

# Artificial Intelligence and Anthropogeny

## Glossary

**Artificial intelligence (AI):** a form of intelligence in which a machine system is able to make rational decisions based on perception of its environment.

**Auditory system:** the part of the **nervous system** that processes how we hear and understand sounds.

**Axon (nerve fiber):** in invertebrates, a long, slender projection of a **neuron** that transmits information (as electrical impulses) to different neurons, muscles, and glands.

**Brain connectivity:** a pattern of links between distinct units within the **nervous system**.

**Central nervous system (CNS):** the majority of the **nervous system** that consists of the brain, spinal cord, retina, optic nerves, and olfactory epithelium. The CNS integrates sensory information and coordinates and influences the activity of the body in bilaterally symmetric animals (all multicellular animals except sponges and radially symmetric animals such as jellyfish).

**Developmental psychology:** the study of physical, cognitive, social, intellectual, perceptual, personality, and emotional growth and development over the lifespan.

**Displaced reference:** the ability to refer to entities, properties, and events at some spatial and/or temporal remove from the immediate communicative situation (Kluender, 2020).

**Eusociality:** a form of social structure featuring cooperative brood care, overlapping generations of adults, and a reproductive and non-reproductive division of labor. Eusociality is observed in ants, bees, wasps, termites, the **naked mole-rats**, and some shrimp. Humans may engage in a weak form of eusociality but this is still debated.

**Glia (neuroglia):** Non-neuronal cells in the **central nervous system** and the peripheral nervous system that do not produce electrical impulses. Their function is to ensure homeostasis, form **myelin sheaths**, and provide support and protection for **neurons**. Glia make up ~50% of our brain cells.

**Haptic:** sensory perception and manipulation of objects through touch and **proprioception**.

**Heuristics:** any problem solving strategy that involves the usage of generalizations as mental shortcuts to quickly come to adequate solutions for complex problems.

**Internal feedback model:** a proposition in which some of a system's output is returned through the input for processing, which allows the system to make adjustments in the output.

**Internal model (motor control):** a process that stimulates the response of the system in order to estimate the outcome of a system disturbance.

**Language (Human):** a structured system of communication that is generative (combine words/symbols to convey an infinite number of ideas), **recursive** (builds upon itself without limit), and has **displaced reference** (describe things not present).

**Large language models (LLMs):** machine learning algorithms that can recognize, summarize, translate, predict, and generate human languages on the basis of very large text-based datasets.

**Lexeme:** a basic unit of lexical meaning core to set of related words (play, plays, playing, played, player, with play as the lexeme).

**Lexicon (Linguistics):** the vocabulary of a person, language, or branch of knowledge.

**Linguistics:** the scientific study of human language.

**Motor pathway:** a part of the **nervous system** that carries signals from the brain to skeletal muscle and smooth muscle.

**Motor system:** the part of the **nervous system** that controls voluntary movement.

**Motor theory of vocal learning:** a theory that proposes the brain pathways that control the learning and production of song and speech were derived from adjacent **motor brain pathways**.

**Myelin sheath:** an insulating layer of fatty tissue (wrapped cell membrane) that protects nerve cells, especially their **axons**.

**Naked mole-rat (*Heterocephalus glaber*):** a burrowing rodent endemic to parts of Ethiopia, Kenya, and Somalia, and is the only mammal with cold-blooded-like body temperature regulation and **eusocial** behavior.

**Nervous system:** the network of nerve cells and fibers that transmits nerve impulses between parts of the body.

**Neural stem cell (NSC):** a self-renewing, multipotent cell that generates the **neurons** and **glia** of the **nervous system** of all animals during embryonic development. Some persist in the adult vertebrate brain and continue to produce neurons throughout life.

**Neurogenesis:** the process by which **neural stem cells** produce neurons.

**Neurolinguistics:** a branch of **linguistics** that examines the connection between language and the structure and functioning of the brain.

**Neuron:** a specialized cell that transmits nerve impulses.

**Neuroscience:** a multidisciplinary science that is concerned with the study of the structure and function of the **nervous system**. It encompasses the evolution, development, cellular and molecular biology, physiology, anatomy and pharmacology of the nervous system, as well as computational, behavioral and cognitive neuroscience.

**Parallel architecture:** a theory of the mental representations (or "data structures") involved in the language faculty that are organized by **phonology**, **syntax**, and **semantics**.

**Phonology (Linguistics):** the organization of the sounds or signs in language.

**Plasticity (brain):** the ability of the brain to change and adapt to new information. These changes can involve the establishment of new synapses or new neurons in some regions.

**Proprioception:** the awareness of the position and movement of the body.

**Psychological AI:** an approach to machine intelligence that also incorporates other features of human intelligence such as causal reasoning, intuitive psychology, and physics.

**Recursion (Language):** the ability to embed linguistic structures of similar types within each other.

**Semantics (Linguistics):** the study of the logic and meaning of a word, phrase, sentence, or text.

**Synapse:** a structure that forms the connection between a neuron and another cell (neuron or other effector cell), that allows for transmission of electrical or chemical signals.

**Synaptic plasticity:** the ability of synapses to change in relation to activity and inactivity, with these changes as central to communication between **neurons** and memory.

**Syntax:** the arrangement of words and phrases to create well-formed sentences in a **language**.

*This glossary is the product of the Anthropogeny Graduate Specialization students, Anthropogeny faculty, and CARTA staff.*