PROCEEDINGS

OF THE 18TH INTERNATIONAL CONFERENCE ON THE FOUNDATIONS OF DIGITAL GAMES

FDG 2023

Lisbon, Portugal
April 11-14, 2023

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Filipe Luz, Lusófona University
Antonios Liapis, University of Malta
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Editors

Organized by the Society for the Advancement of the Science of Digital Games in cooperation with ACM & ACM SIGGRAPH, SIGAI, SIGCHI

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Foreword

Welcome to Lisbon! It is with great pleasure that we welcome you to the 2023 International Conference on the Foundations of Digital Games (FDG'23). FDG takes pride in being an interdisciplinary conference exploring the present, past and future of digital game research from design and technology to game studies and artificial intelligence. This provides the perfect milieu for academic discussion, collaborations and interdisciplinary research opportunities.

This year FDG'23 will take place in Lisbon, Portugal one of the western-most countries of Europe, where one might gaze at the vastness that is the Atlantic ocean from one of the multiple vistas spread around town or get lost in the labyrinth that is the "old town". If attending the conference from the comfort of your chair at home (or work), a live stream of all talks and keynotes will be provided in addition to the official FDG'23 Discord allowing everyone to be part of the discussion even if afar.

The theme for FDG'23 is "New Beginnings". The world just recently came out of a global pandemic and still continues to face mounting crises and uncertainties. More than ever, digital games need to contribute to bringing cultures and generations together. It is also about challenging the *status quo*, such as current practices in user studies, game technology, game design and evaluation, reaching deeper understandings of user experiences, and fostering better representation and inclusivity in playable media. Unprecedented from previous iterations of FDG, this year the conference takes place in Spring, rather than the original Summer and Fall timeline. This change marks a purposeful shift for the conference serving as a stepping stone to bolster opportunities for authors within the field by reducing the amount of overlapping events that commonly tends to occur with the old timeline.

A total of 101 submissions were received for the full paper research tracks, with an overall acceptance rate of 38.6% (39 papers were accepted). This goes in line with the previous iterations of the FDG conference. The short paper track received a total of 38 submissions, with 18 acceptances (a rate of approx. 47.4%). FDG'23 is also hosting six different workshops, five of which have papers published in these proceedings. Workshops include regulars such as the *Procedural Content Generation* and *Tabletop* Workshops, which have been consistently running at FDG for the last few years, while the *Academic Game Development* workshop is also returning since its debut last year. Debut workshops include: *Combating Toxicity, Hate, and Harassment in Online Games*, *Eduaimonia in Digital Games* and *Human-AI Interaction Through Play*. FDG'23 also includes four keynotes, one panel, six demos and four presentations at the Doctoral Consortium.

To conclude, we would like to thank the authors, reviewers, invited speakers, chairs and administrative staff at ACM and TAPS for ensuring the quality of FDG'23. Furthermore, we want to especially thank this year's sponsors, Microsoft and FilmEU, for their support in organizing the event. We look forward to an engaging and fruitful FDG conference.

Phil Lopes & Filipe Luz, General Chairs
Antonios Liapis & Henrik Engström, Program Chairs

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Keynotes

Xalavier Nelson Jr.

Xalavier Nelson Jr. is a BAFTA-nominated studio head, narrative director, and writer, with dozens of titles under his belt including Reigns: Beyond, Hypnospace Outlaw, An Airport for Aliens Currently Run by Dogs, Space Warlord Organ Trading Simulator, and El Paso, Elsewhere. He also makes strides in a burgeoning storytelling career outside of games, with releases such as the cult hit comic Sherlock Holmes Hunts the Moth Man.

Kaitlyn Jones

Kaitlyn Jones is a Program Manager on Xbox's Gaming Accessibility Team at Microsoft, Doctor of Occupational Therapy, an Director of Clinical Outreach for the accessible gaming non-profit organization Warfighter Engaged. Her primary roles at Microsoft include driving accessibility initiatives across Xbox hardware and platform programs and creating accessibility resources for game developers including the award-winning Microsoft Gaming Fundamentals Training and recent updates to the Xbox Accessibility Guidelines. Kaitlyn is a life-long gamer and passionate advocate for the creation of accessible solutions within all mainstream technologies.

