Project 16
Weekly Update: Jul 13, 2026

Cards on the Table:

The Winning Move is Not in the Rules

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Problem Formulation

Real card-game agents should improve after every game.

1. Card-game skill depends on learning what cards, effects, and combos exist.
2. Rules define legal moves, but card effects have higher precedence over rules.
3. A move that looks good now may be bad with knowledge on what cards exist.

Our contribution:

1. LLM/VLM Understanding: Evaluate LLM/VLM performance on in-game questions.
2. LLM/VLM Gameplay: Evaluate LLM/VLM performance in playing full games.
3. Memory-based agent: Evaluate impact of accumulated memory on these metrics.

Week 8-9 Deliverables

Task	Week 8-9
Implement 3 baselines memory modules	✅
Implement our memory module	60%
Evaluate module performance	Running
Improve our module	To-Do
Write paper for AAAI submission	60%
Simulate more games to have data converge	To-Do

Prior Memory Systems

- **Prior memory systems differ in mechanics, not in what memory is about**
- **Memp**: distills past trajectories into reusable "how-to" procedures
- **A-MEM**: organizes memories using tags/keywords as linked notes
- **Memory-R1**: learns to manage the bank (ADD / UPDATE / DELETE / NOOP)

- All three archive the agent's own behavior → assumes it understands the game

Examples from Baseline Memory Systems

- **Memory-R1**:
  - "Develop Sources early to support sustained pressure..."
- **A-MEM**:
  - "Prioritize converting cards into Sources early..."
- **MEMP**:
  - "Playing sources early and maintaining pressure led to victory"

Limitations Baseline Memory Systems

- They keep repeating the same learned memory
- Some require extra training
- They try to store learned rules from the prompts
- Some approaches require sequential memory creation
- Some store useless memory, or trivial knowledge

Our Perspective

- We want to have a training-free memory module
- We want to learn from multiple games in parallel

- **Building stage**:
  - Go through many games and ADD | UPDATE | DELETE | NOOP memory
  - Tag each memory across multiple factors (tempo, card in play, …)
- **Evaluation stage:**
  - Use tags to retrieve relevant memory to the current game state

