AGI: INTELLIGENCE LEVELS

CLASSIFICATION BY CAPABILITY

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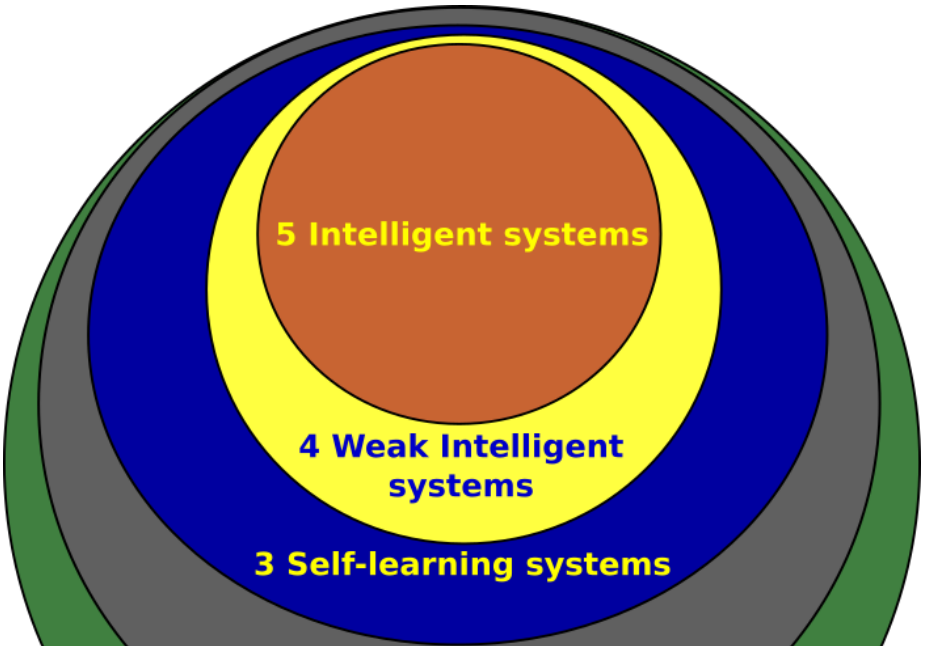
The two main components of the term AGI are "***generality***" and "***intelligence***." We have already discussed Generality; now, let's discuss ***intelligence***. The classification proposed below, as it seems, is constructive and reflects the features essential for AI. It consists of six levels, where each next level adds more capabilities and is more complex than the previous one:



environment.

Examples: *inanimate nature (water turns to ice and back again depending on the temperature); automatic store door; automatic light control that turns on when a human is nearby; contemporary neural networks at the operational phase.*

1 Adaptable system with fused control

Combination of ***unadaptable*** elements. Such a system reacts to changes in the environment by changing a fixed number of "predefined" parameters. Any change of state means changing the whole set of system parameters. For each system's component, the rest of them plays the role of the environment; the ***entire collection forms feedback loop***(s) in a way that reduces the state's dependence on changes in the environment.

Examples[1]: *unicellular creatures; plants; some human-made mechanical/electrical devices; contemporary neural networks at training phase.*

2 Adaptable systems with explicit control systems whose behavior depends on a limited number of recent events.

The presence of a control system simultaneously means ***sensors*** (that provide information about the situation) and ***actuators*** (that implement actions constructed by the control system). Differentiation between the ***control system*** and the ***controlled component*** allows accelerating the response to external events radically.

Examples: *most insects; industrial control systems.*

3 Self-learning systems capable of collecting experience as a filtered sequence of most significant events, discovering consequences of their own actions, and modifying behavior continuously by analyzing accumulated experience.

Examples: *birds, mammals, and octopuses.*

4 Weak intelligent systems capable of detecting a single cause of events when cause immediately precedes consequence in time.

Important note: *we refer specifically to detecting the **causes** of consequence, not detection of **statistical correlations**. These are essentially different concepts; the difference between **correlation** and **causation** will be discussed in a future chapter.*

Such systems use the discovered cause-and-effect relationships to:

- ***filter events, separating significant from insignificant ones***
- ***avoid unwanted situations***
- ***promote desirable situations***

Examples: *certain species of crows, parrots, and monkeys.*

5 Intelligent systems capable of discovering causes of events, when such a cause is a combination of several factors (including hidden ones) and/or when cause and consequence are distant in the time, and quantitative relationships.

Quantitative relationship assumes ***numerical dependencies between measurable values***, for example, the relationship between the radius of a circle and its area, between coordinates in different coordinate systems, and so on.

Such a level of intelligence achieved by humans represents the goal for AGI development.

Most of today's neural network-based systems in the above classification fall into "Adaptable systems with fused control" during training and into "Unadaptable systems" during use.

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1 *Examples that refer level of animal intelligence reflects current estimation that can be changed as a result of new experimental data*

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