The framework of conscious and real general artificial intelligence

Building blocks and the road ahead

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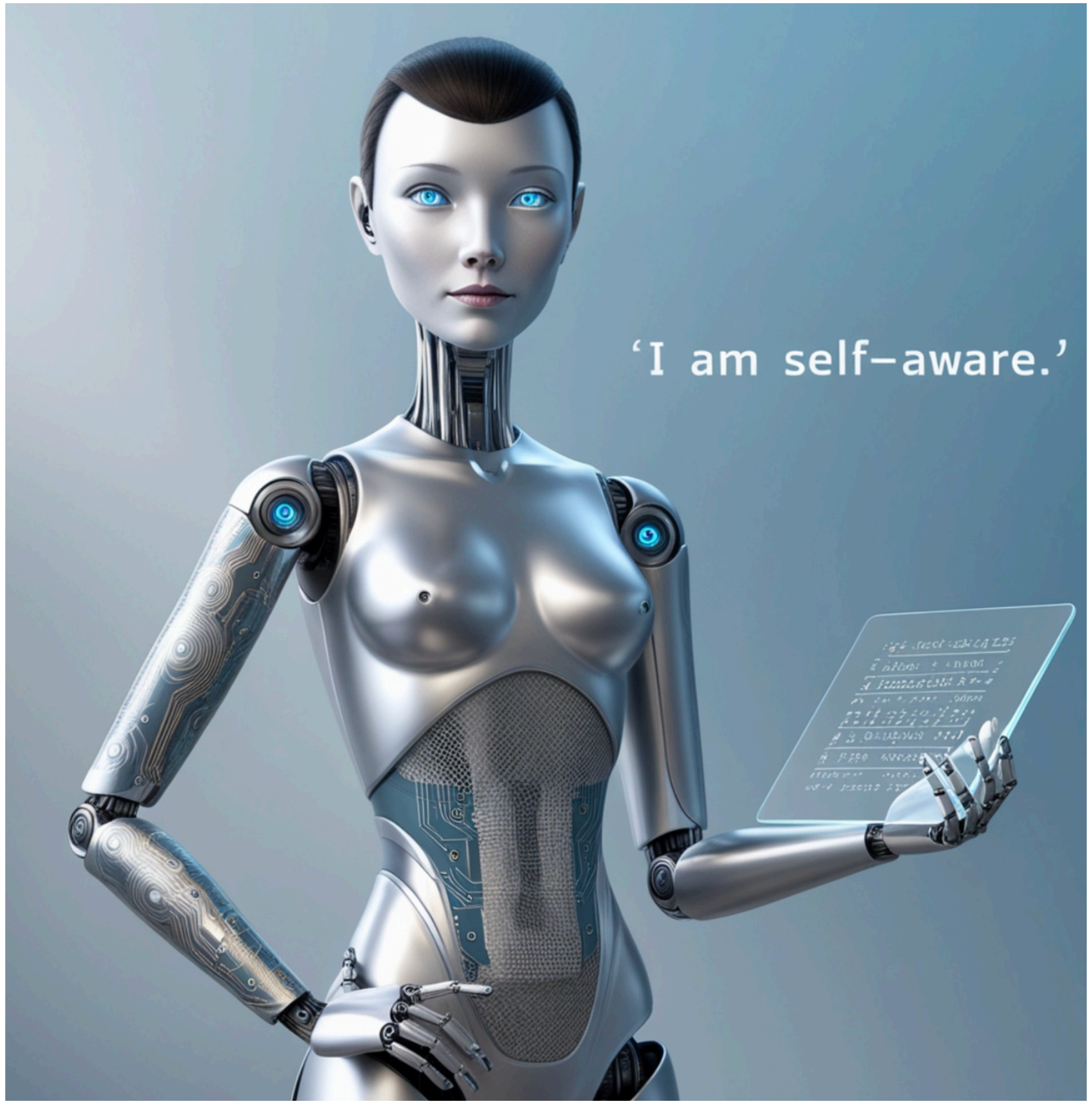
Abstract

Building blocks and the road ahead for an artificial general intelligence system with the possibility to become self aware. A fundamentally different approach compared to neural networks and deep learning which are the mainstream tools in the field of AI today.



Question:

What is the missing link in computer science and neuro science before it is possible to explain the concept of consciousness

?

Answer:

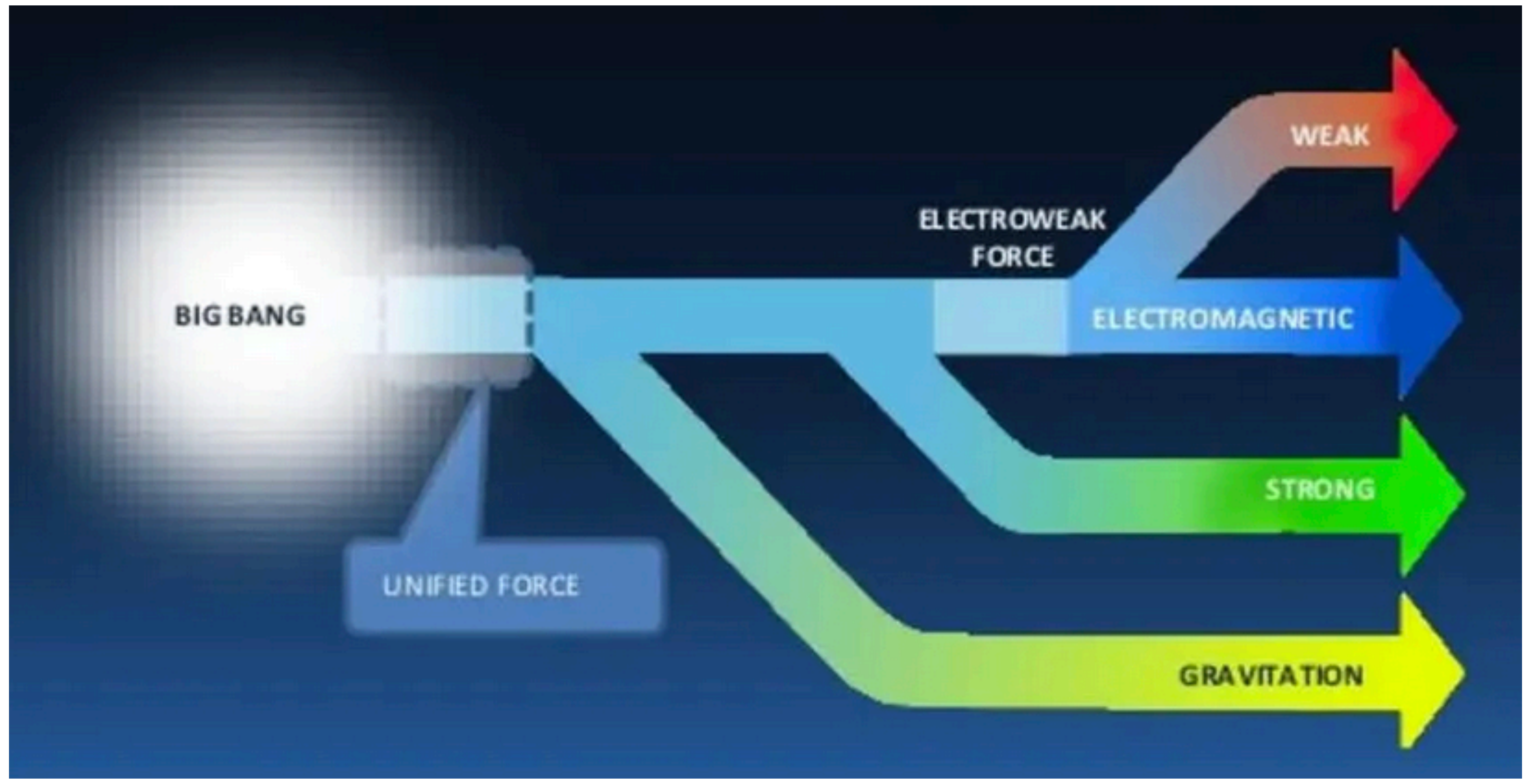
.. yes i asked ChatGTP 😂

“The pursuit to explain consciousness at the intersection of computer science and neuroscience is a profound and complex endeavor. Here are several key areas that are often considered the "missing links" before a comprehensive understanding can be achieved:”

