3rd Workshop on Emerging Novel Prototyping Techniques for XR

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Abstract

The 3rd Workshop on Emerging Novel Prototyping Techniques for XR (ENPT XR) emphasizes interdisciplinary collaboration in Extended Reality (XR). This paper outlines the workshop's scope and ambition, and highlights how it has evolved over three years. The growing attendance and submission quality at ENPT XR demonstrate a rising interest in emerging novel XR prototyping techniques.

Index Terms: Human-centered computing—Interaction design—Interaction design process and methods—Interface design prototyping; Computing methodologies—Computer graphics—Graphics systems and interfaces—Virtual reality

1 Introduction

Extended Reality (XR) has finally emerged as a mainstream technology. Recent advances in commercial Virtual Reality (VR) and the initiatives by big tech companies to build the "Metaverse" have significantly heightened interest in this medium. This surge has prompted designers from various disciplines to seek effective ways to communicate their concepts to technical developers and to rapidly prototype XR experiences. Furthermore, there has been an exponential increase in the utilization of new technologies, such as generative Artificial Intelligence (AI), for content creation. Such technologies have shown great promise in accelerating the design process across multiple fields.

2 About The Workshop

This workshop will bring together researchers and industry practitioners from different backgrounds to discuss the future of prototyping for VR, AR, and 3D User Interfaces, and help chart a course for the future of XR prototyping techniques. We invited authors to submit short papers on any of –but not limited to– the following topics:

- Rapid prototyping for XR experiences (AR, VR, MR)
- Rapid prototyping by novice and non-tech-savvy designers
- Prototyping for immersive storytelling
- Prototyping for Haptic/tactile feedback in XR applications
- XR hardware design and prototyping
- Repurposing of existing prototyping techniques for immersive contexts
- Novel prototyping techniques supported by custom devices/tools
- Rapid prototyping using AI tools
- Prototyping techniques or technologies/plugins/frameworks designed specifically to support novice (non-technical) users in designing/prototyping XR
- User/case studies evaluating the above topics
- Speculative design evaluating the future of the above topics

In this workshop, we seek to tie these contributions together intellectually with unifying ideas, frameworks, and theories that provide common ground for discussing, analyzing, connecting, inventing, comparing, and making predictions about emerging new prototyping techniques as well as to identify gaps or opportunities for a future research agenda. To start the discussion concretely, we will use the notion of "prototyping for XR experiences by novice/non-tech-savvy designers".

3 Objectives

The primary goal of this workshop is to foster a collaborative environment where researchers and industry practitioners from diverse backgrounds can come together to explore and shape the future of prototyping in the realms of Virtual Reality (VR), Augmented Reality (AR), and 3D User Interfaces. It aims to provide a platform for discussing the latest advances in rapid prototyping techniques for Extended Reality (XR). Additionally, it serves as a forum for sharing ideas, formulating unifying theories, and pinpointing research opportunities, establishing a community, all aimed at advancing the field of XR prototyping.

4 Workshop Questions for Discussion

- Do these prototyping techniques differ among VR, AR, MR, etc.? How? Why?
- What is common about these new prototyping techniques, and what things or ideas connect them? What differs?
- Do they vary in importance based on the application, e.g., storytelling vs healthcare app?
- Is there a next generation of prototyping techniques or just a set of disparate developments? Are they unique to XR or inspired primarily by other arts like film or fields like engineering?
- Taking prototyping for XR experiences by novice/non-tech-savvy designers as a provisional starting point, is it possible to extend, expand, support, disagree with, or modify the initial XR prototyping techniques for novice designers' framework? or introduce alternative approaches?

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- How can we predict, understand, and identify gaps in prototyping for XR experiences by novice/non-tech-savvy designers?
- Are there opportunities for new methods or tools inspired by gaps uncovered by this?

5 Keynote Speakers

In previous iterations of the workshop, we were delighted to welcome well-known senior researchers in the area –Dr. Mark Billinghurst, Dr. Michael Nebeling, and Dr. Stefanie Zollmann– as keynote speakers.

6 Workshop Format

The workshop is a hybrid event designed to accommodate those unable to attend physically and to collect as many meaningful contributions as possible in this niche subject. While offering a conventional in-person setup, the hybrid event will also feature pre-recorded presentations alongside live Q&A sessions via Zoom for remote participants.

Since its inception, the workshop has been interactive. It included paper presentations, keynote speeches, and interactive brainstorming activities utilizing a Miro board, which actively engaged the audience.

7 Target audience

This workshop is designed for a diverse group of participants, who are interested in discussing and learning the latest advancements in prototyping practices, practical applications, innovative technologies, and creative possibilities. This includes XR researchers, educators, computer science professionals, HCI and cognitive science specialists, developers, manufacturers, designers, artists, and entrepreneurs.

8 Accepted Papers

Here is a list of all accepted papers and authors of the 3rd Workshop on Emerging Novel Prototyping Techniques for XR (ENPT XR'25):

- **Prototyping by Moving for Virtual Reality** by Nicola Plant, Clarice Hilton, Carlos González Díaz, Rebecca Fiebrink, Phoenix Perry, Ruth Gibson, Bruno Martelli, and Marco Gillies
- **Mesh2SLAM in VR: A Fast Geometry-Based SLAM Framework for Rapid Prototyping in Virtual Reality Applications** by Carlos A. Pinheiro de Sousa, Heiko Hamann, and Oliver Deussen
- **Design and Development of a Tape-Type Vibrotactile Feedback System** by Carlos Paniagua, Hiroki Ota, Yutaro Hirao, Monica Perusquia-Hernandez, Hideaki Uchiyama, and Kiyoshi Kiyokawa
- **A Framework for Rapid Prototyping of Virtual Reality Training Scenarios** by Lyncon E. B. Baez, João Marcelo X. N. Teixeira, Fabiana F. F. Peres, and Claudio R. M. Mauricio
- **PM4Animal: A Scriptable Parametric Modeling Interface for Conceptual Animal Sculpture Design Using PM4VR** by Wanwan Li

9 Conclusion

Since its inaugural iteration, the workshop has aimed to be a forum for discussions on novel prototyping methods and techniques in extended reality. As the workshop enters its third year, its growing attendance and the increasing sophistication of submitted work underscore a shared dedication to solving the unique methodological, technical, and human-centered obstacles inherent in XR prototyping. The organizers look forward to welcoming participants who share a passion for advancing the boundaries of XR prototyping and contributing to a robust, inclusive community of practice.

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