Assgignment 2

1 Building blocks of Cognitive Architectures

The solve the tasks in this section you might want to have a look in Vernon's book [Vernon14] and a seccond look at lecture 3

1.1 Symbolic vs. sub-symbolic representations

1.1.1 General questions

Task 1.1: Why do we separate methods in symbolic methods and sub-symbolic methods? Explain the difference. Why is it customary to use the term 'sub-symbolic' and not 'non-symbolic'?

Task 1.2: What is the main difference between cognitivistic and emergent approaches?

Task 1.3: If a system shows intelligent behavior through emergent approaches, what does this mean?

1.1.2 Hybrid architectures

Task 1.4: What are some key benefits of creating hybrid architectures? Why do people create this type of architecture? (Hint: see Vernon chapter 2.3)

Task 1.5: When combining symbolic and sub-symbolic systems to create a hybrid architecture, what is included from each?

1.2 Perception and sensing

Task 1.6: Why is cognitive architecture research very often centered around vision?

Task 1.7: Explain the three stages of vision as proposed by David Marr.

Task 1.8: What applications is audition used for in cognitive architectures?

1.3 Attention

Task 1.9: Explain the three classes of information reduction mechanisms and how they relate to each other

Task 1.10: Explain the difference between data-driven and task-driven attention. Use at least one example.

1.4 Action selection

Task 1.11: What are the two major approaches to action selection, and how does this relate to symbolic vs. non-symbolic architectures?

1.5 Memory

Task 1.12: Explain the multi-store concept of memory.

Task 1.13: It is common to distinguish between short-term and long-term memory. From which research discipline does this separation come from?

Task 1.14: Optional Can you imagine a disadvantage with this approach?

Task 1.15: Mention some key differences in how knowledge is represented in symbolic vs non-symbolic architectures.

2 Soar

Have a look at "A gentle introduction to SOAR, an architecture for human cognition" [Lehman96]

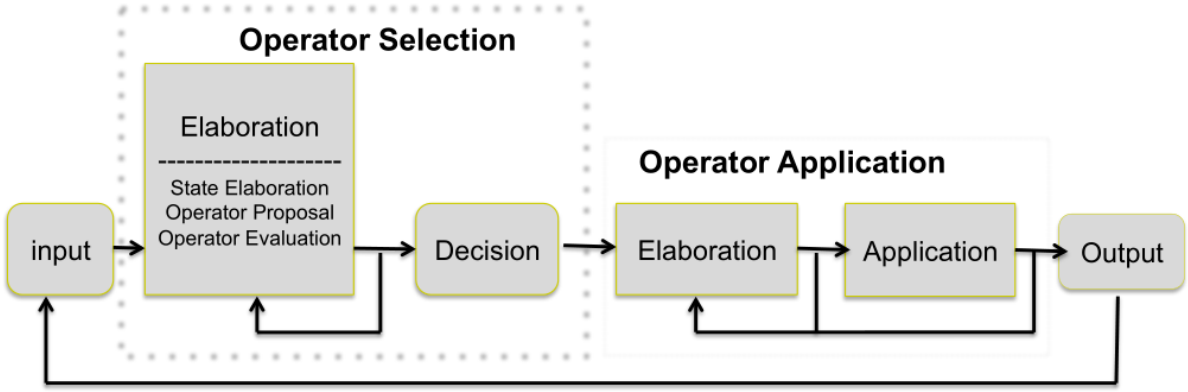

Figure: shows the Soar processing cycle.

Task 1.16: Explain the following phases: Input phase, Operator selection, and Operator application

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