

Rational OpenCog Controlled Agent

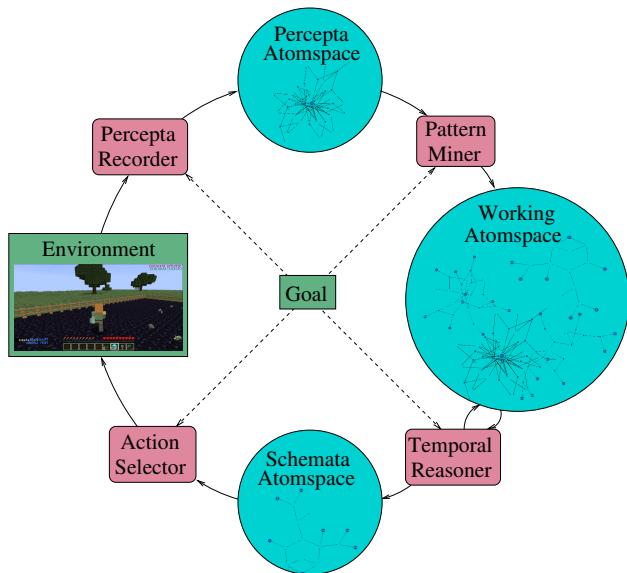
Nil Geisweiller, Hedra Yusuf

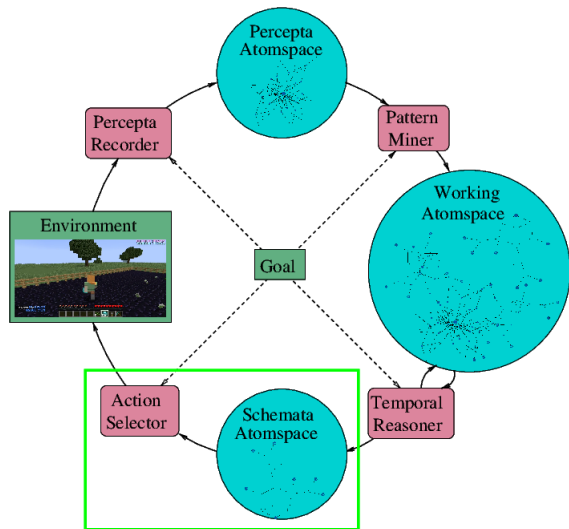
AGI-23



SingularityNET



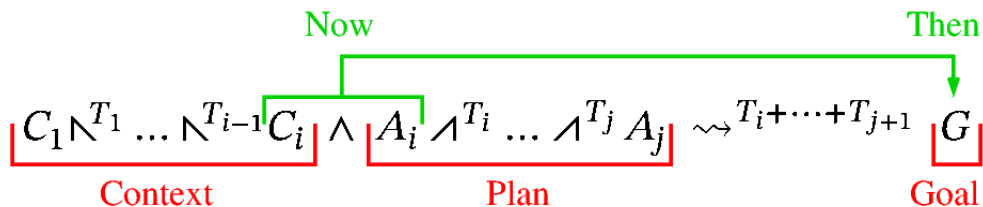


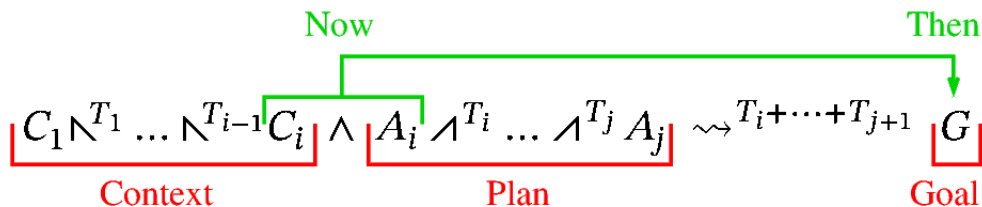


Cognitive Schematic

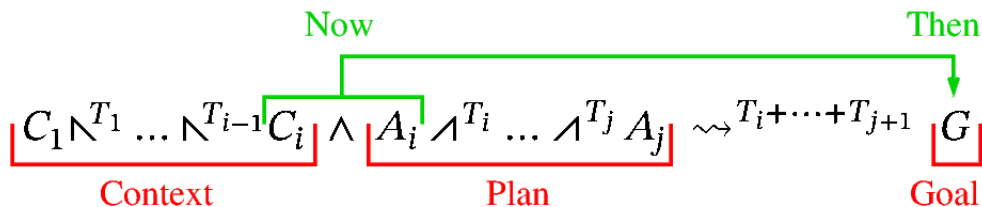
$$\bullet \text{ Context} \wedge \text{Action} \rightsquigarrow^T \text{Goal}$$

$$C_1 \mathbin{\smash{\mathrel{\mathcal{N}}}}^{T_1} \dots \mathbin{\smash{\mathrel{\mathcal{N}}}}^{T_{i-1}} C_i \wedge A_i \mathbin{\smash{\mathrel{\mathcal{A}}}}^{T_i} \dots \mathbin{\smash{\mathrel{\mathcal{A}}}}^{T_j} A_j \rightsquigarrow^{T_i + \dots + T_{j+1}} G$$