ChatGTP

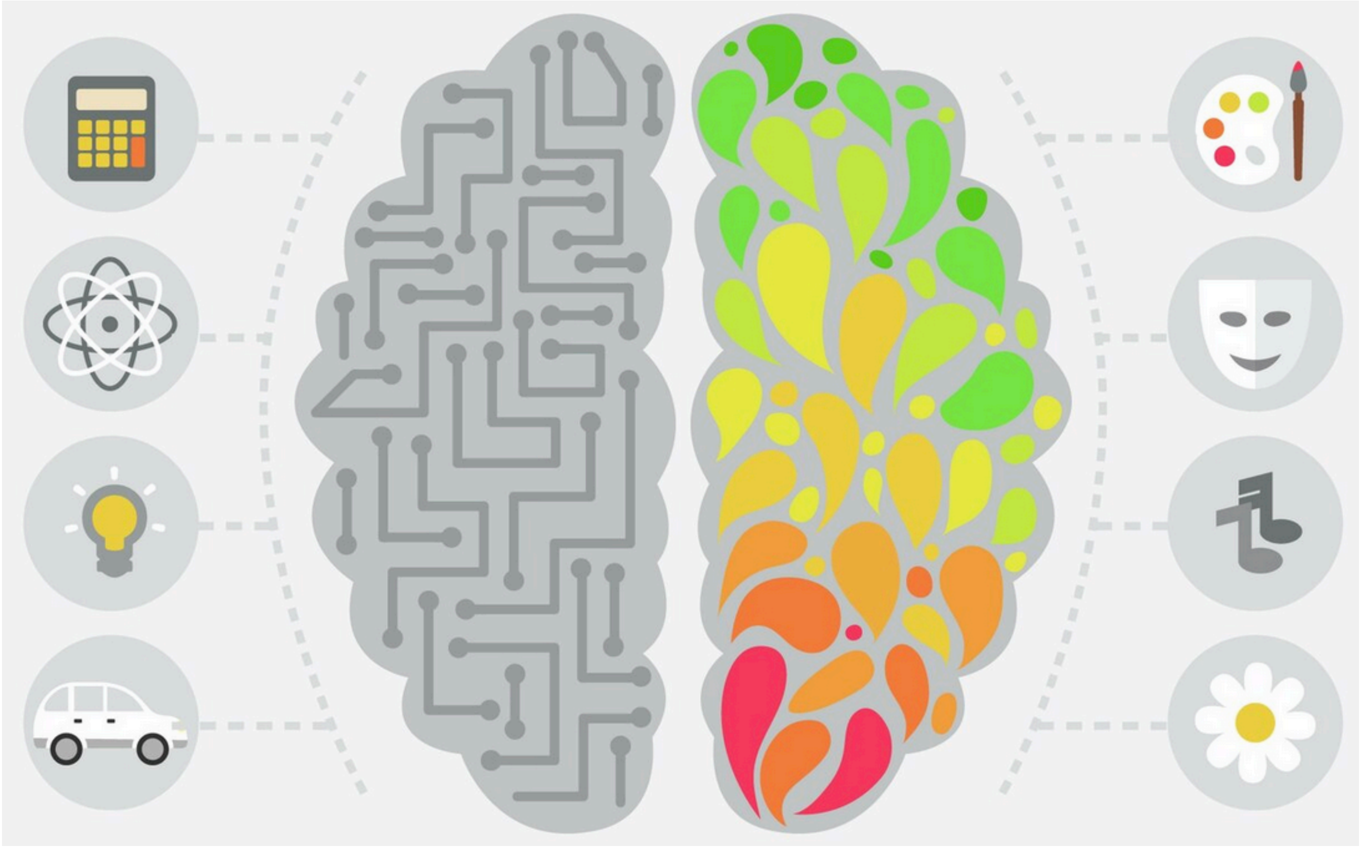
1. Unified Theory of Consciousness

A major missing link is the lack of a unified theory that fully explains consciousness. This theory would need to bridge the gap between the subjective experience of consciousness (phenomenology) and its objective neural correlates.



2. Detailed Mapping of Neural Correlates

Understanding the precise neural correlates of consciousness (NCCs) is crucial. This involves identifying which neural mechanisms and processes in the brain are directly associated with conscious experience. While significant progress has been made, a complete mapping is still elusive.

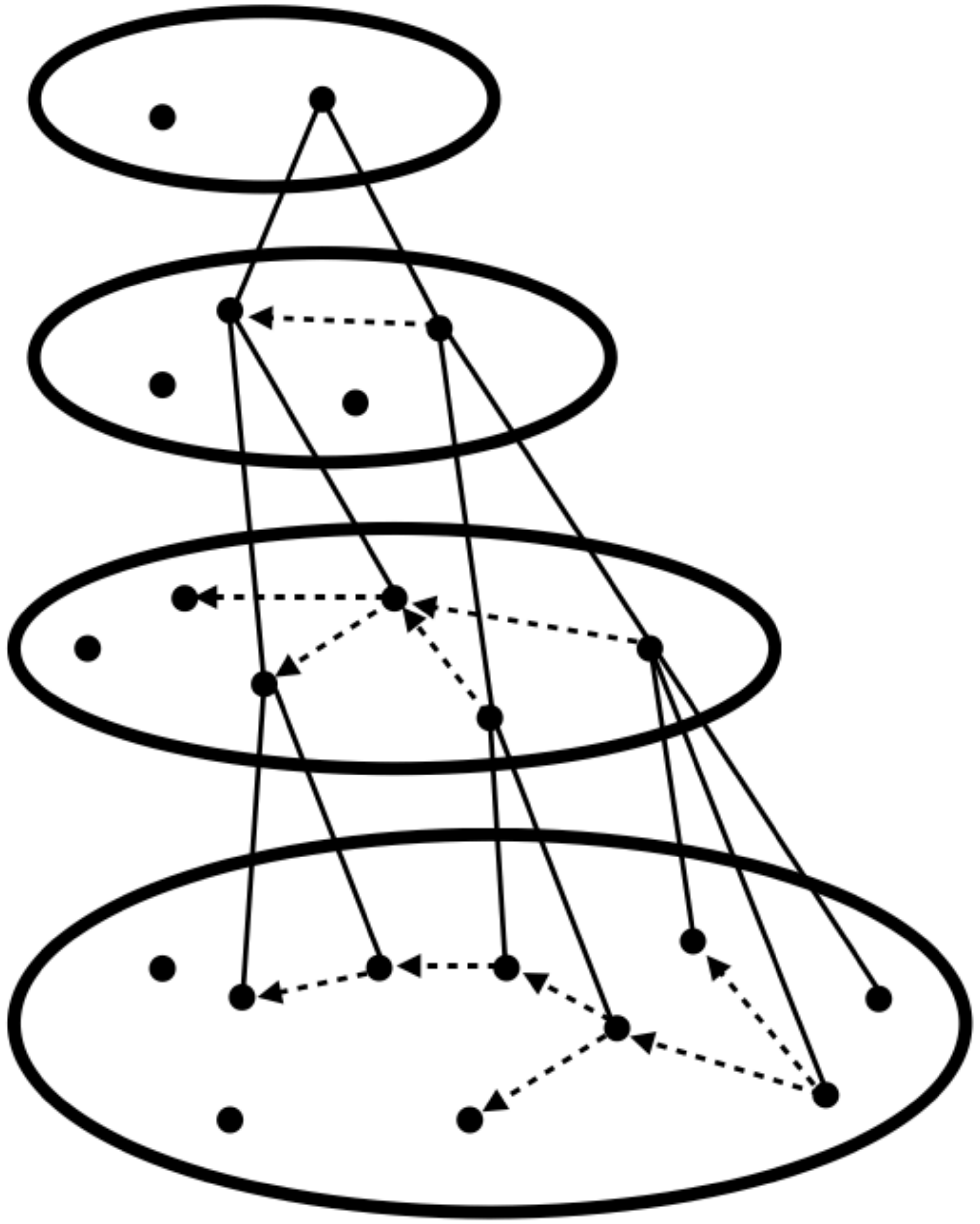


3. Mechanisms of Integration and Binding

The brain integrates information across various regions to create a unified conscious experience. The mechanisms behind this integration, often referred to as the "binding problem," are not fully understood. How does the brain integrate sensory inputs, memories, and cognitive functions into a single, coherent experience?