Holly Nielsen

Holly Nielsen is a historian, writer, and narrative designer based in London. She is currently completing her PhD at Royal Holloway, University of London. Her thesis is titled 'British Board Games and the Ludic Imagination, c.1860-1960'. Alongside her academic work Holly does writing and narrative design for video games. Before pivoting to academia and games, Holly was a journalist and arts critic, with bylines including The Guardian, The New Statesman, and Vice, among others.

Rémy Devaux

Rémy Devaux solo creator of small games since 2016, and developer of their own game engine SUGAR since 2018. In 2021 they founded PUNKCAKE Délicieux along with fellow Pico-8 enjoyer Benjamin Soulé and chiptune extraordinaire Pentadrangle. The studio's goal is to make a new game every month, constantly exploring new ideas while also delivering well-crafted experiences. Remy makes some of the games but also does engine upkeep and marketing for all the games.

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☆: Best Paper ◆: Honorable Mention

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Workshop on Tabletop Games

The aim of the 5th workshop on Tabletop Games is to address ways in which academics can apply their tools to the discussion of analog games; this includes but is not limited to board games, war games, tabletop role-playing, collectible card games and other miniature games. The workshop also aims to highlight the connections between analog and digital games, either approaching the prototyping and playtesting aspects or exploring the hybrid dimension of games directly influenced by the analog dimension.

Organizers:

Micael Sousa, Hamna Aslam, Akrivi Katifori, Joseph Alexander Brown and Antonios Liapis

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by Lori Kougioumtzian, Christos Lougiakis, and Akrivi Katifori

Computer Aided Content Generation – A Gloomhaven Case Study Article 61
by Kristian Tijben and Marcus Gerhold

Historical Reality vs Anachronistic Fantasy: The History Educators' Perspective on Tabletop RPGs Article 62
by Dimitra Petousi, Akrivi Katifori, Maria Roussou, Yannis Ioannidis, and Pantelis Sakellariadis

"It Has to Ignite Their Creativity": Opportunities for Generative Tools for Game Masters Article 63
by Kevin Tang, Terra Mae Gasque, Rachel Donley, and Anne Sullivan

Workshop on Combating Toxicity, Hate, and Harassment in Online Games

While online multiplayer games are great in many ways (e.g., supporting social connectedness), they are also platforms on which players can experience or witness toxicity, hate, and harassment. These behaviours are potentially harmful for players and ubiquitous in many games, despite substantial work on combating them. In this workshop, we want to bring together researchers from different backgrounds to build a community, identify current challenges, imagine potential solutions, and foster collaborations aiming to help combat toxicity, hate, and harassment in online games.

Organizers:

Julian Frommel, Regan Mandryk, Alessandro Canossa, Bastian Kordyaka, Yubo Kou, Rachel Kowert and Selen Turkay

Workshop on Procedural Content Generation

Procedural Content Generation (PCG) attracts significant interest from both academia and the games industry where it has been researched and used extensively. PCG has the potential of substantially reducing the authorial burden in game creation, improving the theoretical understanding of game design and realizing its automation, and enabling entirely new forms of games and playable experiences.

This workshop aims to advance knowledge in PCG by bringing together researchers and developers, and facilitating discussion on practices, opportunities, and challenges within the field. Likewise, one of the aims is to help bridge the gap between academia and industry by giving space to both to present, discuss, and engage in fruitful dialogue. To support these goals, this year we provide multiple submission possibilities: full/short length paper submissions, short position papers, and demonstrations of ongoing projects. Besides these submissions, this year we also support and encourage participants to submit early research ideas and work-in-progress in the form of extended abstracts to be presented and discussed as lightning pitches to get feedback and foster collaboration.

Organizers:

Alberto Alvarez, Bahar Bateni and Diogo Rato

Papers

Sturgeon-MKIII: Simultaneous Level and Example Playthrough Generation via Constraint Satisfaction with Tile Rewrite Rules Article 64
by Seth Cooper

Lode Enhancer: Level Co-Creation through Scaling Article 65
by Debosmita Bhaumik, Julian Togelius, Georgios N. Yannakakis, and Ahmed Khalifa

"That Darned Sandstorm": A Study of Procedural Generation through Archaeological Storytelling Article 66
by Florence Smith Nicholls and Michael Cook

Interactive Latent Variable Evolution for the Generation of Minecraft Structures Article 67
by Tim Merino, M Charity, and Julian Togelius

