

Multi-agent systems

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<http://www.agentspace.org/mas>

Cognition

- What does it mean cognition ?

Cognition

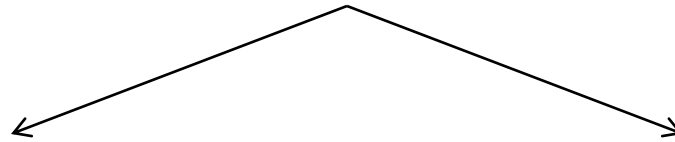
- What does it mean cognition ?
- Cognition is an ability to process information like a man

Cognition

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- Cognition is an ability to process information like a man
- How to propose an unbiased definition ?

Cognition

- What does it mean cognition ?
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- How to propose an unbiased definition ?



any processing generating
a behaviour which is
observed to be reasonable

Processing accompanied with
a structural development
corresponding to a
sophisticated adaptation

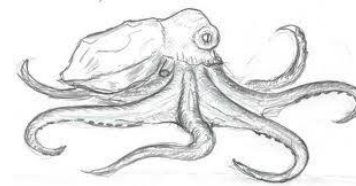
Adaptation

Kinds of minds (Dennett):

- darwinian ∞



- skinnerian n



- popperian 1

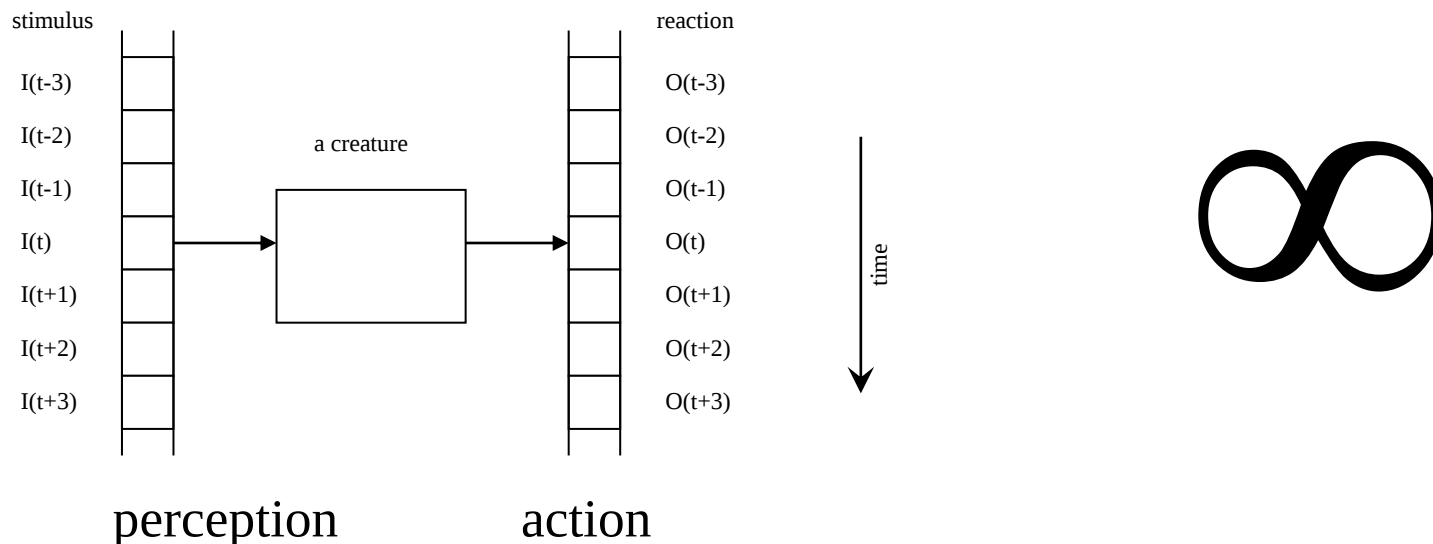


- gregorian 0



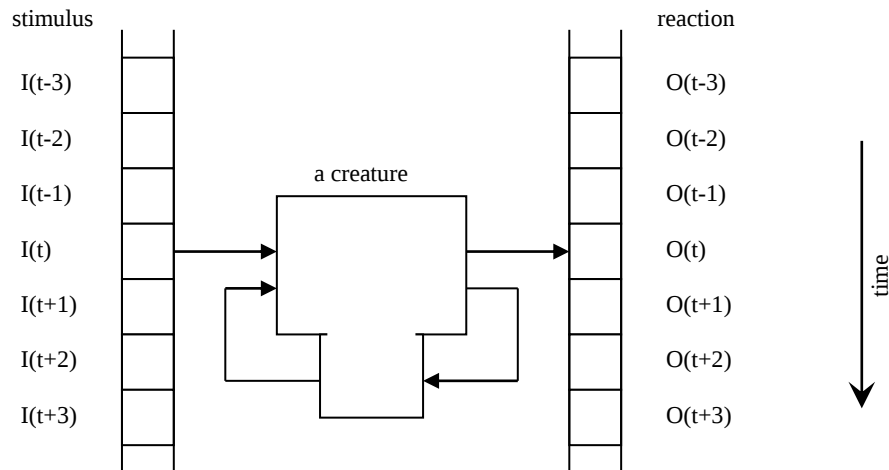
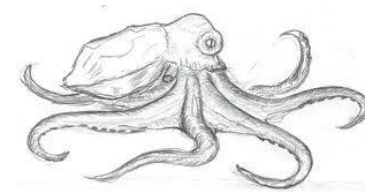
Darwinian kind of mind

- stimulus – response
- no ability to change responses on stimuli



Skinnerian kind of mind

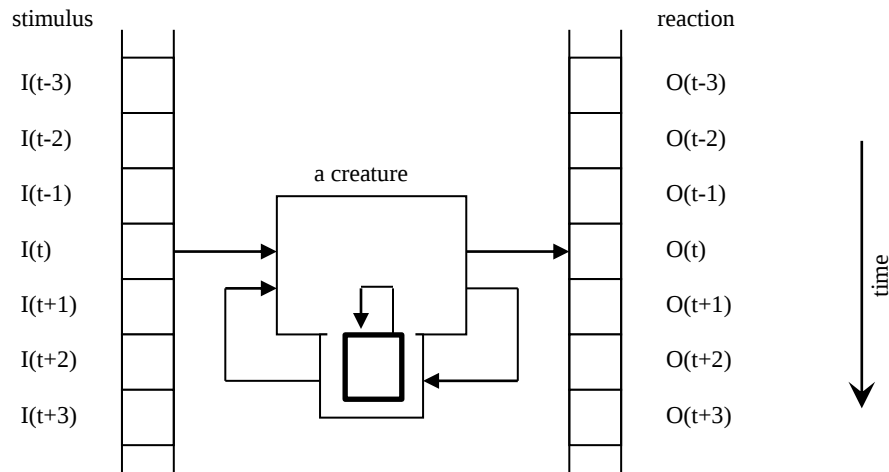
- conditioning
- reactions to stimuli develop gradually



n

Popperian kind of mind

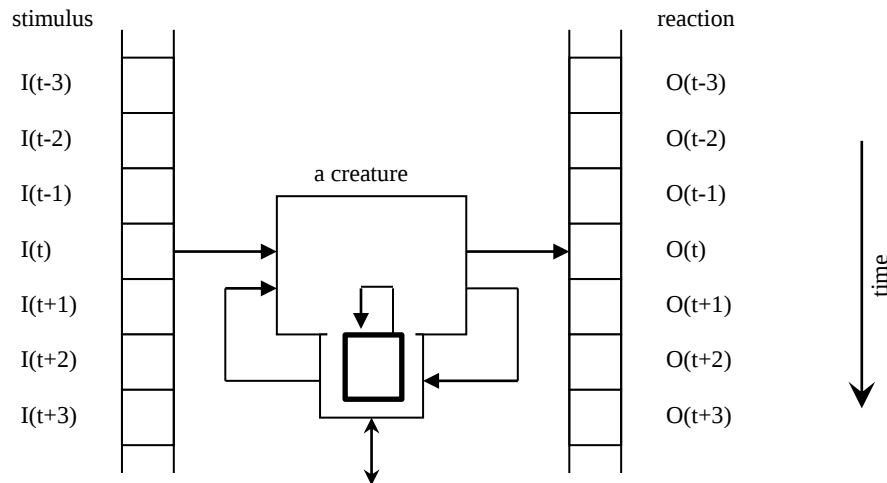
- world modelling in mind
- reactions on stimuli can change suddenly



