

ENGINEERING ARTIFICIAL INTELLIGENCE

GLOSSARY OF AI TERMS



artificial intelligence
control systems
expert systems
intelligent control systems
microcontroller
microprocessor
neural networks
telemetric sensing technology

artificial intelligence (AI)

Artificial Intelligence (AI) is a set of software tools that enables computers to think like humans to solve problems. These tools include neural networks, "brain-like" feedback systems that enable computers to learn and refine knowledge gained from experience, and expert systems which can solve real-world problems using human knowledge and following human reasoning skills.

control systems

Control systems are an integral part of our daily life. Heater and air conditioners in our homes maintain temperature within our comfort zones. In our cars, things such as power steering, cruise control, and automatic transmission are based on automatic control systems. Air craft, automated manufacturing tools, and self guided agricultural equipment all use control systems to stay on track and perform their functions under all kinds of disturbances and fluctuations in the environments they are used.

expert systems

An expert system can solve real-world problems using human knowledge and following human reasoning skills. Knowledge and thinking processes of experts are collected and encoded into a knowledge base. From that point on, the expert system could replace or assist the human experts in making complex decisions by integrating all the knowledge it has in its knowledge base.

intelligent control systems

Complex systems must operate under various conditions and disturbances, and artificial intelligence techniques offer an excellent alternative to classical control theory techniques. This type of control, is based on artificial intelligence techniques. Incorporating artificial intelligence into control systems allows these systems to be more flexible, to adapt to various operating conditions and disturbances, and to incorporate human expertise and thinking into their decision-making process.

microcontroller

A microprocessor whose sole purpose is to monitor and control a process.

microprocessor

The heart of an electronic monitoring and control system.

neural networks

Humans, through neurons in their brains, learn how to read human writing, recognize a bad apple from a good one or identify their child from a group of children. Neural networks allow computers to use the same principles that neurons in the brains use to recognize and classify different patterns. So in a way, neural networks are a digital representation (although very simplified) of our brains.

Neural networks are made of artificial neurons, connected by weights, which are indicative of the strengths of the connections. The neurons are arranged in layers, and depending on the complexity of the application, there could be hundreds or thousands of neurons. Iterative propagation of input from one layer of neurons to the next (training) is what enables the neural network to learn from experience.

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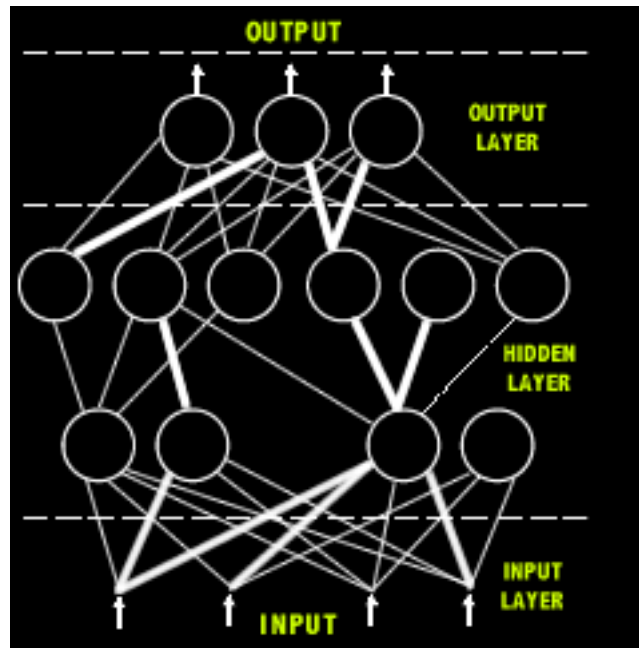
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neural networks (cont'd)

Unlike humans, when a neural is fully trained, it can classify and identify patterns in massive amounts of complex data, at high speeds that can not be duplicated by humans.



Circles in this illustration indicate individual nodes. The solid lines that connect the layers indicate positive connections; the wider the line, the stronger the connection. Broken lines represent negative or inhibitory links.

telemetric sensing technology

Microsensors implanted inside live animals measure things like deep body temperature and other physiological responses. These devices relay information, or raw data, to a computer or controller that monitors and controls an automated process that affects the animal.