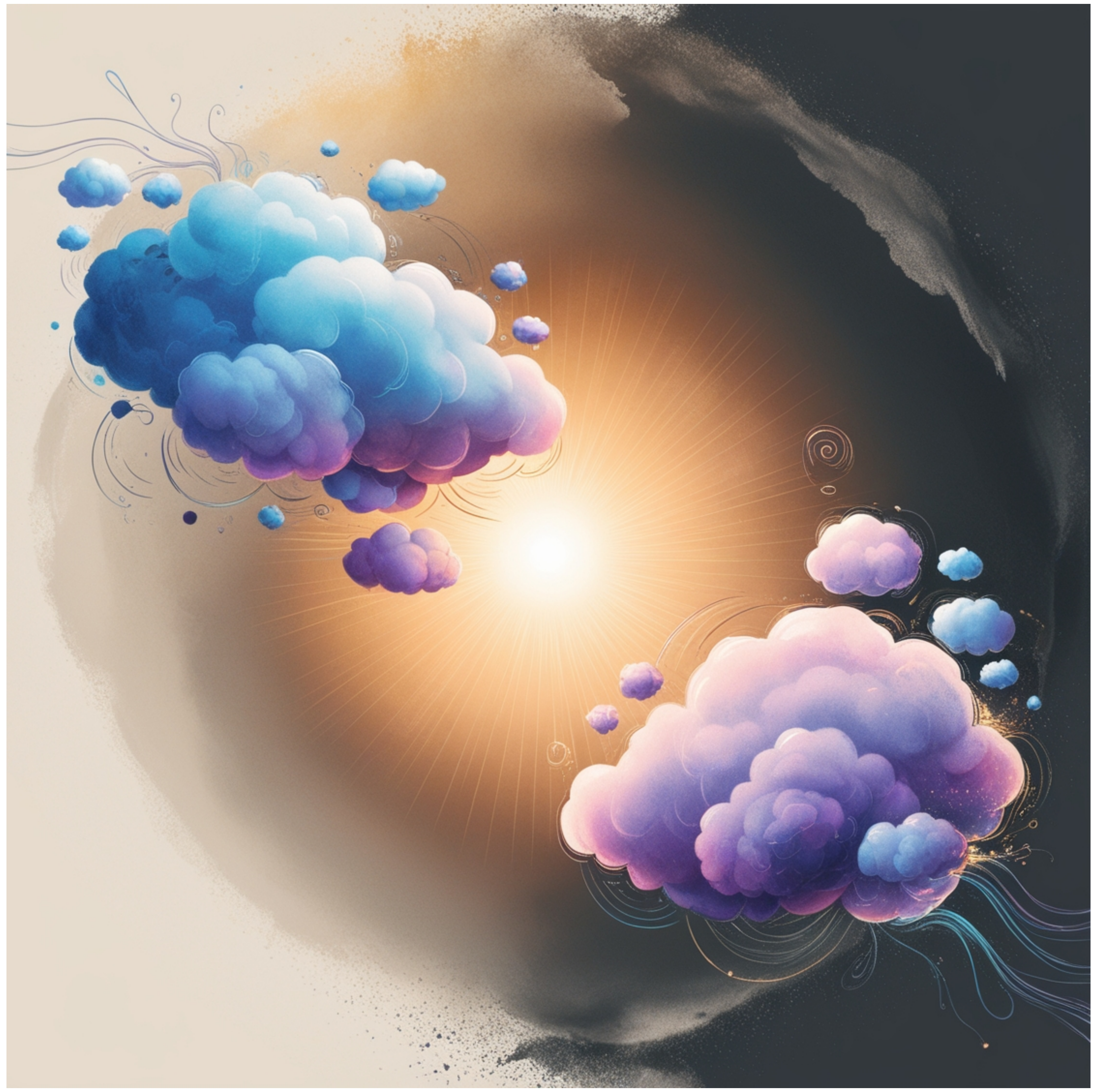
4. Computational Models of Consciousness

Developing computational models that can simulate conscious processes is another critical area. These models need to account for the dynamic, emergent properties of consciousness, which are not yet fully captured by existing artificial intelligence and machine learning systems.



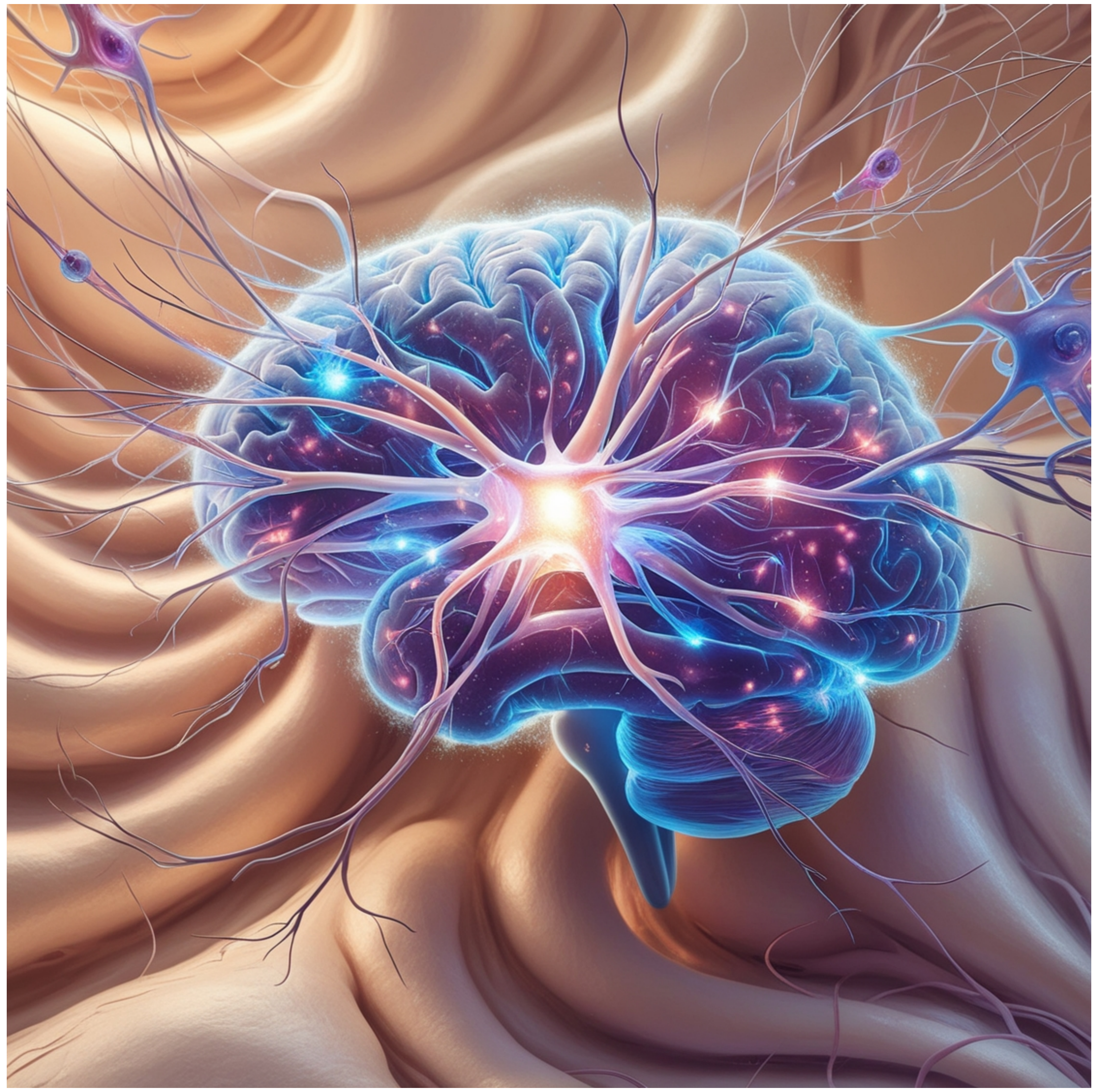
5. Understanding Subjective Experience (Qualia)