1

Gregorian kind of mind

- Language communication
- reactions on stimuli can change preventively

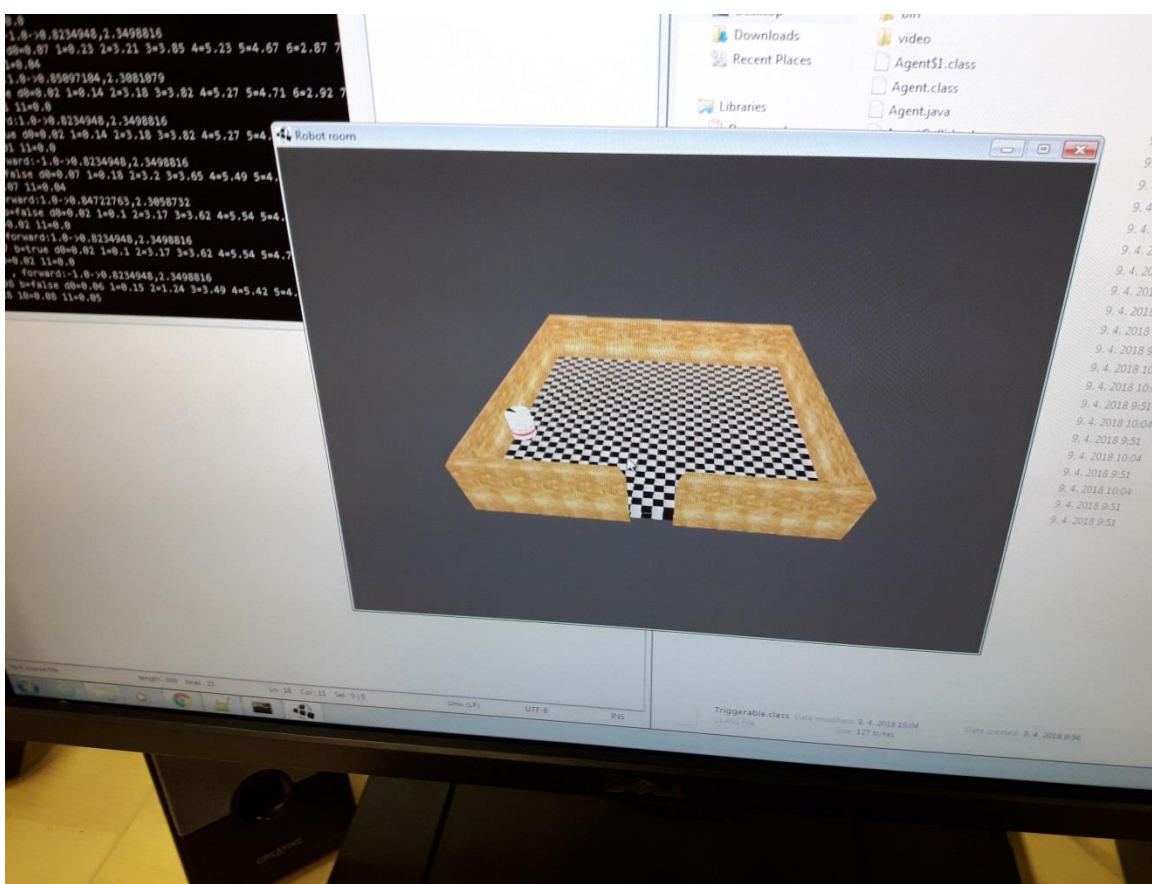


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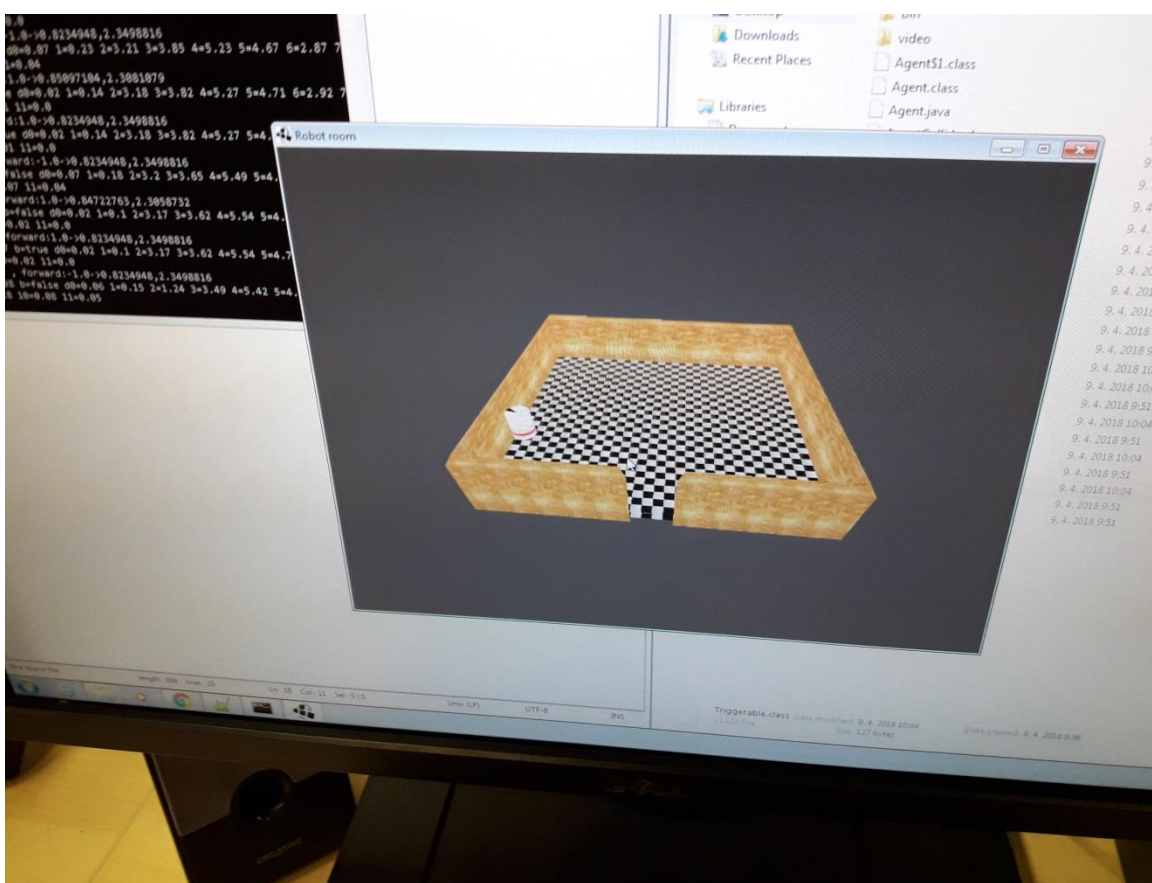
Dennet's kind of minds

- Let us try to classify some artificial systems according Dennet

- Cambrian AI
- world as its own best representation



- Robot getting out of room
- No improvement after many times of crossing the door
- No idea what is door



- Cambrian AI
- world as its own best representation

- Robot getting out of room
- No improvement after many times of crossing the door
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- Darwinian kind



- Delayed reinforcement learning + Genetic programming



- Robot with handicap is learning to fix it



- Delayed reinforcement learning + Genetic programming



- Robot with handicap is learning to fix it

- Skinnerian kind



- Simplified model of the robot body
- Simplified model of the human body seen

- Face model
(created off-line from data which are not available in the system vicinity)
