Curiosity in Games: An Interdisciplinary Workshop

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ABSTRACT

Curiosity is emerging as an important source of gameplay engagement and enjoyment. While there is rich and growing work on human and computational curiosity across fields, there is little multidisciplinary dialogue on curiosity and how to design for it in games, manually or computationally. This one-day workshop therefore convenes HCI, design, and AI researchers to establish and advance the state of the art in curiosity in games.

CCS CONCEPTS

• **Applied computing** → **Computer Games** • *Human-centered computing* → *Human computer interaction (HCI)* • *Computing methodologies* → *Intelligent agents*

KEYWORDS

Curiosity; interest; novelty; uncertainty; intrinsic motivation; game AI; game user experience; game design

1 BACKGROUND

Games research is becoming curious about curiosity – an intrinsic motivation driving exploratory behavior, accompanied by the emotional experience of interest [10]. An increasing number of human-computer interaction (HCI) studies are suggesting that curiosity is a distinct and important source of gameplay engagement and enjoyment, urging us to better understand novelty, uncertainty, complexity, and other game features affording it [1–3,6,9]. Game design researchers have begun to develop and test explicit design models and tools for affording curiosity in gameplay [11,12], following in the footsteps of general HCI researchers [4].

A further active strand of curiosity research can be found in game artificial intelligence (AI). Here, researchers are using and creating computational formalizations such as artificial curiosity, novelty detection, or intrinsically motivated reinforcement learning to model players and predict player experience [14], create effective and enjoyable non-player characters [7,8], procedurally generate interesting game content [5,13,16], or improve general game-playing AI [18].

Despite this overlapping interest, there has been to date little exchange between HCI, design, and AI researchers working on curiosity. This is all the more surprising as psychological studies of human curiosity have long informed computational curiosity models [15]. As in other areas of cognitive psychology, computational formalizations could in turn advance design and psychological theories by translating them into readily testable models. And with their access to potentially large online populations generating big datasets, games provide an ideal petri dish to test psychological models, identify and validate related design features and patterns, and merge these into data-driven design support and content generation tools. Put differently, basic and game-related research on curiosity could be greatly advanced by interlinking HCI, design, and AI research.

2 WORKSHOP GOALS

The goal of this one-day workshop is therefore to convene researchers from game AI as well as game HCI and game design communities to assemble and advance the state of the art of games research on curiosity. By connecting communities, we wish to facilitate collaborations around questions such as:

- How can we design for player curiosity in games?
- How can we model and measure individual state and trait curiosity and interest around gameplay?
- How can computational models of curiosity, novelty search, and related AI techniques help produce more effective and enjoyable NPCs and content?
- How might computational models of curiosity inform our psychological understanding of curiosity – and vice versa?
- How might the design of curiosity-inducing games inform computational models of curiosity– and vice versa?
- How might psychological research on curiosity and game design mutually inform each other?

3 ORGANIZERS

Sebastian Deterding is a senior research fellow at the Digital Creativity Labs at the University of York. His work explores formalizing and validating models, guidelines, and tools for motivational design in and beyond games, more recently in

intelligent, data/AI-driven interfaces. He has chaired numerous workshops at CHI (2011, 2013, 2015, 2017)

Davy Smith is an interdisciplinary researcher, focusing on curiosity as a creative and exploratory process from both design and algorithmic viewpoints. A former software developer in the creative industries and current postdoc at the Digital Creativity Labs, his recent work centred on the development of intrinsically motivated algorithms in neuroevolutionary computation.

Edward J. Powley is a senior lecturer at the Games Academy and research fellow at the MetaMakers Institute at Falmouth University, researching computational creativity and artificial intelligence for games. His current work centers on mixed-initiative, systems to democratize game design and uncover novel design spaces.

Jessica Hammer is an assistant professor at the Human-Computer Interaction Institute and Entertainment Technology Center at Carnegie Mellon University. Her work combines quantitative and qualitative HCI research with game design to understand how design decision affect how players act and feel, including several publications on how to design for curiosity.

Alexandra To is a PhD student in HCI at Carnegie Mellon University. Her work [11,12] seeks to empower marginalized individuals through transformational games.

Christian Guckelsberger is a PhD student at Goldsmiths and visiting scholar at NYU's Game Innovation Lab. His work explores how formal models of intrinsic motivation can advance computational creativity in and beyond games, e.g. employed in general NPC's or the automatic prediction of player experience. He co-organised the first tutorial and co-authored a survey on intrinsic motivation in games [17].

4 WORKSHOP PLAN

4.1 Pre-Workshop

We expect to draw interest from games researchers working on AI, user experience, and design across AI, HCI, and game studies communities, and consider FDG the conference best positioned to convene all three. We will advertise the workshop and host materials at a dedicated website. To recruit participants, we will distribute a CFP through our extensive personal networks spanning said communities, social media, and relevant mailing lists. Acceptance to the workshop will be based on a juried review of short (2-5pp.) papers, aiming for relevance, quality, diversity, and complementarity of overall contributions. We aim for a total of 10-20 participants. Participants are expressly invited to bring interactive demos, and are required to read all accepted papers ahead of the workshop.

4.2 Workshop Day

Based on past workshop experiences, we aim to avoid fatigue and maximize productive discussion with decent breaks and a short workshop (10am-4pm). To prime debate, the first part will alternate thematic panels of 3-4 10 min. presentations followed by 20 min. panel discussions, drawing out intersection points of AI, HCI, and game design. Panel talks and discussion will be publicly live-streamed and video-archived afterwards. Depending on turnout, some participants may present their work as 20 min. talks or 5 min. posters. Second we will break up into small groups revolving around one of the identified intersections. A final plenum will share group results and identify follow-up plans.

4.3 Post-Workshop

Accepted papers will be published on the workshop website. Pending approval, we will edit an *IEEE Transactions on Games* special issue on curiosity in games that all accepted authors are invited to submit extended versions of their workshop papers, flanked by an open CFP. Depending on turnout, we consider re-running the workshop at future FDGs.

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