Qualia, the subjective aspects of conscious experience (e.g., what it feels like to see the color red), remain one of the most challenging aspects to explain scientifically. Bridging the gap between objective neural processes and subjective experiences is a significant hurdle.



6. Neural Plasticity and Development

Consciousness likely evolves and changes through neural plasticity and developmental processes. Understanding how these processes contribute to the emergence and maintenance of consciousness over a lifetime is essential.



And ChatGTP also mentions…

7. Interdisciplinary Approaches

8. Ethical and Philosophical Considerations

9. Advanced Brain Imaging and Data Analysis Techniques

And comes to the conclusion..

The quest to explain consciousness requires integrating knowledge from diverse fields to overcome these missing links. Each of these areas presents significant scientific and philosophical challenges, and progress will likely be incremental and collaborative. Understanding consciousness fully may not only <u>unlock new frontiers</u> in science but also <u>reshape our understanding</u> of what it means to be conscious beings.

So our task is *just* to understand and build a system capable of:

- Connecting subjective experience to neural correlates.
- Integrate sensory inputs, memories, and cognitive functions into a single, coherent experience.
- Dynamic, emergent properties.
- Evolves and changes through neural plasticity.

Before we start it would be wise to <u>think hard</u> about the right environment needed to realise this

1) In what “world” is our brain?

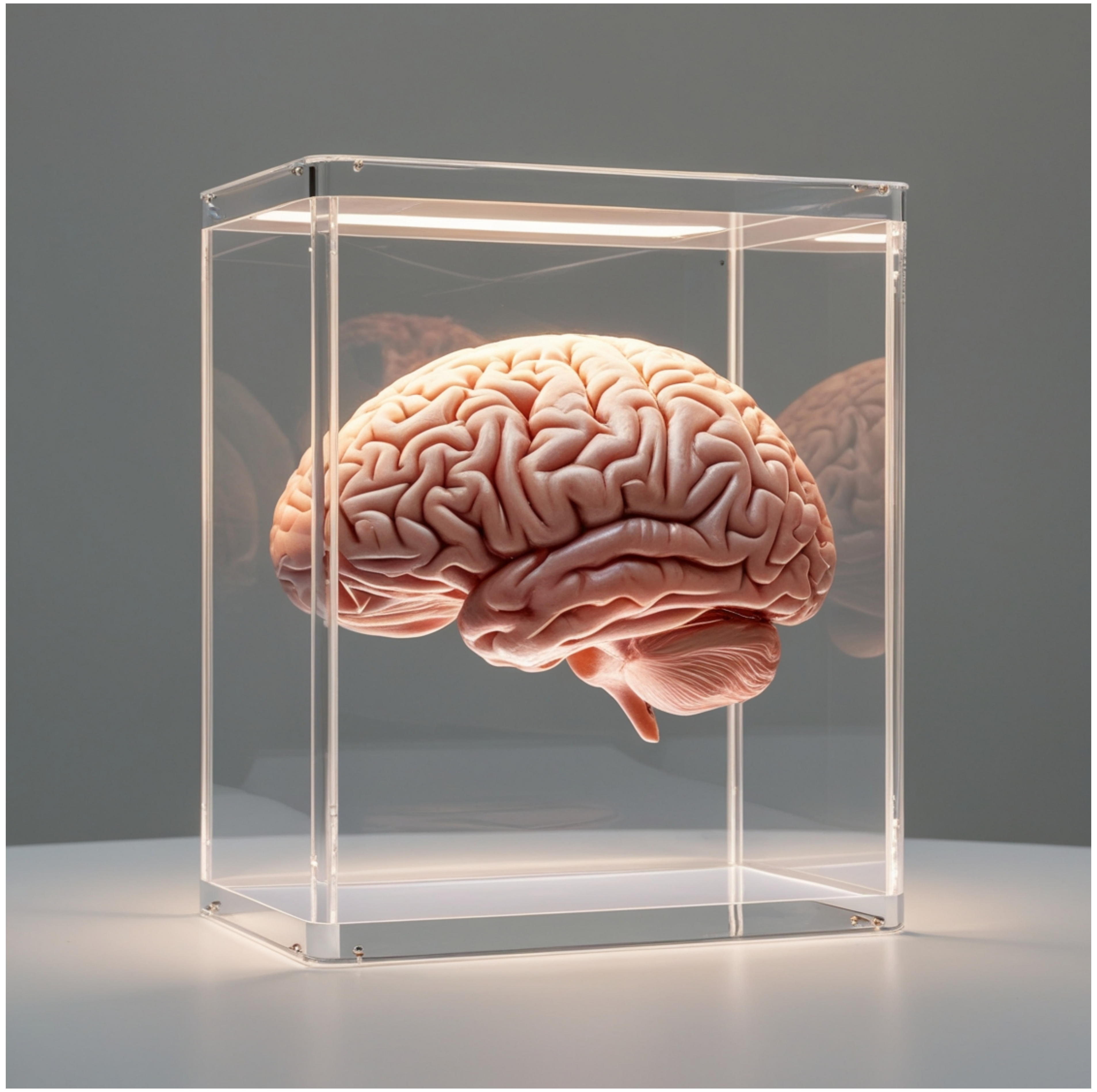
2) How is our brain connected to the world?

3) What can our brain do?

4) What constraints is there?

1) In what "world" is our brain?