Hierarchical Semantic Wave Function Collapse Article 68
by Shaad Alaka and Rafael Bidarra

Re-Trainable Procedural Level Generation via Machine Learning (RT-PLGML) as Game Mechanic Article 69
by Seth Cooper, Emily Halina, Jichen Zhu, and Matthew Guzdial

Level Generation through Large Language Models Article 70
by Graham Todd, Sam Earle, Muhammad Umair Nasir, Michael Cerny Green, and Julian Togelius

Conceptual Art Made Real: Why Procedural Content Generation is Impossible Article 71
by Isaac Karth and Kate Compton

"Generator's Haunted": A Brief, Spooky Account of Hauntological Effects in the Player Experience of Procedural Generation Article 72
by Max Kreminski

Academic Game Development – Professionalizing the creation of video games for research purposes

Game design and development for research purposes have been growing in importance. Such ""academic games"" are applied games that are created in an academic context. They may involve education, training, support understanding of human behavior, data gathering, or AI training, to name some examples.

Academic game development involves different constraints and opportunities compared to commercial game development. However, there is a lack of published discourse on the idiosyncrasies that accompany academic game development.

The 'AcaDev' workshop provides a venue for sharing experiences and best practices for academic game development and expanding publications on that topic. Join us for a day of getting into the weeds of academic game development and shaping the discourse surrounding it.

Organizers:

Marcello A. Gómez Maureira, Giulio, Barbero, Isabelle Kniestedt, Pedro Neves, Carla Sousa, Arianna Boldi and Mike Preuss

Paper

Promotypes – Prototyping Games for a University Game Production Pipeline Article 73
by Edward Morrell, Annakaisa Kultima, Ylva Grufstedt, and Tomi Kauppinen

Workshop on Eudaimonia in Digital Games

The concept of eudaimonia in the study of video games has been the subject of increasing interest in recent years, especially as juxtaposed to the idea of hedonia which is often assumed as lying at the heart of most video game play experiences. However, there is a lack of consensus on what eudaimonia exactly is, how it manifests in the player experience, and what effect it could have on the emotional experience of game play.

This workshop seeks to bring together researchers from across a broad range of games research fields, such as those represented at FDG. We will discuss this emerging and important concept and potentially create a cross-disciplinary research agenda for delving deeper into how this foundational concept of wellbeing can be applied within the field of digital games.

Organizers:

Tom Cole, Alena Denisova and Jo Iacovides

Workshop on Human-AI Interaction Through Play

Human-AI Interaction is a rapidly growing research area. As Artificial Intelligence (AI) and machine learning (ML) increasingly take over tasks previously performed only by humans, it leads to more situations where humans and machines need to cooperate. In this work, we explore questions around human-AI interaction and cooperation through play. For example, how to design playful interactions that facilitate human-AI teams? Can affects associated with gameplay be used to guide human-AI collaboration? How do we design gameplay where multiple AIs and multiple players interact with one another? In addition to paper presentations, workshop attendees will participate in group discussions and idea formulation.

Organizers:

Jichen Zhu, Mike Preuss, Antonios Liapis, Casper Harteveld, Alena Denisova, Seth Cooper and Guillaume Chanel

Papers

Towards a Human-in-the-Loop System for Authoring Game AI using Behavior Languages Article 74
by Erica Kleinman, Spencer Lynn, Bryan Loyall, and Magy Seif El-Nasr

Designing for Playfulness in Human-AI Authoring Tools Article 75
by Antonios Liapis, Christian Guckelsberger, Jichen Zhu, Casper Harteveld, Simone Kriglstein, Alena Denisova, Jeremy Gow, and Mike Preuss

Playing with Dezgo: Adapting Human-AI Interaction to the Context of Play Article 76
by Jennifer Villareale, Gabriele Cimolino, and Daniel Gomme

Speculative Game Design of Asymmetric Cooperative Games to Study Human-Machine Teaming Article 77
by Erik Harpstead, Kimberly Stowers, Lane Lawley, Qiao Zhang, and Christopher MacLellan

Towards Computational Support with Language Models for TTRPG Game Masters Article 78
by Jack Kelly, Michael Mateas, and Noah Wardrip-Fruin

