

Metaphors for Memory: Charting a Design Space of AI Memory Tools and Interfaces

Munyeong Kim¹, Michalis Famelis², Ian Arawjo¹

¹ Montréal HCI, DIRO, Université de Montréal

² GEODES, DIRO, Université de Montréal

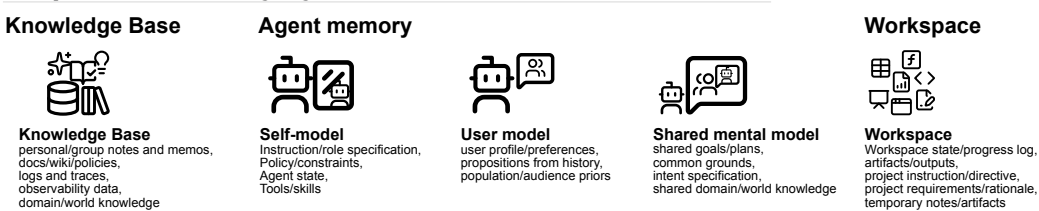
Abstract

ACM DIS 2026 accepted paper (Acceptance rate: 21%)

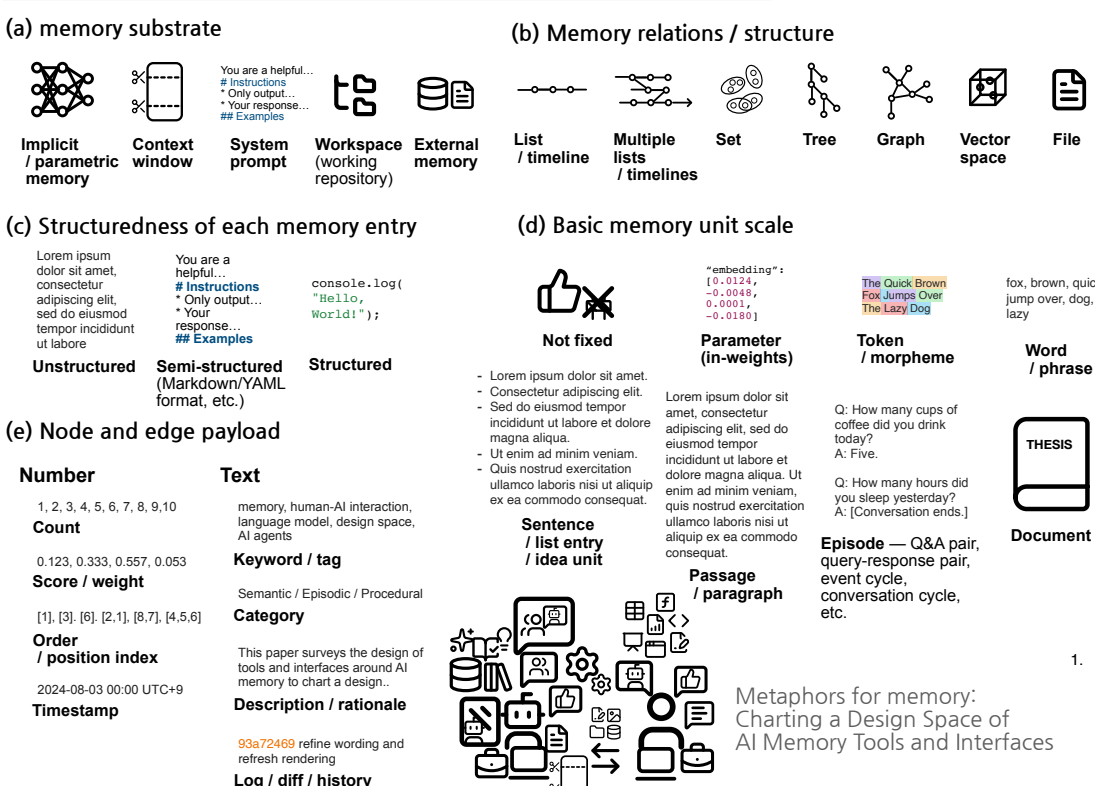
AI memory is becoming central to AI systems that aim to support personal and professional work. Yet, designing interfaces for AI memory is not well understood. How should we design for user interaction with AI memories— for instance, what kinds of operations might users want to perform on memory, either now or in the future? We survey the design of tools and interfaces around “AI memory” to chart a design space of common design patterns, architectures, and operations, and identify dominant metaphors and gaps in the space. Then, we apply generative metaphorical design to expand the design space for AI memory, exploring less-dominant metaphors of software version control, Zettelkasten, requirements, personal diaries, community archives, cultural probes, and science fiction. Our work offers rich opportunities for gaps and emergent needs that future interfaces for AI memory might address.

