Episodic Memory and Databases
A Year to "Remember"

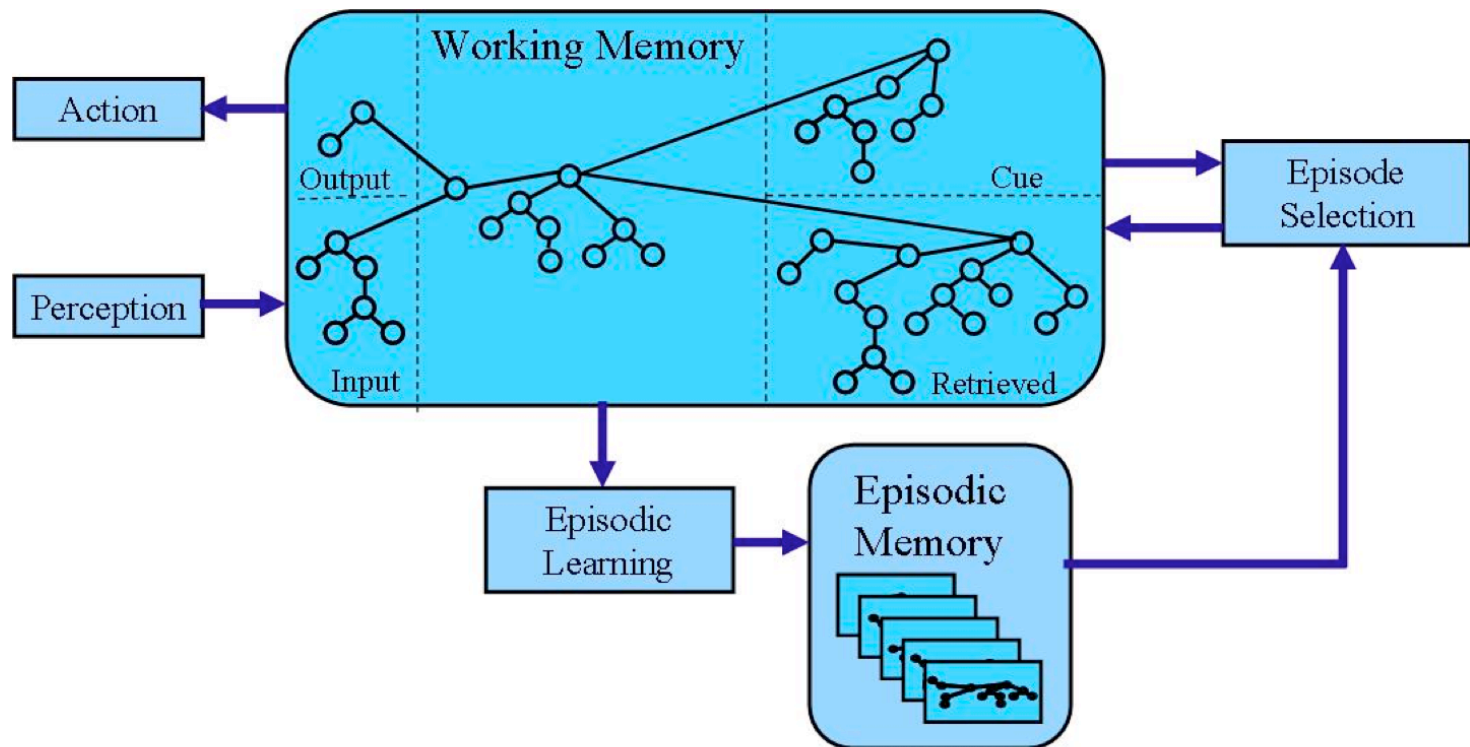Nate Derbinsky

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Outline

- Cue EpMem
- A Database Perspective
- Nuggets & Coal

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- **Cue EpMem**
  - Functional Structure
  - Issues of Space and Time
- A Database Perspective
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Functional Structure

Baseline Implementation Architecture

Issues of Space and Time

- Adding and Indexing Episodes
  - Instance vs. Interval approach
- Partial-Match Retrieval
  - Instance vs. Interval approach
  - Activation/Cardinality ratio as task-independent form of feature weighting
- Managing Memory ⇔ Disk

Outline

- Cue EpMem

- **A Database Perspective**
  - Learning from Experience
  - An Initial Approach

- Nuggets & Coal

Learning from Experience

- Database management systems are really good at
  - efficient storage & retrieval of data
  - management of memory/disk interaction

- Can we leverage DBMS approaches to data management in order to enable efficient episodic memory capabilities in long living Soar agents on general software platforms?

An Initial Approach

- Short Term
  - Mine EpMem logs to develop a series of query-load test beds
  - Map episodes/cues to appropriate representations in candidate DBMS types
    - Relational, XML, Graph Matching, Lucene, MAC/FAC
  - Develop storage/computation complexity profiles
- Long Term
  - Assess/implement/test integration solutions for EpMem storage & retrieval

Potential Pitfalls

- Databases are usually highly tuned to handle general data types and general queries
- Introducing this significantly different storage/retrieval paradigm may make integration with other modules more difficult
- Initial performance vs. long-life performance

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- **Nuggets & Coal**

Nuggets & Coal

- Nuggets
  - I am very interested in a path of research that could enable episodic memory capabilities for agents with long lifetimes
  - I am excited about my prelim!
- Coal
  - "So you'll have results by the Soar Workshop, right?" -John Laird