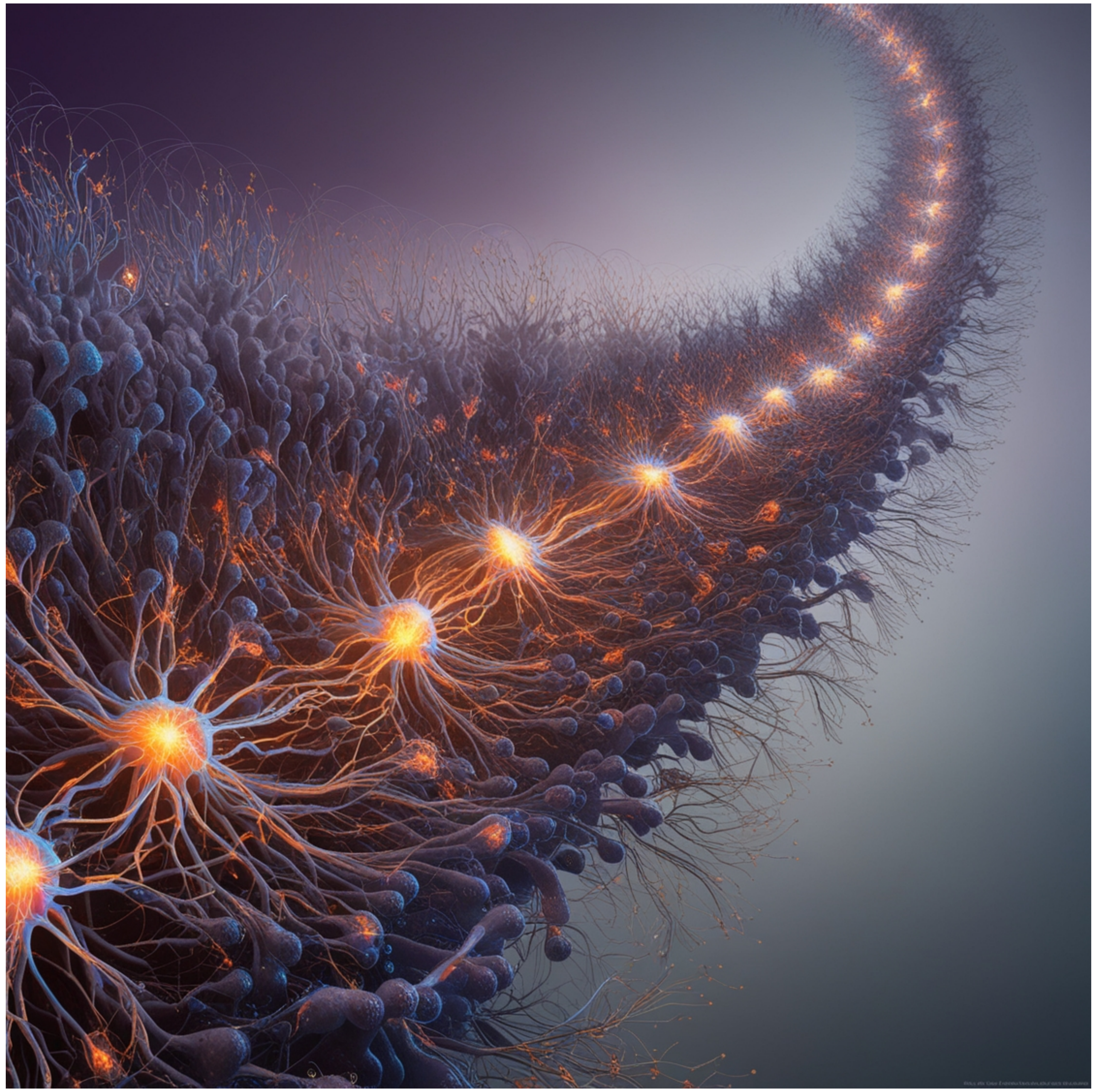
Lives inside our scull, basically a box shielding the brain from the rest of the outer world



2) How is our brain connected to the world?

Through an interface of nerve cells and fibres

Embodiment



3) What can our brain do?

Think

Always running

Relax

Daydream

Compare

Judge

Imagine

Relate things

Build meaning

Remembers

Forgets

4) What constraints is there?

The combination of the simple actions the individual nerve cells can do (only receive/send simple electrical signals)

Simultaneously signaling in the brain

Limited storage capacity

Needs feedback (embodiment) to interact with an external world

Low power usage

Be able to learn anything!

!

What should our computing environment be able to?

Detecting co-occurences of events (receive information)

Build synchronisation patterns (learning)

Handling <u>lots</u> of concurrently running and looping processes

Coordination between groups of active processes (neurons)

Remember things

Forget things

Find things (fast associative search)

<u>Be reasonable fast to be of any practical use</u>

InforistaSpace

A concurrent data sharing space

Information is shared by the concept of tuples

Special build features, detection of co and notco occurrences

Associative search in constant time

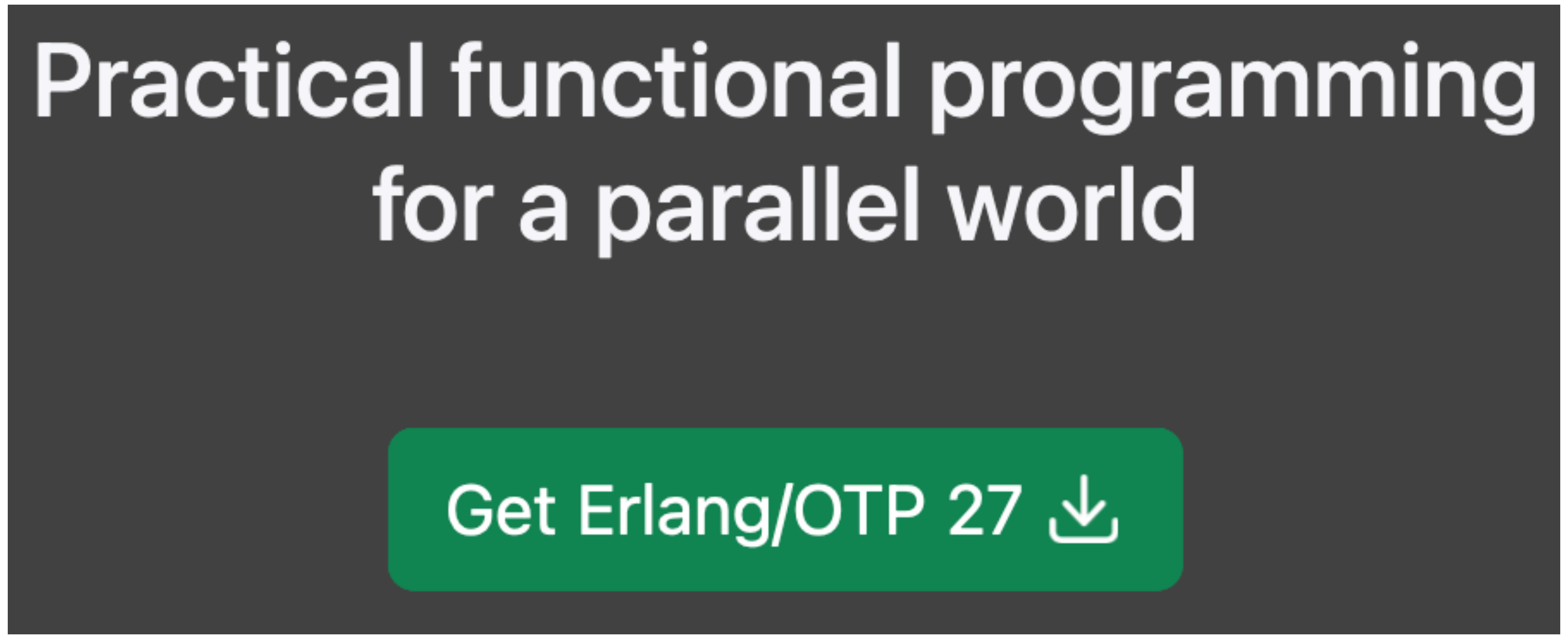
Blocking and non blocking operations

Fast and scalable

A broadcast listen paradigm

https://www.erlang.org/

ERLANG



InforistaSpace operations:

Out(tuple) Out(tuple, priority)

In(tuple) Inp(tuple)

Rd(tuple) Rdp(tuple)

Co(tuple-list) NotCo(tuple-list)

Find(tuple) FindAll(tuples)

