Andy Clark: An extended mind

"The world is its own best model"
ULS2206 4PM by Lynette C and Joyce

Last Week...

The technologies around us influence the way we think *(Postman, Mumford)*

- Examples: Timekeeping, Writing, TV

Today....

These technologies are part of and integral to how we think

1. Action-Oriented Representations
2. Wideware
3. Extended Mind Theory
4. Discussion

Action-Oriented Representations

Motor-Specificity of Perceptual Adaptation

Thach experiment: Lenses tilt dartboard sideways

Adaptation did not extend to non-dominant hand

Suggests the **absence of action-neutral internal representation**

Action-Oriented Representations

Our inner representation of the world is **constructed for us to act on it** (“recipe for action”)

- Versus action-neutral ***descriptions*** which create an objective map for us to reason about
- Integrating perception, cognition and **action**

Claim #1

“Daily agent-environment interactions often do not require the construction and use of detailed inner models.”

Claim #1

We often do not notice changes to unattended parts of our environment

Claim #1

Herbert: designed to collect soft drinks cans

- Detect obstacle ➜ halt and turn
- Detect table ➜ scan for cans
- Detect can ➜ rotate body until facing can

No inner representation of the world or planning logic, but achieves its goal

Claim #2

“Low-level perception may “call” motor routines that yield better perceptual input and hence improve information pickup.”

Claim #3

“Real-world actions may sometimes play an important role in the computational process itself.”

Claim #3

Depth perception

More efficient to move head/ body than stare at a static image

Claim #3

Herbert rotates body to face the can

- Create a standard action frame
- **Simplifies grasping action of robotic arm**

Deictic Binding [“context dependent”]

The body action already does the some of the cognitive work

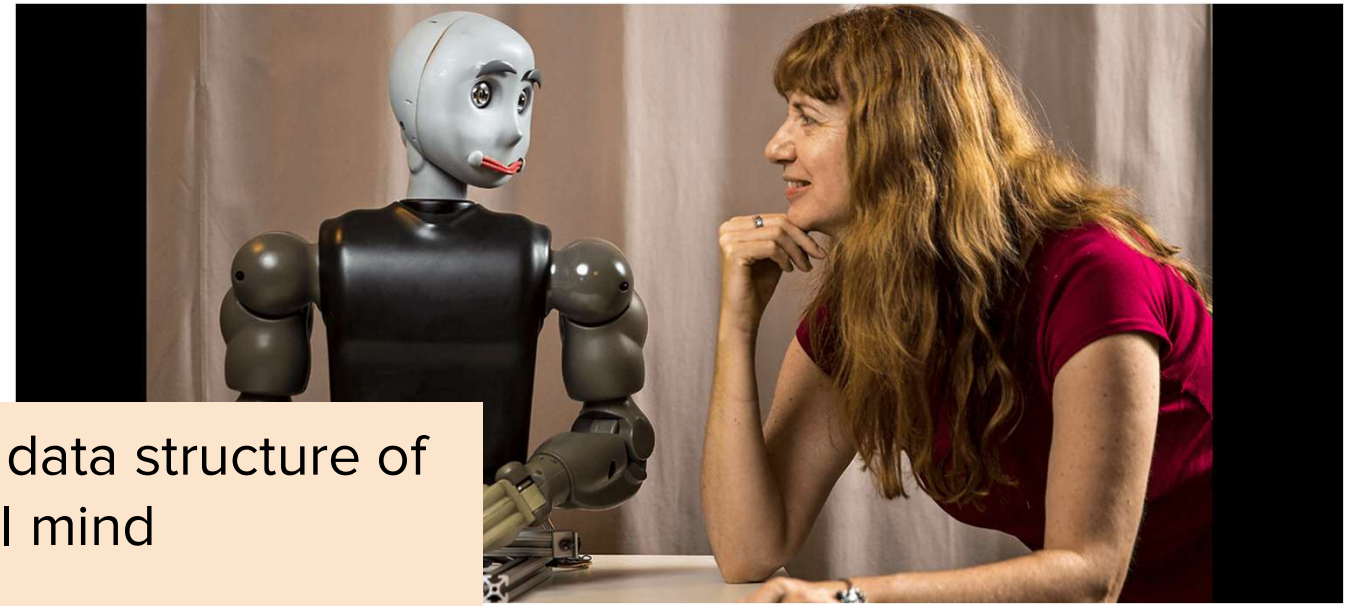
Summary

1. Absence of a rich and objective representation of reality
2. Action can improve perception
3. Action can itself be part of cognition

Clark: We have **Action-Oriented Representations** of our world

- Churchland: makes claims for #1 and #2
- Umwelt: Action-based perceptual relations

Example



Action-oriented data structure of the AI mind

Mataric: Robot navigates maze by encoding landmarks using sensory input + its current motion

Wideware

Wideware

External media or bodily actions are themselves performing cognitive or information-processing operations

