Roulettective: AI Re-invention of a Vintage Slide Projector as a Tangible Detective Game

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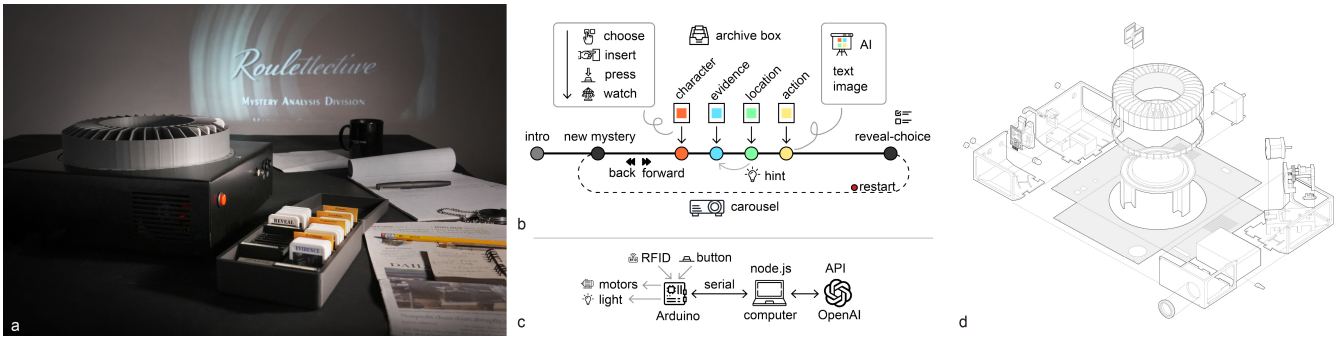

Figure 1: Diagrams of Roulettective: a: functioning photo. b: gaming sequence. c: data pipeline. d: mechanical design.

Abstract

As a Large Language Object (LLO), Roulettective is an AI-driven detective game machine that reinvents the vintage carousel slide projector as a tangible interface for immersive gaming. The project explores the projector's potential in a detective game context, creating new usage scenarios by reprogramming its physical interaction mechanisms and integrating AI-driven gameplay. It further transforms this forgotten artifact into a multimodal, immersive, customizable, intuitive, and co-creative interface through AI-generated narratives, visuals, and sound. By revisiting physical interactions lost in the shift to screen-based computing, Roulettective reframes obsolete artifacts as platforms for new multimodal AI experiences. It introduces AI reinvention as a design toolkit as a generalizable framework.

CCS Concepts

• **Computing methodologies** → **Artificial intelligence**; • **Human-centered computing** → **Human computer interaction (HCI)**.

Keywords

AI reinvention, Large Language Object, Physical AI, Affordance, Tangible Interface, AIGC, Game

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1 Introduction

Large Language Objects (LLOs) are artifacts that extend the capabilities of Large Language Models (LLMs) into the physical world, blending multimodal outputs with tangible interfaces.[4] As Coelho and Labrune note, LLOs challenge traditional notions of form and function by enabling physical artifacts to embody AI behavior that is fluid and situationally aware.[4]

Many design projects combine LLM-based software with physical objects, allowing not just augmentation but AI reinvention. AI reinvention uses obsolete artifacts as prototypes, reinterpreting their forms and mechanisms for new scenarios and contemporary needs. This design approach treats AI as an opportunity to learn from the legacy of forgotten artifacts, enabling LLOs to draw on their form, function, and symbolic meaning.

The Kodak Carousel projector, though absent from everyday life, remains ripe for reinvention due to its cultural significance and mechanical affordances. Released in 1961 and discontinued in 2004 with the rise of digital technologies,[8][15] decades of use shaped its identity as a cultural artifact. In popular culture, it appeared in Mad Men (2007), renamed "The Carousel" and framed as a metaphor for cyclical time.[18] In psychological studies, it was used to present sequential imagery from simulated crime scenes.[12][11] Its tactile mechanics and optics made it ideal for immersive narration, inspiring artists [9] to explore slide projection as a medium.[8] This blend of cultural memory and material interaction positions the projector as an ideal prototype for creating immersive tangible experiences.

Roulettective is an AI-driven detective game machine that builds on this heritage by reinventing the projector's mechanism and exploring new scenarios for the artifact. It reprograms the projector's

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buttons and card insertion functions, while an LLM dynamically generates narratives, clues, and analytical assistance. The device extends the projector's multimodal outputs—sound, image, and text—to create customized content in real time.

Roulettective responds to the legacy of computing interfaces, where rich physical interaction grammars were gradually compressed into screen-based clicks and swipes. Devices like the slide projector, once structured around embodied and sequential gestures, were replaced by software systems such as PowerPoint and generic digital displays [8]. While computing emphasized efficiency and interface convergence, AI introduces generative uncertainty and reopens space for alternative interaction paradigms. Roulettective reactivates these forgotten modalities to explore how AI might materialize through embodied, multimodal systems.