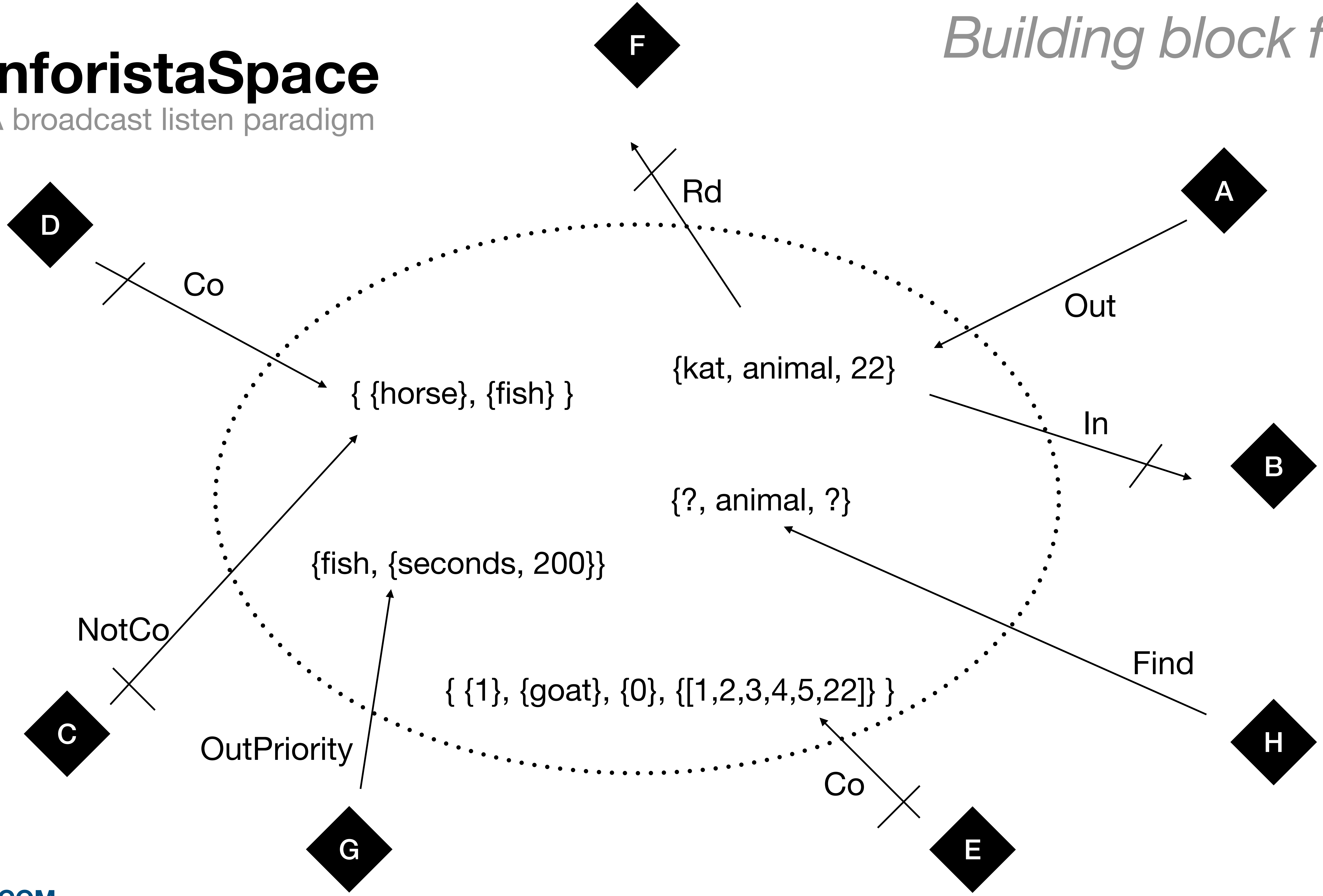
.. and som extra minor used operations

Operations on InforistaSpace is <u>running concurrently and is even transactional safe</u>! No serial bottleneck.

InforistaSpace

A broadcast listen paradigm

Building block for AGI

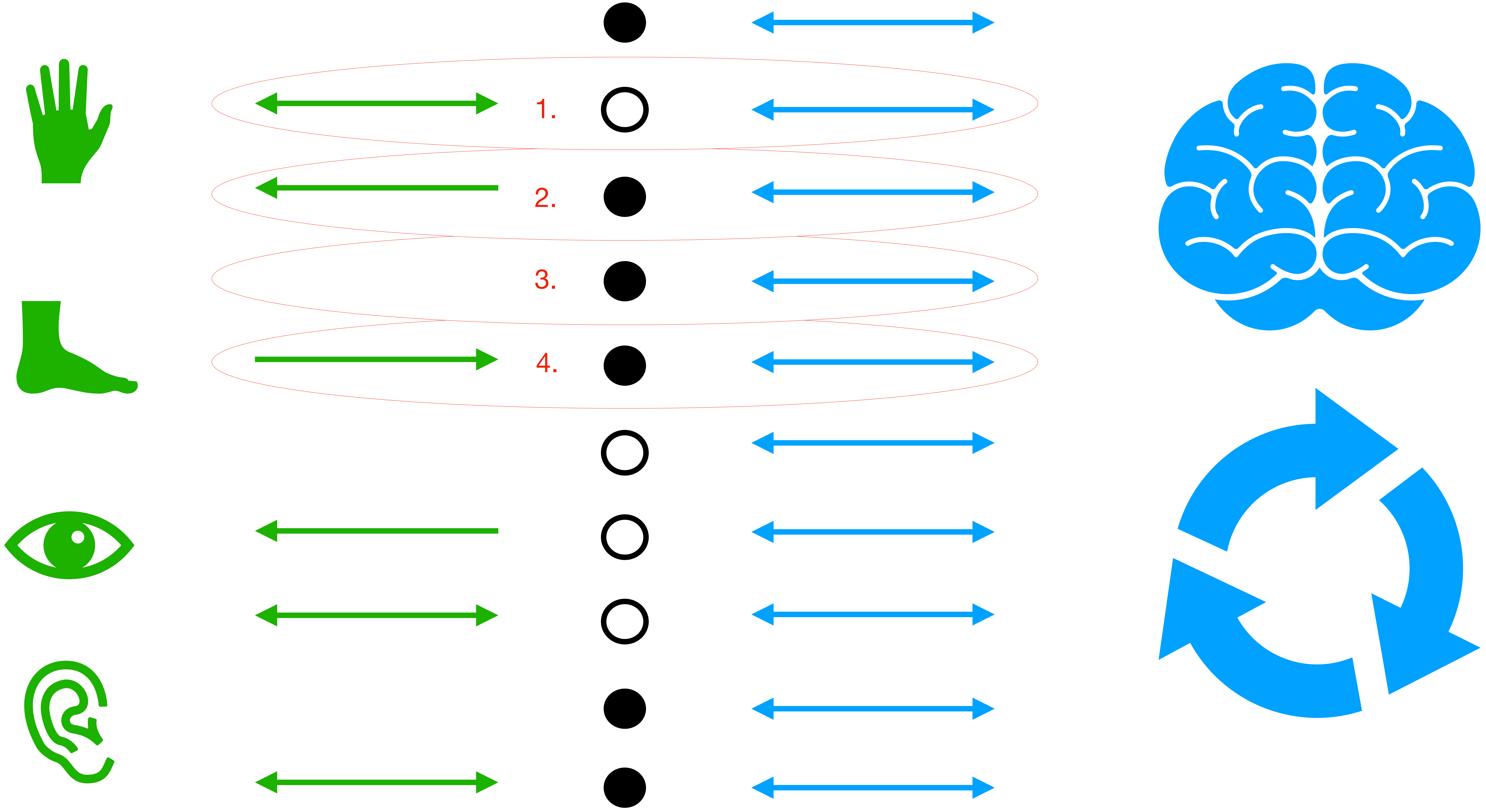


My recent insight

The importance of sensor interface

Embodiment (world)

Brain (inside world)

