# Capabilities of Cognitive Architectures

- Recognition and Categorization
    - represent patterns and situations in memory
    - learn these patterns

- Decision Making and Choice (one step plans?)
    - allowable alternatives
    - desirability of alternatives
        - goals, objectives, and utilities
    - learning allowability/desirability/effectiveness

- Perception and Situation Assessment
    - Compose large-scale environment models from percepts
    - relies recognition and categorization of patterns in the environment
    - relies on inferential mechanisms

- Prediction and Monitoring
    - model of the environment
    - effects of actions

- Problem Solving and Planning
    - goals, objective, and utilities
    - partially ordered actions
    - enabling conditions
    - predicted effects
    - learning to reduce effective breadth and depth of search

- Reasoning and Belief Maintenance
    - deductive reasoning
    - abductive reasoning
    - inductive reasoning
    - incremental or online learning

- Execution and Action
    - actuators in environment
    - primitive actions
    - composite actions

- Interaction and Communication
    - translating knowledge for other agents
    - question asking and answering

- Remembering, Reflection, and Learning
    - cognitive structures formed during external or cognitive activities
    - explanation/justification
    - metareasoning

Learning is pervasive and in human instantiations, perhaps

- emotional awareness and response

is too.

Common Structures of many Cognitive Architectures
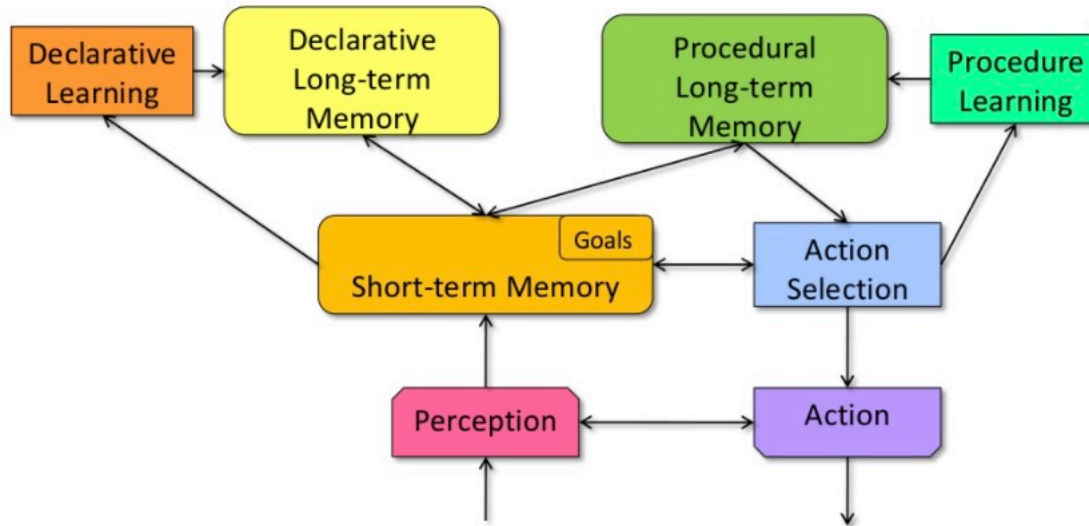
https://www.pinterest.com/pin/494833077805311125/
University of Michigan, John Laird lab
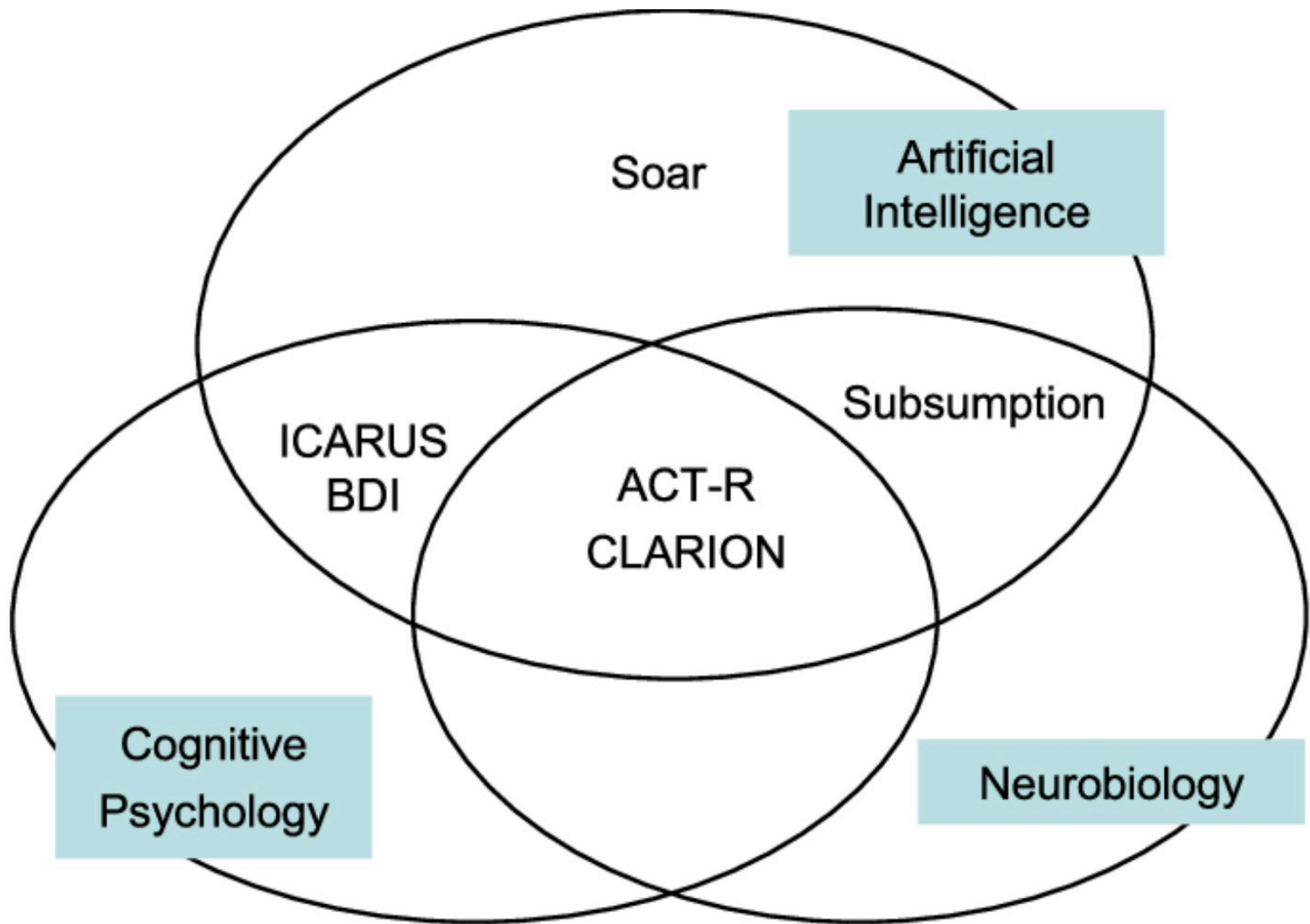
An overview of the six cognitive architectures

Chong, Hui-Qing & Tan, Ah-Hwee & Ng, Gee-Wah. (2007). Integrated cognitive architectures: A survey. Artificial Intelligence Review. 28. 103-130. 10.1007/s10462-009-9094-9.

How does this paper differ from previous papers?

Rational analysis in the large?

Anything missing in this architecture?

Can there be a hybrid of declarative and procedural? e.g. declarative for indexing/segmenting/bridging procedural?

How can generic CAs be specialized to certain agents in certain settings? How do different instantiations use different "modules"?

Can a generic CA serve to contain and guide evolution?

What would the CA of a smart vehicle look like? Lets expand on this

- Recognition and Categorization

- Decision Making and Choice

- Perception and Situation Assessment

- Prediction and Monitoring

- Problem Solving and Planning

- Reasoning and Belief Maintenance

- Execution and Action

- Interaction and Communication

- Remembering, Reflection, and Learning

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