2 Related Work

Recent explorations of AI-embedded hardware have demonstrated how integrating AI functionalities into physical objects can open up novel interaction paradigms[4][7][13]. By introducing tangible interaction principles [6], these projects give AI a presence in the physical world, enabling more immersive and intuitive engagement.

Particularly relevant to Roulettective, researchers have revisited everyday artifacts—such as radios,[2] cameras,[10] and teapots[14]: integrating AI into objects still present in daily life. In contrast, Roulettective draws on a prototype that has already disappeared from everyday use.

Language-based AI models now drive personalized, real-time narration in education,[5] creative writing,[3] and gaming.[17] Detective games—from classic board games[16] to narrative video games[1]—offer interactive structures of deduction, discovery, and evolving stories. These trends show how generative AI and game logic enable engaging experiences.

Building on these strands, Roulettective explores how AI can reinvent outdated designs by combining tangible interaction, generative narration, and game mechanics, designing new LLOs based on prototypes of past artifacts.

3 Design

3.1 Gameplay Re-invention

Roulettective combines detective gameplay with physical components from vintage slide projectors, including slide cards, button-controlled carousel rotation, an indicator bulb, and a speaker. Players insert RFID-enabled cards and press the forward button to proceed. An Arduino Pro Micro detects carousel movement, card insertion, and button presses, and streams this data as JSON to a Node.js backend. The backend uses GPT-4o and DALL·E 3 to generate narrative text and images, manages memory for narrative consistency, filters image prompts, and identifies associations or contradictions. When a new association is detected, the indicator bulb pulses.

Cards are categorized as instruction, mystery, exploration, or reveal. Instruction cards provide guidance; mystery cards start new cases; exploration cards contain evidence, characters, or locations; reveal cards present five statements, one of which is false. Players can navigate forward and backward to review content. All AI-generated text and images are stored in runtime memory. AI also generates static assets such as interface graphics and printed clues, as well as dynamic illustrations and background music.

3.2 Mechanism Adaptation

Roulettective incorporates two key mechanical subsystems inspired by the carousel slide projector: a rotating carousel and a vertical slide-card channel. The carousel, driven by a NEMA-17 stepper motor and Geneva mechanism, converts continuous motion into precise, click-indexed steps, with an optical limit switch ensuring automatic reset. Reinforced mounting and calibrated slots preserve the tactile "click" essential to the gameplay ritual. The slide channel maintains the original guide-rail geometry, enabling smooth and consistent card insertion.

4 User Test

A public user test with students from diverse academic backgrounds showed that Roulettective's operation was largely intuitive. Familiarity with the physical appearance and mechanisms of traditional slide projectors enabled participants to engage with the device with minimal instruction. The mapping between physical gestures and system response was quickly understood after brief orientation.

The vintage aesthetic, tactile interactions, and multisensory feedback—such as the carousel's clicking sounds and the movement of slides—were noted as key factors contributing to immersion and a strong sense of telepresence. Participants highlighted that the AI's role in generating clues and hints added a co-creative quality, making the machine feel responsive and "alive."

Some users initially misunderstood how slide tokens mapped to AI-generated content, but adapted quickly after reading the introduction. A few participants also commented on latency in AI image generation, observing its impact on gameplay pacing but recognizing this as a technical limitation that could be improved with future AI models.

5 Discussion

Roulettective is a research project on AI reinvention that establishes a methodology for expanding AI interaction modalities. It begins by selecting a prototype from the era before current computer paradigms. The next step is research, focusing on the object's historical development, tangible interaction design, and cultural impact. Then comes repurposing, which combines the object's cultural context with AI capabilities to redesign its use scenarios and adapt its interaction mechanisms. The final step is integration, where the reinvented object is built and refined through user testing and iteration.

Roulettective reactivates tangible interactions of AI by embedding prompts into physical slides and structuring interaction through the projector's rotation and gesture-based inputs. With tangible interfaces, AI responses are rendered as tactile and visual feedback, with mechanical motion creating a direct link between user input and system output in the physical world. Through this process, the project explores how AI can support perceptible, embodied modes of engagement and reintroduce material presence into intelligent systems.

6 Conclusion

The project selected the carousel as a vintage object, analyzed its cultural connection to detective narratives, and implemented an AI-driven detective game closely tied to its original physical interactions. On one hand, the system proposes intuitive, high-affordance tangible interaction methods for AI hardware; on the other hand, it uses AI to generate personalized and unique feedback, elevating the interaction to a new level of immersion and engagement.

The project presents Roulettective not as a standalone AI hardware implementation, but as an example of a broader methodology for AI-based reinvention of obsolete artifacts, with the hope that this approach will inspire similar designs and interactions in the future.

References

[1] Capcom. 2001. Phoenix Wright: Ace Attorney. Video game. Originally released for Game Boy Advance in Japan; known as Gyakuten Saiban.