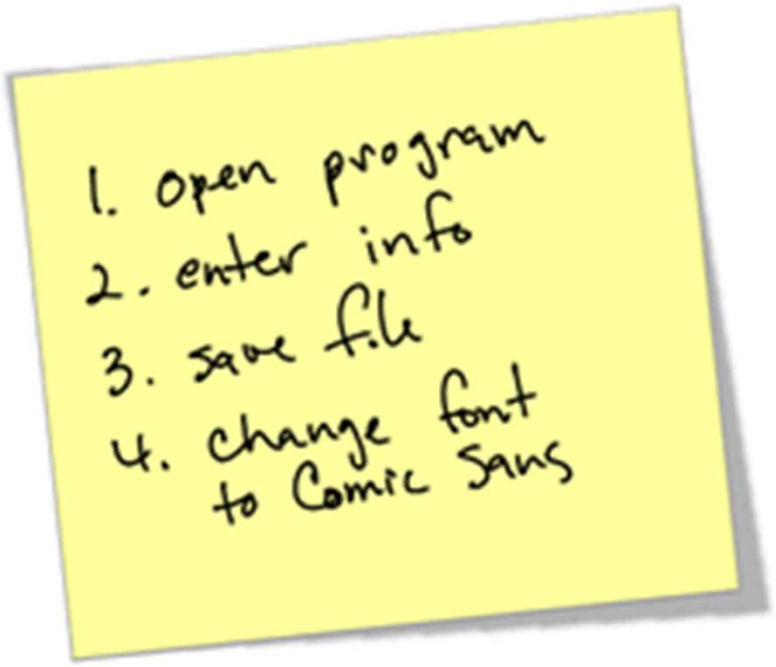
- Example: Storing, searching or transforming information
- Environmental and not biological elements
- Functions in an *extended cognitive process* by **exploiting information from bodily action and the environment**

External Media

Off-loading information

- Facilitated by being able to symbolically represent our thoughts using language

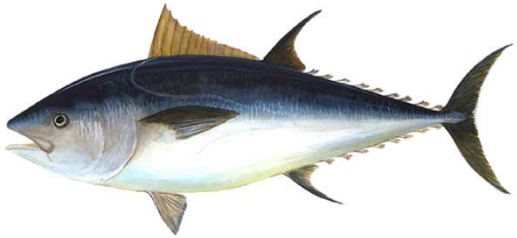
External props are reliably present, exist in the spatial and temporal realm.



Example: Bluefish Tuna

Biological build cannot explain its swimming behaviour

Make use of external environment



- Eddies and vortices to gain speed
- Create its own eddies and vortices

The real swimming machine is the ***fish in its proper context***

Example: Writing an Essay

Not just additional memory, but also a **potent symbol-manipulating arena**

Writing an essay involves cycles of reading, responding and externally reorganising information

Type of cognitive tasks performed changes

Example:

Facial Expression and Reading

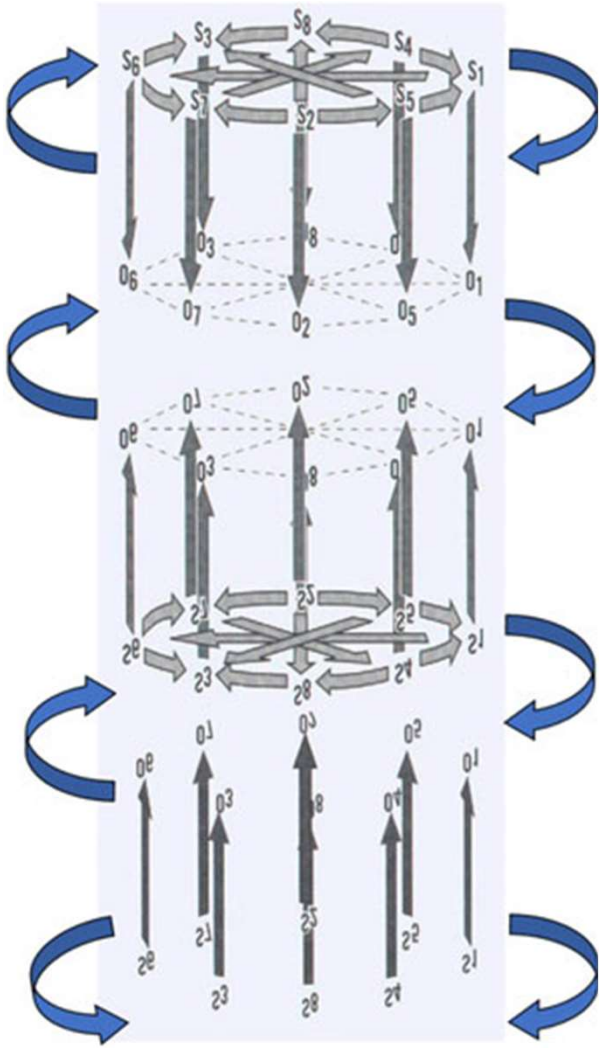
Youtube Andy Clark - What is an Extended Mind 97s to 138s

Interacting with Wideware

Relation to Deacon:

Wideware indexically represent our symbolic thoughts

In engaging with wideware, we traverse the layers of Deacons' hierarchic relationships



Extended Mind Theory

What is the mind?

Wideware are fundamental in how we think

- *Are we just cognitive agents who co-opt and exploit surrounding structures to expand our problem-solving capacities?*

We actively generate and exploit wideware

- **Active Externalism** of the mind: Not exclusively in the brain or the body, but also extending into the physical world
- Spatially and temporally extended cognition

What is the mind?

Software → Brain

Wetware (or Hardware) → Body

Wideware → Environment

*The mind is an essentially **situated** brain: a brain at home in its proper bodily, cultural and environmental niche*

Example: Alzheimer's

Alzheimer's patients relies on the cognitive scaffolding afforded by wideware

- Labelling objects in the house
- Memory books with annotated photos of friends and relatives
- Diaries for tasks and events

Compensating for biological limits on cognition

When we remove these wideware, we are not just interfering with the environment, but interfering with the person

Discussion

Discussion Questions

1. [Tomasello] What role can wideware play in cumulative cultural transmission?

1. Is the internet part of my mind? Your mind? *Our mind?*

Extra Discussion Questions

1. What are some ethical consequences of the extended mind theory? Example: “Petty crimes” like theft of a diary containing memories

2. Is there action-oriented representation in wideware? [Postman] We are exposed to so much information that is not actionable. How do we represent information that is not action-oriented? What are the consequences of not being able to encode information in action-oriented manner?

Thank You