Pocket Ink - Heaven's mandate: a hyper-individualized tangible card game platform in the Age of AI

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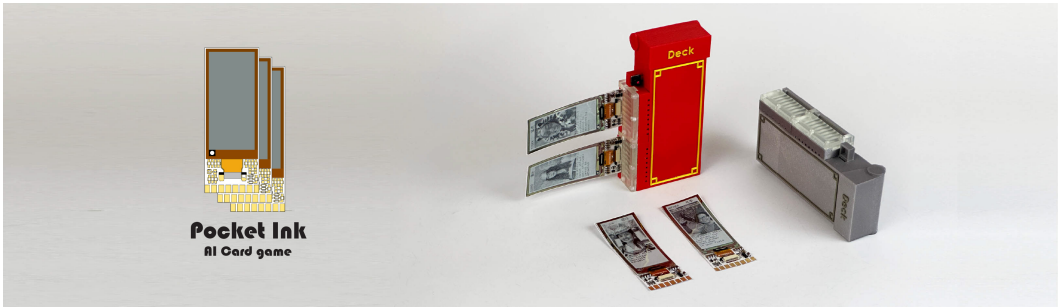

Figure 1: The Pocket ink system

1 Tangible childhood: A Touchstone of Humanity

Modern children's entertainment has shifted increasingly into the digital realm. Growing up during this transition, our team draws on our own childhood experiences of physical, social play to design systems that preserve an essential human experience: playing face-to-face with friends. We chose card games, particularly Collectible Card Games, because they nurture strategic thinking, shape personal identity, and foster in-person connection through tangible gestures like holding, trading, and slamming cards onto the table. These moments—built on touch, eye contact, shared anticipation, and the unspoken language of play, are foundational to empathy, cooperation, and emotional resilience. Yet in an era of smartphones, social media, and online gaming, such human moments are disappearing. We believe children's entertainment is not trivial; it is a cultural and developmental foundation that shapes who we become. Technology should extend physical interactions, not replace them. With the emergence of AI, we can now infuse the dynamism of computation into embodied, tangible forms. Motivated by this, we developed Pocket Ink, a card game platform that merges AI's adaptability and personalization with the tactile richness of traditional play. Using flexible e-ink displays, each card can dynamically change its content, allowing a single deck to host countless games and stories. While traditional cards are simple and affordable, they cannot match the customization and interactivity of modern digital media. Without innovation, physical play risks losing children's attention entirely. Pocket Ink counters this by embedding advanced technology into a tangible, socially engaging form—retaining the presence, haptics, and social rituals of cardboard cards while adding AI-powered personalization, evolving narratives, and adaptive play styles. By re-centering play in the physical world, we aim to preserve the face-to-face interactions, shared emotions, and cultural bonds that keep us human. We envision a generation that is not only digitally connected, but deeply connected to one another through moments of real, present, human play.

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2 How Pocket ink works through the lens of Heaven's Mandate

To demonstrate the platform, we created Heaven's Mandate, a 2–4 player dueling game where players use a physical Pocket Ink deck to transform themselves into characters of their own design. We tested this personalized version against a non-customized version with a group of friends and found that the Pocket Ink version fostered greater engagement. The ability to incorporate self-created characters encouraged inside jokes, personal references, and more dynamic gameplay. To set up the game, players first transform into characters within the game using the deck box. Each player shares a fun fact or character trait about themselves, for example, "I enjoy playing frisbee," and uploads a selfie. The multi-modal input is then used to spawn a character in the card game. The text description is analyzed by a large language model (LLM) and matched with one of the 53 predefined character profiles, such as Archer, Witch, Doctor, etc. The picture is fed into an image generation model to create a fictional portrait that both looks like the character and the player. Once the generation is finished, an empty Pocket Ink card is inserted into the station to flash the personalized character and start a unique playthrough (see figure 2).

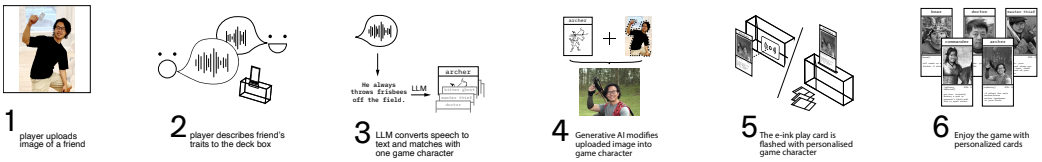

Figure 2: Interaction chart of the pocket Ink system.

3 Generative AI in the Art of Collecting and Dueling

The appeal of trading card games lies not only in strategic play, but also in the self-expression embedded in choosing and identifying with particular characters. A player's preference for a dragon over a warrior is shaped by their unique aesthetics, worldview, and personal history with that character. In this way, selecting a favorite card or deck theme becomes an act of identity, a reason why many players cherish rare cards and strive to win with them. These cards hold value both as collectibles and as extensions of the player's personality. In the Age of AI, we see an opportunity to amplify this self-expression. What if collecting rare cards could be transformed by the hyper-individualization of generative systems? Imagine owning a card that is truly one-of-a-kind, inseparably linked to your identity, elevating the excitement and play experience to new heights. Such deep personalization would not only enrich the game, it would actively pull players back into physical, face-to-face play. When every card is uniquely tied to its owner, the game becomes a natural stage for showing off creations, trading one-of-a-kind designs, and sparking conversations that can only happen in person. The social energy of revealing a freshly generated character, responding to friends' reactions, and weaving these personalized elements into shared narratives makes the physical gathering itself the most exciting place to play.

