Rational OpenCog Controlled Agent

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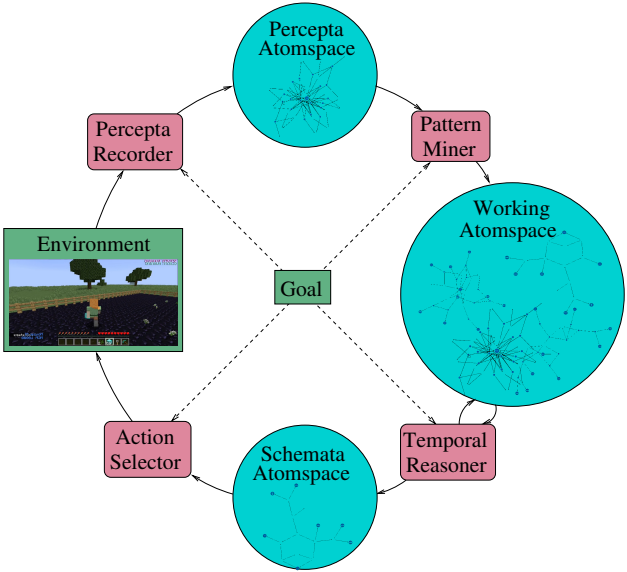
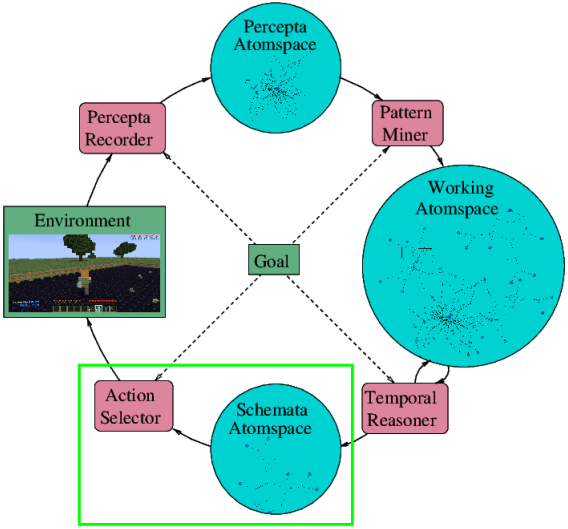
AGI-23

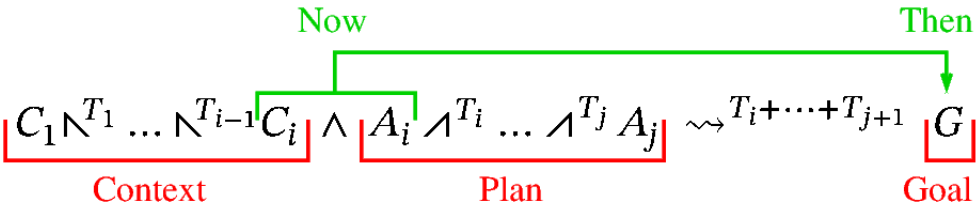

Percepta
Atomspace
Pattern
Miner
Working
Atomspace
Temporal
Reasoner
Schemata
Atomspace
Action
Selector
Environment
Percepta
Recorder
Goal

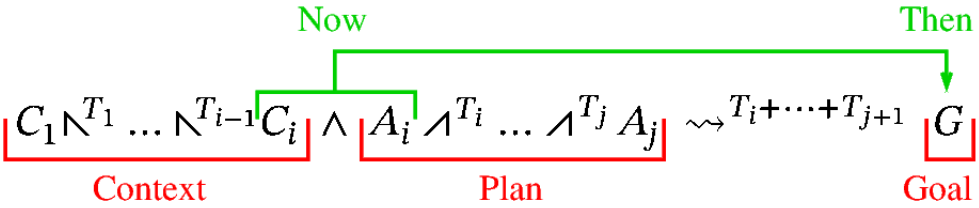


Cognitive Schematic

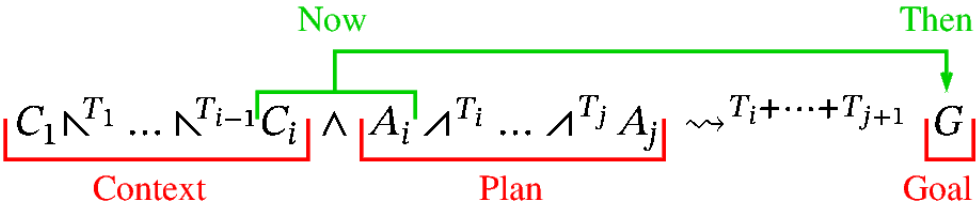
- Context $\wedge$ Action $\rightsquigarrow^{T}$ Goal

$$C_1 \barwedge^{T_1} \ldots \barwedge^{T_{i-1}} C_i \;\wedge\; A_i \barwedge^{T_i} \ldots \barwedge^{T_j} A_j \;\rightsquigarrow^{T_i + \cdots + T_{j+1}}\; G$$