[2] Ethan Chang, Zhixing Chen, Jb Labrune, and Marcelo Coelho. 2025. Be the Beat: AI-Powered Boombox for Music Suggestion from Freestyle Dance. In *Proceedings of the Nineteenth International Conference on Tangible, Embedded, and Embodied Interaction (TEI '25)*. Association for Computing Machinery, New York, NY, USA, Article 67, 6 pages. doi:10.1145/3689050.3705995

[3] John Joon Young Chung, Wooseok Kim, Kang Min Yoo, Hwaran Lee, Eytan Adar, and Minsuk Chang. 2022. TaleBrush: Sketching Stories with Generative Pretrained Language Models. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems* (New Orleans, LA, USA) *(CHI '22)*. Association for Computing Machinery, New York, NY, USA, Article 209, 19 pages. doi:10.1145/3491102.3501819

[4] Marcelo Coelho and Jean-Baptiste Labrune. 2024. Large Language Objects: The Design of Physical AI and Generative Experiences. *Interactions* 31, 4 (June 2024), 43–48. doi:10.1145/3672534

[5] Min Fan, Xinyue Cui, Jing Hao, Renxuan Ye, Wanqing Ma, Xin Tong, and Meng Li. 2024. StoryPrompt: Exploring the Design Space of an AI-Empowered Creative Storytelling System for Elementary Children. In *Extended Abstracts of the CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) *(CHI EA '24)*. Association for Computing Machinery, New York, NY, USA, Article 303, 8 pages. doi:10.1145/3613905.3651118

[6] Hiroshi Ishii and Brygg Ullmer. 1997. Tangible bits: towards seamless interfaces between people, bits and atoms. In *Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems* (Atlanta, Georgia, USA) *(CHI '97)*. Association for Computing Machinery, New York, NY, USA, 234–241. doi:10.1145/258549.258715

[7] Quincy Kuang, Feifei Shen, Cathy Mengying Fang, and Annie Dong. 2023. Memeopoly: An AI-Powered Physical Board Game Interface for Tangible Play and Learning Art and Design. In *Companion Proceedings of the Annual Symposium on Computer-Human Interaction in Play* (Stratford, ON, Canada) *(CHI PLAY Companion '23)*. Association for Computing Machinery, New York, NY, USA, 292–297. doi:10.1145/3573382.3616057

[8] Martha Langford. 2014. When the Carousel stops turning … What shall we say about the slide show? *Intermédialités / Intermediality* 24-25 (2014). doi:10.7202/1034158ar

[9] Nicholas Loewen. 2021. *Making light: criticality and carousel projection in the work of Marcel Broodthaers and Allan Sekula.* Ph. D. Dissertation. University of British Columbia. doi:10.14288/1.0395462

[10] Rowan Page and Jian Shin See. 2025. Creative Reflections on Image-Making with Artificial Intelligence: Interactions with a Provocative 'Camera'. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI '25)*. Association for Computing Machinery, New York, NY, USA, Article 543, 16 pages. doi:10.1145/3706598.3713529

[11] John S. Shaw III. 1996. Increases in Eyewitness Confidence Resulting from Postevent Questioning. *Journal of Experimental Psychology: Applied* 2, 2 (June 1996), 126–146.

[12] John S. Shaw III, L. M. Appio, T. K. Zerr, et al. 2007. Public Eyewitness Confidence Can Be Influenced by the Presence of Other Witnesses. *Law and Human Behavior* 31, 5 (2007), 629–652. doi:10.1007/s10979-006-9080-6

[13] Haoheng Tang and Mrinalini Singha. 2024. A Mystery for You: A fact-checking game enhanced by large language models (LLMs) and a tangible interface. In *Extended Abstracts of the CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) *(CHI EA '24)*. Association for Computing Machinery, New York, NY, USA, Article 631, 5 pages. doi:10.1145/3613905.3648110

[14] Kevin Tang. 2025. gpTea. https://kvntang.com/gptea. Accessed: 2025-07-10.

[15] Jeroen Verbeeck, Lilian Haberer, Helen Westgeest, Jelena Stojković, Julian Ross, Dork Zabunyan, and Paige Sarlin. 2015. Image After Image: Reconsidering the Fabric of Slide Shows. *PhotoResearcher* 24 (October 2015). https://www.academia.edu/17426124/Image_After_Image_Reconsidering_the_Fabric_of_Slide_Shows Guest editor: Jelena Stojković.

[16] Waddingtons. 1949. Cluedo. Board game, published by Waddingtons (UK) / Parker Brothers (USA).

[17] Xiyuan Wang, Yi-Fan Cao, Junjie Xiong, Sizhe Chen, Wenxuan Li, Junjie Zhang, and Quan Li. 2025. ClueCart: Supporting Game Story Interpretation and Narrative Inference from Fragmented Clues. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI '25)*. Association for Computing Machinery, New York, NY, USA, Article 410, 26 pages. doi:10.1145/3706598.3713381

[18] Wikipedia contributors. 2024. Carousel Slide Projector. https://en.wikipedia.org/wiki/Carousel_slide_projector. Accessed July 2025.