- Face detector and Facial landmark detector learned in Skinnerian way



- Simplified model of the robot body
- Simplified model of the human body seen

- Face model
(created off-line from data which are not available in the system vicinity)

- „Popperian“
kind

- ACL Message Example -

```
(request
  :sender (:name dominic-agent@whitestein.com:8080)
  :receiver (:name rex-hotel@tcp://hotelrex.com:6600)
  :ontology personal-travel-assistant
  :language FIPA-SL
  :protocol fipa-request
  :content
    (action movenpick-hotel@tcp://movenpick.com:6600
      (book-hotel (:arrival 25/11/2000) (:departure 05/12/2000) ...
    ))
)
```

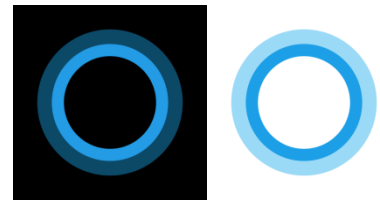
- Domain-dependent language (syntax and semantics)
- or natural language

- Booking

- Siri



- Cortana



- ACL Message Example -

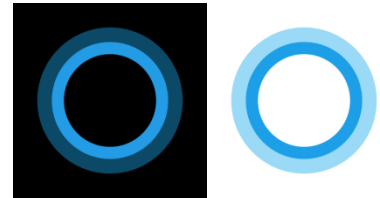
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  :content
    (action movenpick-hotel@tcp://movenpick.com:6600
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- Gregorian
kind

- Really intelligent system should involve all kinds of mind in parallel
- Effort to achieve that is called Universal AI