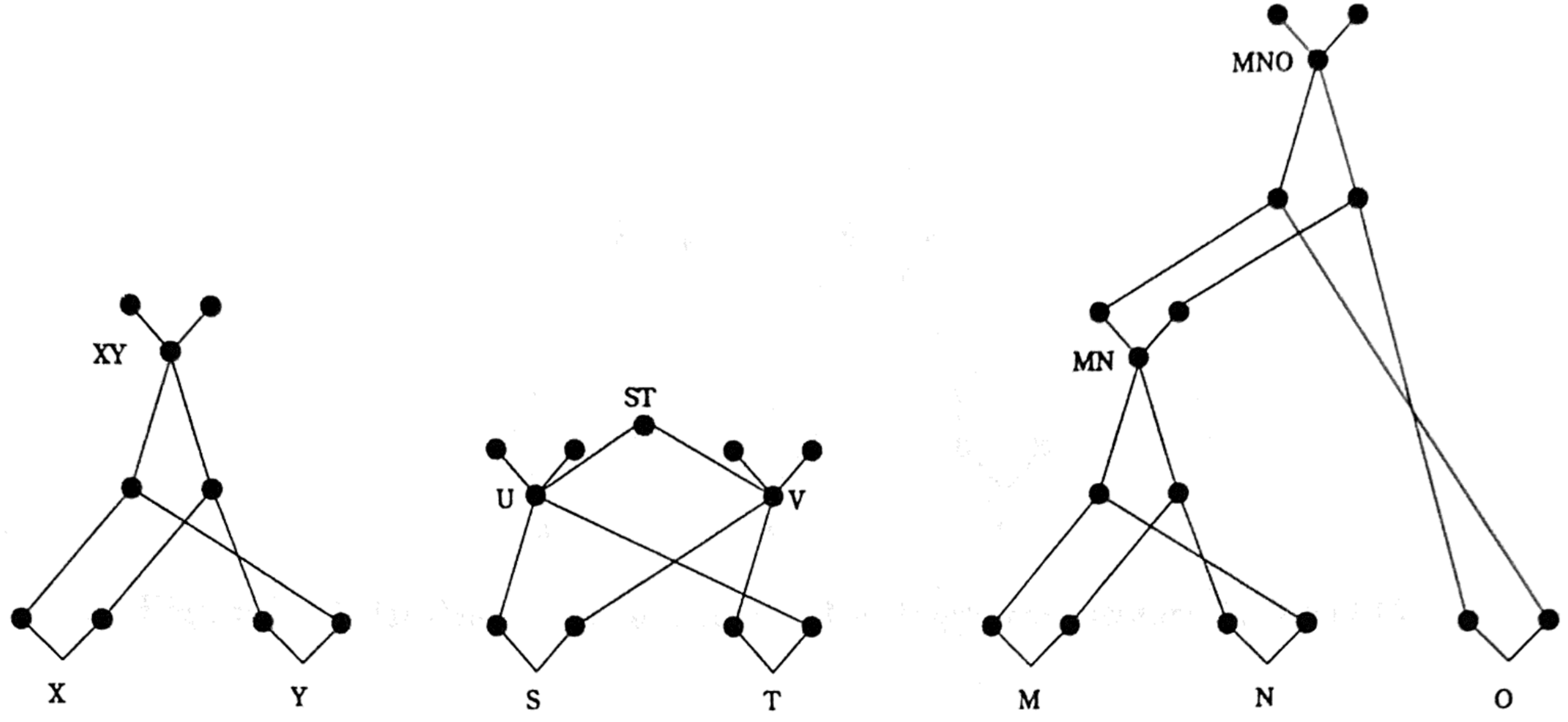


Patterns of synchronisation

Co-occurrence build information, do not consume it

Relate patterns (subjective experience)

Planning - low and high level



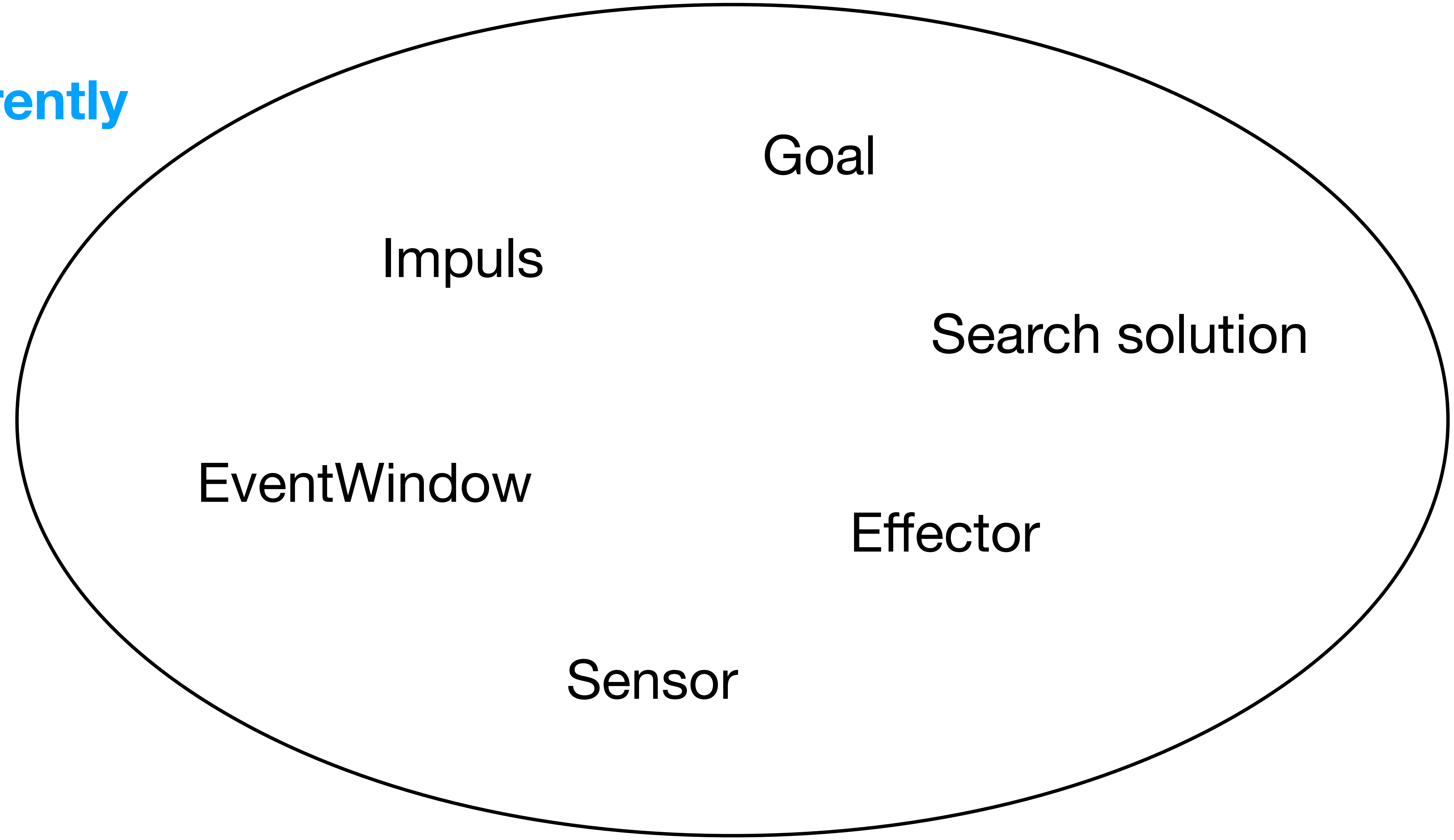
Brain Computing environment

No concept of time,

just plenty of change!