Panels

Research-Creation of Alternative Controller Games

This panel addresses the emergent field of alternative controller game design in the context of academic research. Alternative controllers are a mix of custom-created devices and / or re-appropriations of conventional input and feedback devices for novel interactions. In this paper, five practice-based researchers address topics and problems inherent to the relationship between alternative controller games and their field of research. Tatiana Vilela dos Santos, is a researcher in alternative controller game design at the University of Lorraine focuses on the specifics of alternative controller game design as opposed to traditional game design. Enric Llagostera, researcher at Concordia University focuses on alternative controller game design as a political practice. Edward Melcer, researcher and professor at the University of California, Santa Cruz, focuses on the educational aspect of alternative controllers. Mona Bozdog, researcher and lecturer in immersive experience design at Abertay University focuses on accessibility issues raised and solved by alternative controller games. Lynn Love, researcher and lecturer in computer arts at Abertay University focuses on the socialisation made possible thanks to alternative controller games.

Members:

Tatiana Vilela dos Santos, Enric Llagostera, Edward Melcer, Mona Bozdog, Lynn Love

Games and Demos

Space Adventure
by José Carlos Neves, Conceição Costa, Andreas Melo, Fernando Soares, João Frade, Carlos Santos, Lília Marcelino and Guilherme Saturno.

Abstract

"Space Adventure: defend the planet!" is a research-based game aimed at supporting a more inclusive education in primary maths for deaf and hard of hearing (DHH) students, as well as to their hearing peers.

In Space Adventure the player controls the Commander, a character in charge of building a space base on another planet. In order to obtain the necessary resources, the player must first build the production plants and then solve challenges inside each of those. By doing that, the player is able to build new production plants and upgrade the existing ones, increasing the resource output. In each production plant one or two mathematical competencies can be improved and, by repeating the necessary actions to obtain the required number of resources, the player develops mathematical dexterity in those areas. Real-time feed-back guides the player through the learning activities, which are integrated intrinsically on the playability. The player uses math skills to solve challenges that emerge organically from the game world and is rewarded with resources that allow progression through the game challenges, as well in acquiring more complex math knowledge. In Space Adventure failure is an opportunity to play again, therefore, to learn.

Baked Burger Bash: A Serious Virtual Reality Game Informing about Effects of Acute Cannabinoid Intoxication
by Anne Vetter, Johannes Büttner and Sebastian von Mammen

Abstract

This paper presents Baked Burger Bash, a serious game that aims to enhance a drug prevention program for adolescents using virtual reality (VR). The game is based on a simulation of acute cannabinoid intoxication embedded in an interactive cooking game. The player takes on the role of a food truck chef who needs to serve up the orders of passers-by. Various effects of the intoxication make it hard to live up to the customers' expectations. In this paper, we provide the scientific background and feedback by drug prevention experts who have motivated and accompanied the project, that have informed the game's concept and its iterative development.

Playful Experiences Through ALT+CTRL Games
by Pedro Fernandes, João Cabral and Filipe Luz

Abstract

This research aims to demonstrate that redesigning game display and control devices can provide new play experiences to a developed digital game. Adapting the well-known video game Pong (Atari, 1972) through an alternative rendering interface, this work seeks to explore different gameplay experiences, which resulted in a peculiar version of the game Pong, the HexPong (2022).

The creative possibilities of game designing alternative controller games (alt.ctrl games) can transform the player experience. Thus, this work was oriented to increasing Pong's playfulness, and enhancing the creative possibilities for game design.

Village Druid: Modular Narrative and Dynamic Difficulty Adjustment for Rehabilitation
by Pedro M. A. Fernandes, Pedro Neves, Phil Lopes, Micaela Fonseca, Filipe Pinto, Inês Palmeira and Filipe Luz

Abstract

Village Druid is a virtual reality game for rehabilitation developed as part of the PlayersAll project. In PlayersAll, the objective is to explore how designing a game that treats the patients as players can impact their investment in inherently repetitive rehabilitation treatment. Village Druid seeks to solve these issues by implementing a fantasy narrative that effectively contextualizes the exercises associated with rehabilitation therapy, and by implementing dynamic difficulty adjustment (DDA) mechanics that control the evolution of challenge in the game - adapting it to the player. The game then explores how these systems can be implemented in a format that allows for the adaptation of its content to the variable number of sessions players' may undertake as part of their treatments. Testing done with the prototype has shown that the fantastic context given to the player's actions generates excitement and the partial implementation of the DDA system makes the game more accessible to players. Future work on the prototype would see the implementation of the modular narrative system and further development of the DDA system.