Design space of AI memory systems and interfaces

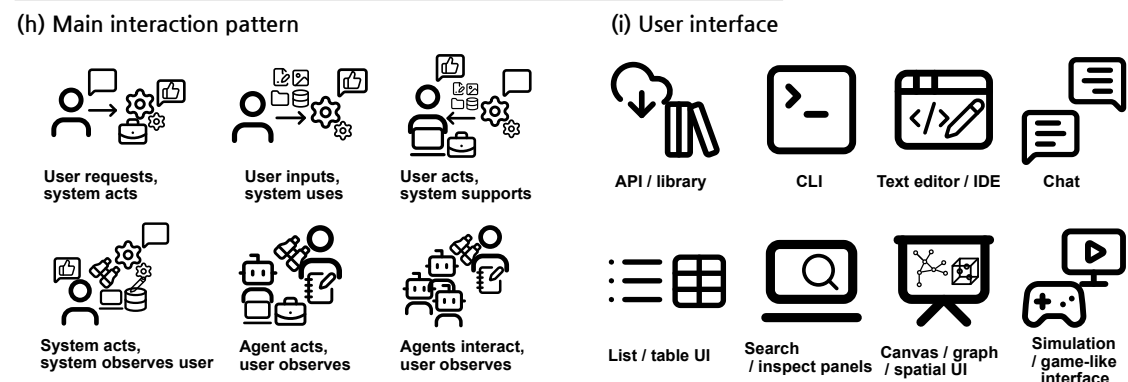
Purpose of Memory systems



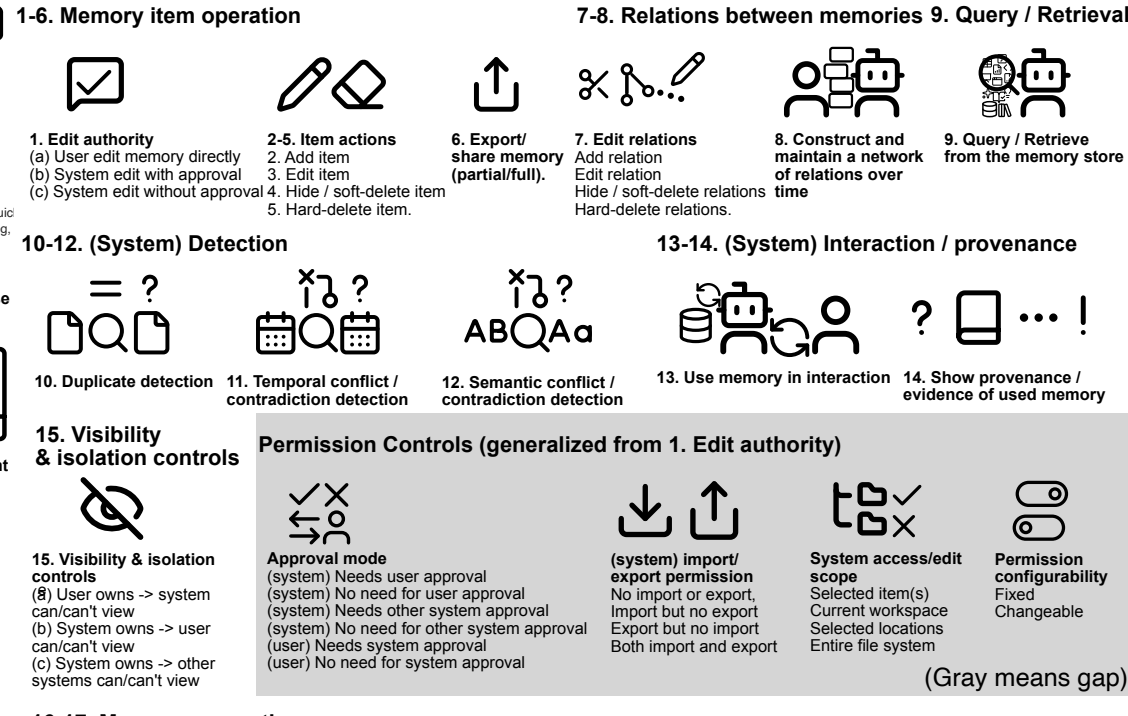
Architectural Design Space (Structural)



Architectural Design Space (Interface and Interaction)



Operational Design Space



Gaps in Current Dominant Design Choices

1. Underappreciated coupling between architecture and operation
2. Gap in recording relationships among memories
3. Lack of user-agent common grounding steps
4. Accumulate-only lifecycle with no versioning
5. Lack of selective access control
6. Lack of approval control over memory operations
7. Gray zone in NLP and HCI

Metaphors for AI memory

Dominant metaphors

1. Records, repositories, and database systems
2. Neurobiology of human cognition
3. Skills and tools (Claude Skills, etc.)

Exploring less used metaphors

1. Software version control (e.g. Git)
2. Zettelkasten
3. Requirements
4. Personal diary and record
5. Community archive
6. Cultural Probes
7. Science fiction tales/games

