution to design and propose physiatry exercises from a remote location, hence broadening the number of patients that could benefit from the cares of a physiatrist. The tool presented in the paper gives the possibility to tailor exergames on the specific needs of each patient and to monitor them in an automated way by exploiting the technologies that have been developed so far for gaming purposes. The final goal of the work was to increase the quality of the therapy and to shorten the recovery time of seniors. Last but not least, Knutas and Hynninen, in "The Impact of Gamification on Socio-technical Communities: A Case for Network Analysis" [14], analyzed the perspective of the so-called gamification and examined its impact on users. They underlined that, in multi-user socio-technical environments, the benefits produced by gamifying tasks can be quantified in terms of interactions between users. To sustain their thesis, they presented a case in which social network analysis has been exploited to analyze the impact of gamification, demonstrating how it can support the evaluation of the impact of gamification at community level. In particular, the demonstration uses an example of how interaction data from a gamified system is contrasted with a non-gamified environment using descriptive network statistics and network analysis -based hypothesis testing.

CONCLUSION

Video game design and development is a technically and culturally rich area, which not only involves issues from different other research fields, but that can also inform the research conducted in neighboring areas, whose cross-fertilization can produce benefits affecting both academic and industrial worlds. Hence, as clearly emerged from the works presented at GHItaly18, this field is fascinating for both researchers and practitioners. Moreover, improvements in the techniques, approaches and inter-cultural connections adopted in the field of game design and development can result in an improved experience for the final users, being them people playing just for fun or for more serious reasons. Therefore, as already observed regarding the previous edition of the workshop, the inherent complexity of video games can spur different investigations with its rich set of interconnected facets. These investigations can tackle either general aspects (such as design strategies and techniques), game aspects (like playability and engagement), and user evaluation, as well as specific application contexts (as in the case of applied games). Albeit their diversity, each contribution presented at the workshop challenged the idea that games are artefacts by far more complex and cross-disciplinary than it could be imagined from a superficial analysis. Moreover, their fruition and the impact they have on the media through which they are used has deep implications from the point of view of the experience lived by the player: they can no longer be classified as only "simple" software applications aimed at producing mere fun and just-in-time amusement. Hence a more frequent, intense and fruitful exchange among the different disciplines involved should take place, as we hope this will happen in the next future.

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