NoFold: A web/VR Hybrid Platform for Board Game Creators
by Christos Lougiakis, Lori Kougioumtzian and Giorgos Ganias

Abstract

Board game creators face several challenges when developing a physical board game, mostly related to the playtesting phase. Existing digital tools offer possible solutions by allowing remote testing; however, they introduce new issues, due to the limited possibilities to support direct user interaction, communication and social cues. NoFold as an immersive VR application aims to address these challenges by employing the VR medium at the playtesting phase and supporting the interactive manipulation of virtual game components. Coupled with a web platform for the management and design of these components, it offers board game designers new opportunities to design and playtest their games. The application is currently at an early prototype stage, ready to undergo further testing to inform the next steps of design and development.

BabelAR: A collaborative multilingual game for any classroom
by Wim Forceville, Joana Duarte and Thomas Meynen

Abstract

The Virtual Language App, in short VirtuLApp, is a 3-year Erasmus+ Key Action 2 Strategic Partnership project 2019-2022. It aimed at developing an innovative multididactic approach which teachers can use in the classroom in any (multilingual) situation. The needs of teachers - more knowledge about and tools for multilingual education, integration of migrant languages and lesser language separation- will be addressed with the development of a multi-player augmented reality app 'Babelar' about multilingual education and the development of a toolkit with video-based documentation of best-practices of schools already using the heteroglossic approach in the classroom.

Doctoral Consortium

Creating Group Profiles to Enhance Player Experience in Table Top Role-Playing Games

by Ana Pinha, Phil Lopes and Micaela Fonseca

Abstract

Tabletop Role-Playing Games (TTRPG) offer a unique way of experiencing stories and adventures through collaborative storytelling, where creativity and imagination influence the world in which a narrative takes place. Profiling players is quite a common topic when dealing with digital and tabletop games, but a question remains on its applicability for TTRPGs. We propose to generate group profiles, from individual player profiles, which can be used to suggest or adapt game content in a TTRPG setting. When attempting to collect data from such situations, several problems arise, such as what factors are relevant for TTRPG profiling, how we can efficiently collect such data, and whether such models have any value for the players themselves. As such, we intend to compare levels of player satisfaction with the different types of profiles. We predict the results may be applied to preexisting or future tools and recommendation systems.

Player Experience in Exergames with Dynamic Difficulty Adjustment

by Sittikrai Chorrojprasert, Alena Denisova and Ben Kirman

Abstract

A challenge is widely adopted in exergames to motivate players to have physical activity while they are playing the games. However, a one-size-fits-all approach for designing exergames might not be suitable because individual players have different play skills and fitness. Therefore, a dynamic difficulty adjustment (DDA) is utilised to automatically adjust demands and difficulties in an exergame to be suitable for a player. To develop DDA functions in exergames, there are 2 methods commonly used. The first one is a performance-based DDA using in-game performance data (e.g. success rates) with algorithms for changing difficulty levels. The second method is an exercise intensity-based DDA using physiological data (e.g. heart rates) from a player. This research aims to examine how both DDA methods affect player experience (PX). This research will contribute to understanding the effects of DDA on PX and this understanding will be useful for designing and developing DDA in exergames that could promote the motivation of players.

Certified Synthesis for Interactive Media: High Assurance Metroidvania Generation
by Ross Mawhorter

Abstract

Automatically generating level designs for videogames is a complex task, and existing generation techniques can produce levels that are unplayable. While there are ways of detecting and mitigating these flaws, those methods have problems scaling up to the generation of entire game worlds. In my research, I will extend techniques from the field of formal methods in order to synthesize level designs that provably have user-defined playability properties. This research will handle verification over faulty abstractions, and improve the ecological validity of procedural content generation research.

Challenging Assumptions and Fostering Reflection in Physical Puzzle Games
by Rachel Donley

Abstract

This Doctoral Consortium paper outlines PhD work towards designing physical puzzle games that challenge player's assumptions to support teaching social justice concepts and develop methods of reflection to strengthen and retain learning for players beyond the game.