Diagram 1 → Memory Build Stage

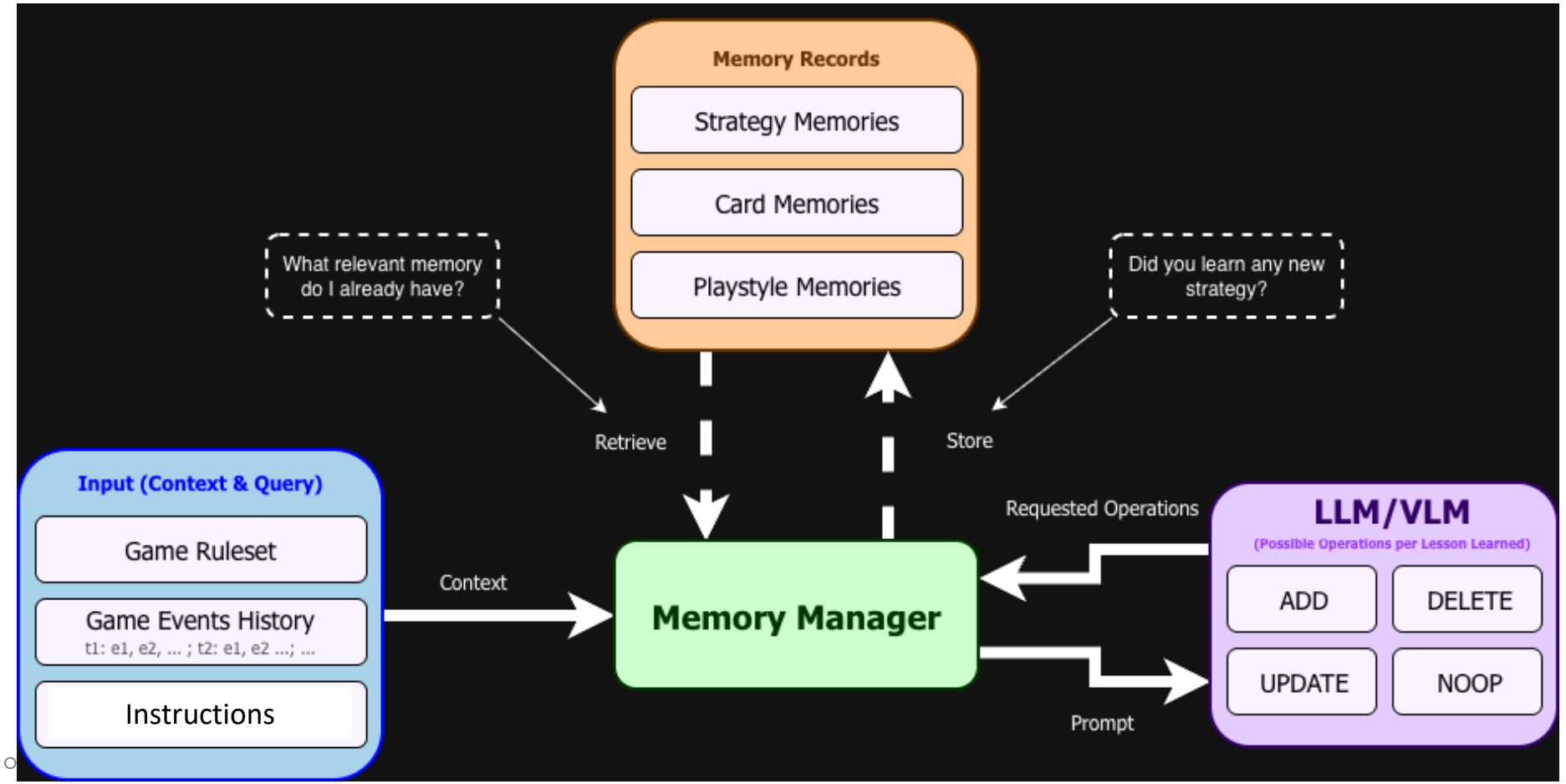
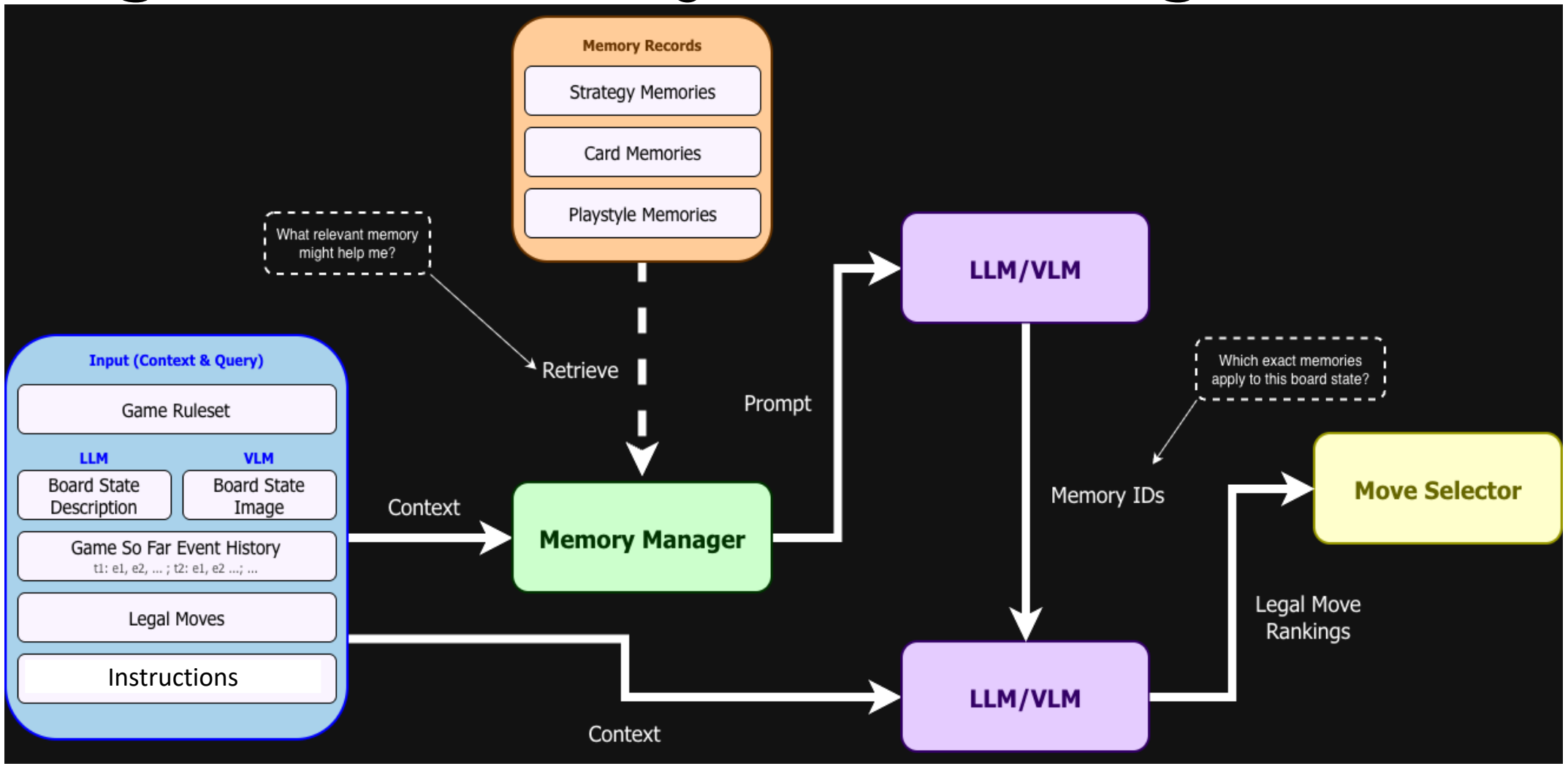


Diagram 2 → Memory Retrieval Stage



Our Memory Example

- Memory_Type: strategy
- Content: Playing multiple cards as Sources early in the game allows for consistent Aura generation and enables stronger plays in subsequent turns.
- Context: The player consistently played cards as Sources in the early game, allowing them to gather Aura and deploy stronger cards later. This strategy helped them maintain pressure and eventually win the game.
- Keywords: consistent aura generation, stronger plays, subsequent turns
- Tags: early game, source development, ...
- Category: source development and aura timing
- Confidence: 0.75
- Evidence: auroras-call:0FEG6P:game, ...

Preliminary Results

- All three baseline memory systems and our first iteration are implemented
    - Performance improves → 10% increase in win-rate against the greedy bot

- Most results are running; no complete table yet
    - Will plan to have complete tables for baselines and our module for paper deadline

Thanks for listening!

Questions?