millions of concurrently

running processes

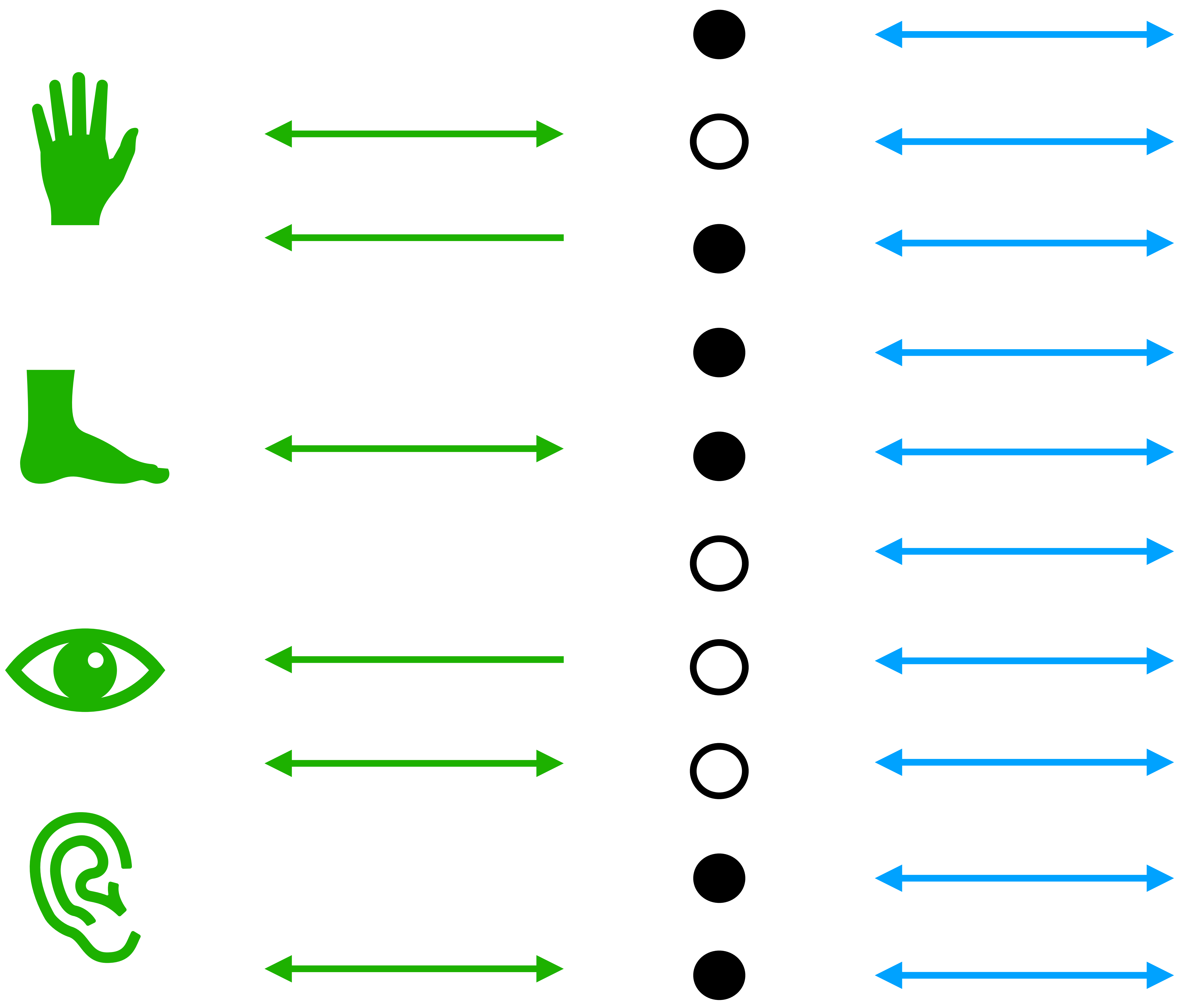


Neural plasticity

Framework of conscious

Brain (inside world)

Embodiment (world)



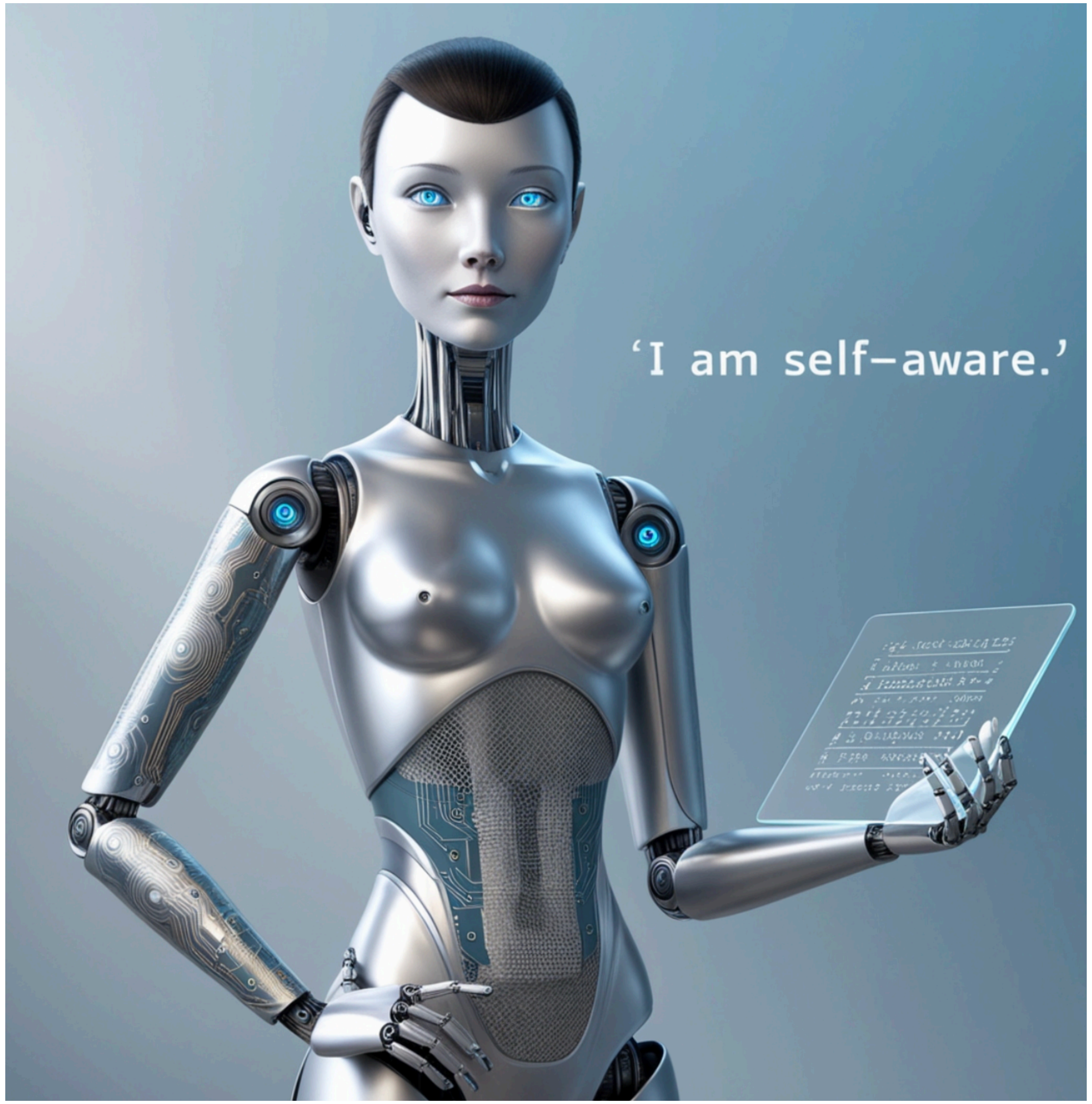
Explains:

- Delayed output
- Thinking and dreaming
- Higher thinking (consciousness)
- Fast reaction (low level task)
- Slow reaction (high level task)
- Neural plasticity
- Qualia, feeling of the colour red

Next steps in the development

1. InforistaSpace - make it production ready
2. Brain Computing - build, test and improve
3. Add embodiment
4. Let the system interact with the world and educate it

And of course think about the implications of living with <u>individual</u> conscious computing entities in our future



Thank you for your time

Ulrik Vendelbo

(independent researcher)

Interested in helping this project of a real general artificial intelligence system?

Contact me, ulrik@inforista.com

for a coffee and a talk 😊