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Contents

1 Questions:

1.1 Q 1: To what extent are modern robots being modelled on human and other animal systems? Does it make sense to build humanoid robots, or are other configurations more appropriate?

Modern robots are being modeled on human and other animal systems to varying degrees, depending on the application and the goals of the robot designer. Here are some examples:

Humanoid robots: Humanoid robots are designed to resemble humans in their appearance and behavior. These robots often have arms, legs, and a head, and they are designed to perform tasks that require human-like dexterity and mobility.

Biomimetic robots: Biomimetic robots are designed to mimic the behavior and physiology of animals. These robots often have unique features, such as the ability to fly, swim, or climb, and they are designed to perform tasks that are difficult or impossible for traditional robots. Ultimately, the choice of robot configuration depends on the specific task and the constraints of the environment in which the robot will operate. Some tasks may require a humanoid robot to interact with humans in a social and intuitive way, while other tasks may require a robot to have specialized sensors or actuators that are not found in human or animal systems.

1.2 Q 3: What is the state-of-the-art in humanoid robot building?

The state-of-the-art in humanoid robot building is constantly evolving, as researchers and engineers make new breakthroughs in areas such as control, perception, and machine learning. Here are some examples of recent advances in humanoid robot building:

Dynamic walking: One of the biggest challenges in humanoid robot building is achieving stable, efficient walking. Recent advances in control algorithms and mechanical design have enabled robots such as Boston Dynamics' Atlas and Honda's Asimo to walk with more human-like gait and stability.

Human-robot interaction: As robots become more human-like in their appearance and behavior, researchers are exploring new ways for humans to interact with them. This includes developing more natural and intuitive interfaces, such as voice and gesture recognition, and enabling robots to understand and respond to social cues such as facial expressions and body language.

While these and other advances in humanoid robot building are impressive, there are still many challenges to overcome before humanoid robots can become a ubiquitous presence in our daily lives. These challenges include developing more robust and reliable control systems, improving the power efficiency of robot designs, and addressing ethical and social concerns around the use of robots in human society.

1.3 Q 6: How are long term and short term knowledge commonly represented/encoded within a neural network?

Short-term knowledge in a neural network is commonly represented by the activation of neurons and the strength of their connections. This information is stored in the synaptic weights between neurons and can be updated in response to new data or experiences. Long-term knowledge is typically encoded in the structural properties of the neural network, such as the number and arrangement of neurons and the overall architecture of the network.

The distinction between symbolic and sub-symbolic systems refers to the way that information is represented and processed. Symbolic systems use discrete symbols to represent concepts, and use rules to manipulate those symbols to perform computations. Sub-symbolic systems, on the other hand, operate on continuous, distributed representations of information that are learned through training. Neural networks are an example of a sub-symbolic system, as they represent information in the form of patterns of activation across large populations of neurons.

While neural networks are sub-symbolic systems, the brain is capable of performing symbolic computations as well. Some researchers have proposed that symbolic processing in the brain is achieved through the interaction of multiple sub-symbolic systems, each of which performs a different aspect of the overall computation.