

# Intelligence definitions

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The following lists the definitions of intelligence that have been given by various researchers in AGI over the years. Note that most of these definitions have been extracted from *A Collection of Definitions of Intelligence*<sup>1</sup> by Shane Legg and Marcus Hutter.

... the ability of a system to act appropriately in an uncertain environment, where appropriate action is that which increases the probability of success, and success is the achievement of behavioral subgoals that support the system's ultimate goal.

J. S. Albus<sup>2</sup>

Any system ... that generates adaptive behaviour to meet goals in a range of environments can be said to be intelligent.

D. Fogel<sup>3</sup>

Achieving complex goals in complex environments.

B. Goertzel<sup>4</sup>

Intelligent systems are expected to work, and work well, in many different environments. Their property of intelligence allows them to maximize the probability of success even if full knowledge of the situation is not available. Functioning of intelligent systems cannot be considered separately from the environment and the concrete situation including the goal.

R. R. Gudwin<sup>5</sup>

[Performance intelligence is] the successful (i.e., goal-achieving) performance of the system in a complicated environment.

J. A. Horst<sup>6</sup>

Intelligence is the ability to use optimally limited resources – including time – to achieve goals.

R. Kurzweil<sup>7</sup>

Intelligence is the power to rapidly find an adequate solution in what appears a priori (to observers) to be an immense search space.

D. Lenat and E. Feigenbaum<sup>8</sup>

Intelligence measures an agent's ability to achieve goals in a wide range of environments.

S. Legg and M. Hutter<sup>9</sup>

... doing well at a broad range of tasks is an empirical definition of 'intelligence'

H. Masum<sup>10</sup>

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<sup>1</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>2</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>3</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>4</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>5</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>6</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>7</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>8</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>9</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>10</sup><http://arxiv.org/pdf/0706.3639.pdf>

Intelligence is the computational part of the ability to achieve goals in the world. Varying kinds and degrees of intelligence occur in people, many animals and some machines.

J. McCarthy<sup>11</sup>

... the ability to solve hard problems.

M. Minsky<sup>12</sup>

Intelligence is the ability to process information properly in a complex environment. The criteria of properness are not predefined and hence not available beforehand. They are acquired as a result of the information processing.

H. Nakashima<sup>13</sup>

... in any real situation behavior appropriate to the ends of the system and adaptive to the demands of the environment can occur, within some limits of speed and complexity.

A. Newell and H. A. Simon [29]<sup>14</sup>

[An intelligent agent does what] is appropriate for its circumstances and its goal, it is flexible to changing environments and changing goals, it learns from experience, and it makes appropriate choices given perceptual limitations and finite computation.

D. Poole<sup>15</sup>

Intelligence means getting better over time.

Schank<sup>16</sup>

Intelligence is the ability for an information processing system to adapt to its environment with insufficient knowledge and resources.

P. Wang<sup>17</sup>

... the mental ability to sustain successful life.

K. Warwick<sup>18</sup>

... the essential, domain-independent skills necessary for acquiring a wide range of domain-specific knowledge – the ability to learn anything. Achieving this with ‘artificial general intelligence’ (AGI) requires a highly adaptive, general-purpose system that can autonomously acquire an extremely wide range of specific knowledge and skills and can improve its own cognitive ability through self-directed learning.

P. Voss<sup>19</sup>

## 1 References

- <http://arxiv.org/abs/0706.3639>
- Marcus Hutter - What is Intelligence? AIXI & Induction

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<sup>11</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>12</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>13</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>14</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>15</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>16</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>17</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>18</sup><http://arxiv.org/pdf/0706.3639.pdf>

<sup>19</sup><http://arxiv.org/pdf/0706.3639.pdf>