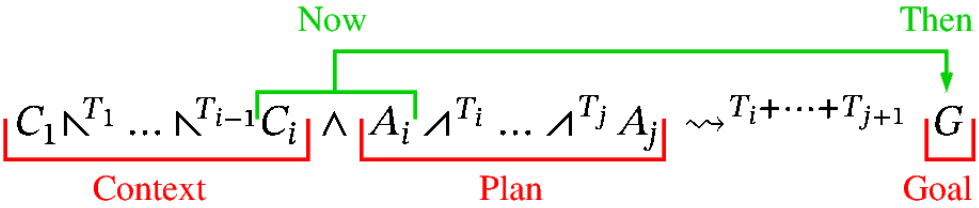

Now
Then
$C_1 \wedge^{T_1} \ldots \wedge^{T_{i-1}} C_i \wedge A_i \nearrow^{T_i} \ldots \nearrow^{T_j} A_j \rightsquigarrow^{T_i+\cdots+T_{j+1}} G$
Context
Plan
Goal



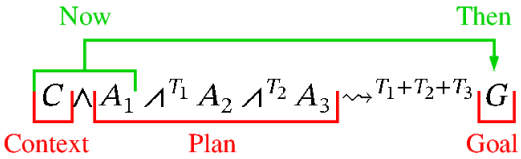
$$\left[C_1 \wedge^{T_1} \ldots \wedge^{T_{i-1}} C_i\right](t) \quad = \quad \textit{True} \mid \textit{False}$$



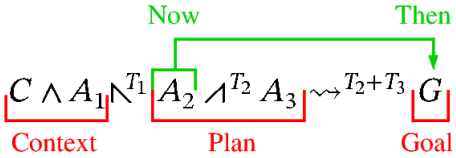
$$\left[C_1 \wedge^{T_1} \ldots \wedge^{T_{i-1}} C_i\right](t) \quad = \quad \textit{True} \mid \textit{False}$$
$$\mapsto \quad \mathcal{D}ist(Bool)$$



$$\begin{aligned} \left[C_1 \wedge^{T_1} \ldots \wedge^{T_{i-1}} C_i\right](t) &= \textit{True} \mid \textit{False} \\ &\mapsto \mathcal{D}ist(Bool) \\ &\mapsto \mathcal{D}ist(\mathcal{D}ist(Bool)) \end{aligned}$$


Now
Then
$C \wedge A_1 \curlywedge^{T_1} A_2 \curlywedge^{T_2} A_3 \rightsquigarrow^{T_1+T_2+T_3} G$
Context
Plan
Goal

$$C \wedge A_1 \nearrow^{T_1} A_2 \nearrow^{T_2} A_3 \rightsquigarrow^{T_1+T_2+T_3} G$$



$$C \wedge A_1 \nearrow^{T_1} A_2 \nearrow^{T_2} A_3 \rightsquigarrow^{T_1+T_2+T_3} G$$

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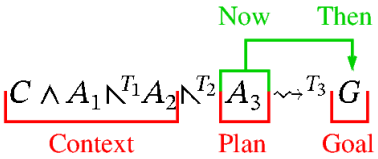

Example: Collect Diamonds

Actions

- get(key)
- go(house)
- collect(diamond)

Percepts

- outside(house)
- inside(house)
- hold(key)
- next(door)
- reward(1)
- reward(0)

Example: Collect Diamonds

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$$\text{outside(house)} \wedge \text{get(key)} \nearrow^{1} \text{go(house)} \nearrow^{1} \text{collect(diamond)} \rightsquigarrow^{3} \text{reward(1)}$$

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$$\text{hold(key)} \wedge \text{go(house)} \nearrow^1 \text{collect(diamond)} \rightsquigarrow^2 \text{reward(1)}$$

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$$\text{inside(house)} \wedge \text{collect(diamond)} \rightsquigarrow^1 \text{reward(1)}$$

Example: Collect Diamonds

$$\text{outside(house)} \wedge \text{get(key)} \nearrow^1 \text{go(house)} \nearrow^1 \text{collect(diamond)} \rightsquigarrow^3 \text{reward(1)}$$

$$\text{hold(key)} \wedge \text{go(house)} \nearrow^1 \text{collect(diamond)} \rightsquigarrow^2 \text{reward(1)}$$

$$\text{inside(house)} \wedge \text{collect(diamond)} \rightsquigarrow^1 \text{reward(1)}$$

Balancing exploitation and exploration

Learning schemata