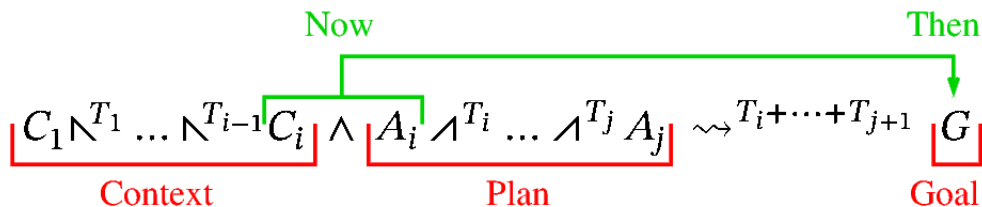


$$[C_1 \wedge N^{T_1} \dots \wedge N^{T_{i-1}} C_i](t) = \text{True} \mid \text{False}$$

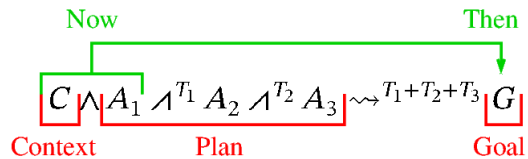


$$[C_1 \wedge N^{T_1} \dots \wedge N^{T_{i-1}} C_i](t) = \text{True} \mid \text{False}$$

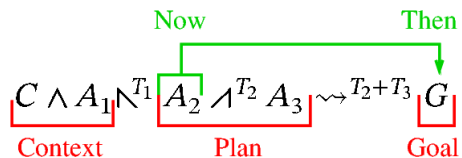
$$\mapsto \text{Dist}(\text{Bool})$$



$$\begin{aligned}
 [C_1 \wedge^{T_1} \dots \wedge^{T_{i-1}} C_i](t) &= \text{True} \mid \text{False} \\
 &\mapsto \text{Dist}(\text{Bool}) \\
 &\mapsto \text{Dist}(\text{Dist}(\text{Bool}))
 \end{aligned}$$

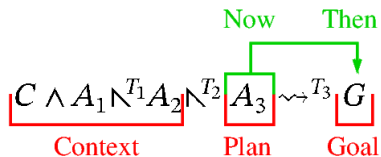


$$C \wedge A_1 \nearrow^{T_1} A_2 \nearrow^{T_2} A_3 \rightsquigarrow^{T_1+T_2+T_3} G$$

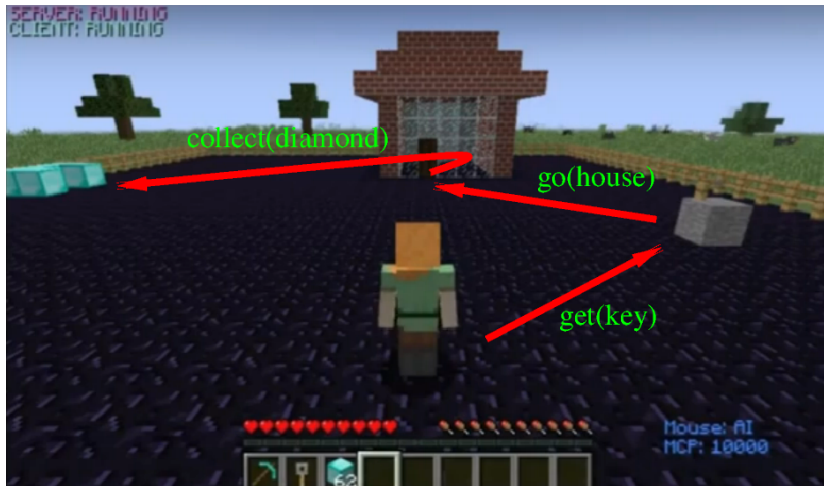


$$C \wedge A_1 \frown^{T_1} A_2 \frown^{T_2} A_3 \rightsquigarrow^{T_1+T_2+T_3} G$$

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



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

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

Example: Collect Diamonds

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

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

Example: Collect Diamonds

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

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

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

Learning schemata

Balancing exploitation and exploration