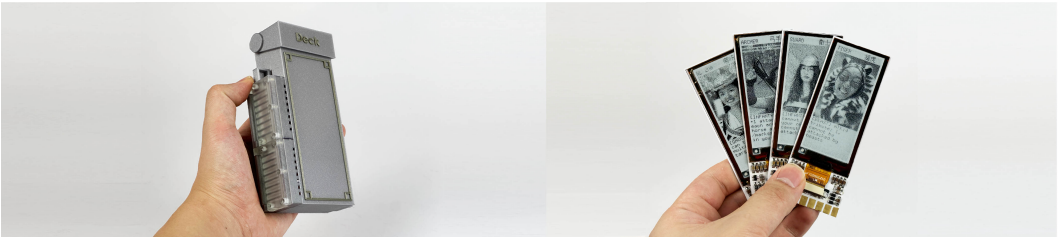

Figure 3: Left: deck box for flashing and hosting connection to LLM. Right: Pocket ink e-ink cards

Generative AI also enables dynamic customization of the play session itself. A user prompt could instantly set a theme; on a rainy day, every character might transform into an ocean-themed variant to match the mood. This adaptability pairs perfectly with our e-ink cards, whose low-power flashing mechanism allows artwork to be updated throughout a game (see figure 3). In a future iteration, a "deck box" could serve both as a carrying case and a portable battle station, continuously updating

cards with new designs as the game progresses—injured characters could visually reflect their status in real-time (see figure 4). This deck box could also function as an edge-computing hub, running a compact local LLM and generative model trained specifically on card designs. Our early tests with a smaller model revealed that its imperfect realism actually added a distinctive charm to the characters (see figure), suggesting that high-parameter models may not be necessary for this use case. Looking ahead, advances in both hardware and software will only make such generated content more intentional, expressive, and personal.

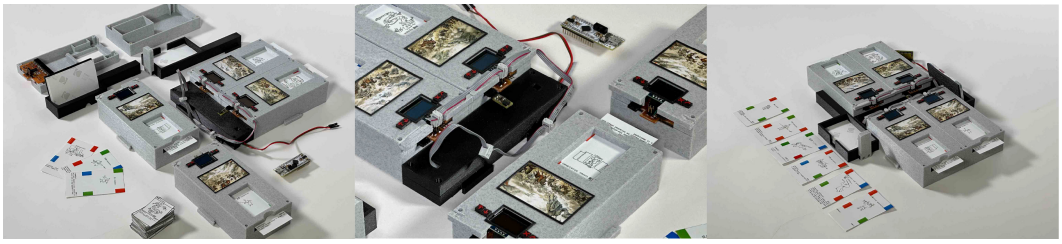

Figure 4: An earlier prototype of the battling station concept, not intergrated with the Pocket Ink system.

4 Bios of the Designers

Our team's expertise spans industrial design, interaction design, and computer science, united by a shared passion for card games—from Yu-Gi-Oh! and Pokémon to Magic: The Gathering and even poker. We've been playing these colorful cards since childhood, and that love continues to shape our work.

Lucy Li is a designer and researcher exploring playful, imaginative interactions with machines. A PhD candidate at the MIT Media Lab's Tangible Media Group, her work spans sociopolitical, multispecies, and optimistic themes, with exhibitions at London Design Week, Ars Electronica, Triennale di Milano, and more. Her project Large Language Writer (see left figure 5) rethinks how people work with LLMs by making the generative process visible and collaborative, rather than hidden behind "magic" interfaces.

Lingdong Huang is a PhD candidate in the Future Sketches group at the MIT Media Lab, specializing in high-performance software for art, games, and interactive media. His work combines machine learning, computer vision, graphics, and interaction design, appearing in museums, advertising, and performances worldwide. His project TinyChat Computer (see middle figure 5) reimagines the "personal computer" as an offline, LLM-powered device in a retro form factor—offering powerful knowledge tools without constant internet connectivity or data tracking.

Quincy Kuang is an industrial designer and research assistant at the MIT Media Lab, focused on reinventing childhood play in the digital age. Believing tangibility is essential to human development, he designs experiences that keep play physical and socially engaging. His project Memeopoly (see right figure 5) adapts the flexibility of LLMs to a tangible board game format, allowing players to co-create personalized storylines while preserving the social, screen-free nature of traditional tabletop games.computers themselves?

Figure 5: Left: Lucy's Large Language Writer. Middle: Lingdong's Tinychat computer. Right: Quincy's Memeopoly