HUMANOID ROBOTS

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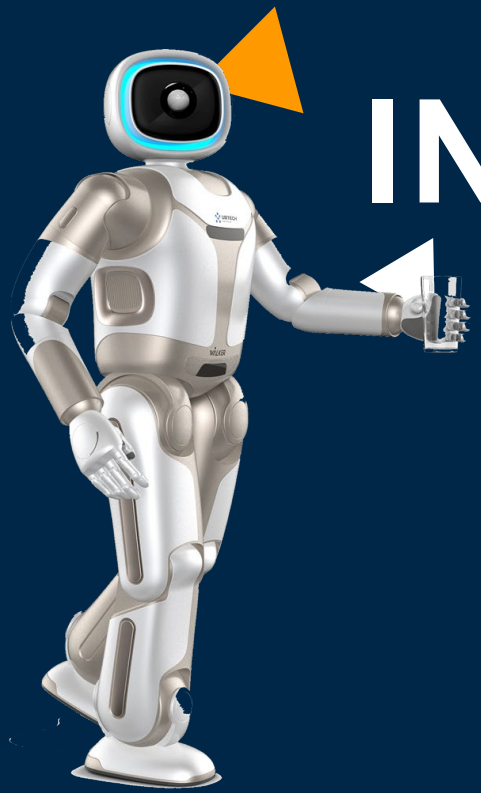
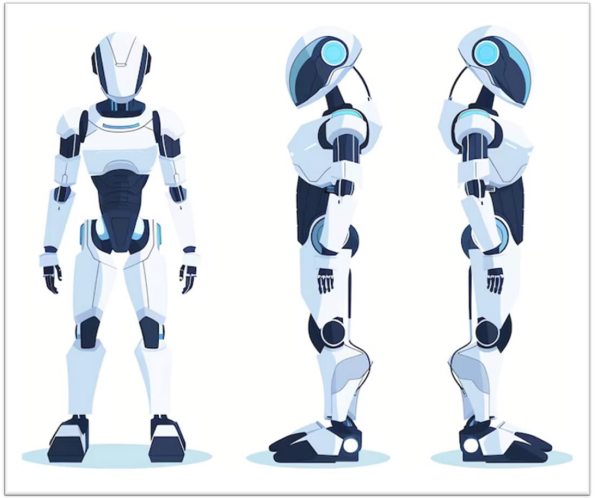


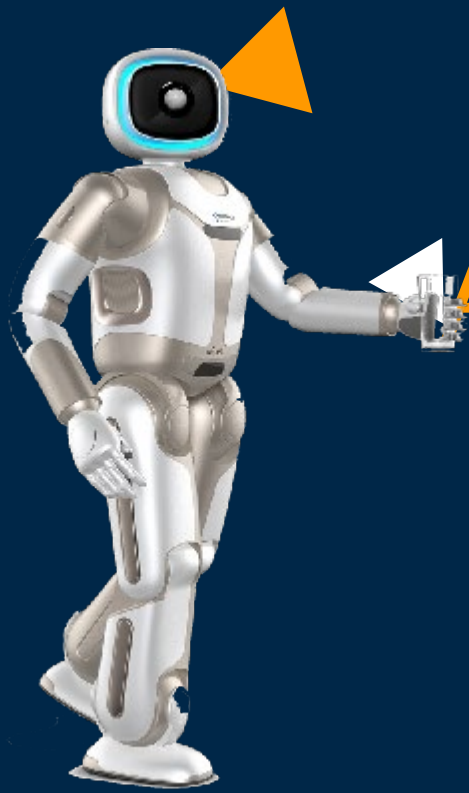
INTRODUCTION

Robots that are designed to resemble the human body, often with a head, torso, arms, and legs, allow them to perform tasks in similar ways to humans.

These robots can be equipped with sensors, cameras, microphones, and other components that allow them to perceive their surroundings, process information, and act accordingly—whether it's walking, lifting objects, or engaging in conversation.

They are created to imitate human motions and behaviors, enabling them to interact in human-centered environments and assist in tasks that require mobility, dexterity, or social interaction.





BRIEF HISTORY AND EVOLUTION

Brief History and Evolution

1930 - Elektro, Westinghouse Electric Corporation,perform simple tasks like moving its arms and "speaking."

1973 - WABOT Project first full-scale humanoid robot. WABOT-1 could walk, grasp objects, and even carry on simple conversations

1993-1997 - Honda started developing robots with enhanced mobility, walk and climb stairs. These prototypes laid the groundwork for ASIMO.

2000 - QRIO by Sony and Robovie by ATR in Japan were developed to interact with people more socially.

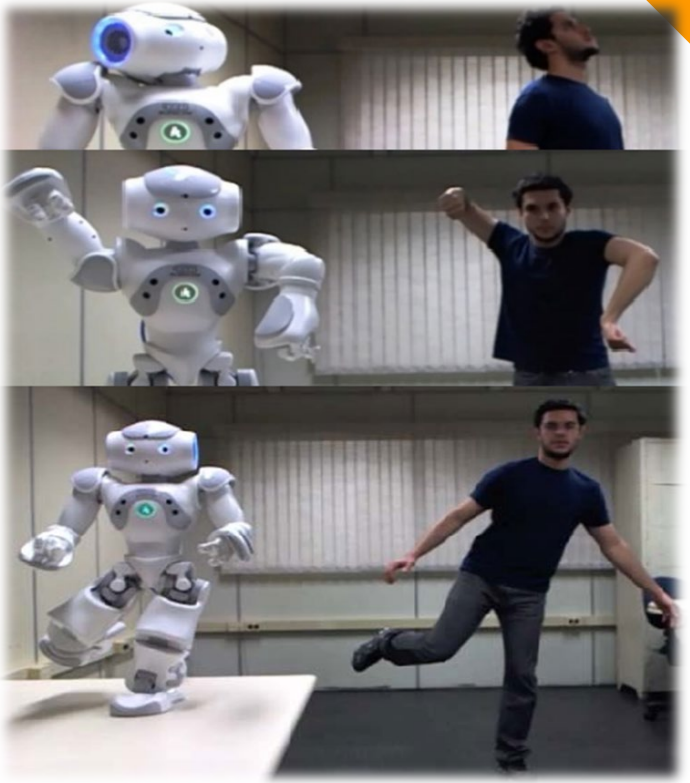
2006 - NAO first humanoid robots widely used in education

2014 - Pepper recognize and respond to human emotions

Brief History and Evolution

Future Directions for Humanoid Robots

- Humanoid robots are expected to incorporate more sophisticated AI, allowing them to learn from interactions and provide personalized experiences.
- As technology progresses, humanoid robots are becoming more affordable, which could lead to their widespread adoption in education and even in homes.
- Future humanoid robots might integrate seamlessly into multiple subjects, assisting in everything from language learning and STEM to social studies and soft skill development.



TYPES OF HUMANOID ROBOTS

Types of Humanoid Robots

Service Humanoid Robots

assist humans in daily taska, such a homes, offices, and hospitals.

Educational Humanoid Robots

To facilitate learning by engaging students and providing hands-on experiences in programming, STEM subjects, and social skills.

Industrial Humanoid Robots

Work alongside humans in industria settings, performing tasks like assembly welding, and packing.

Medical and Assistive Humanoid Robots

Assist in medical and therapeutic applications, providing support to patients, caregivers, and medical professionals.

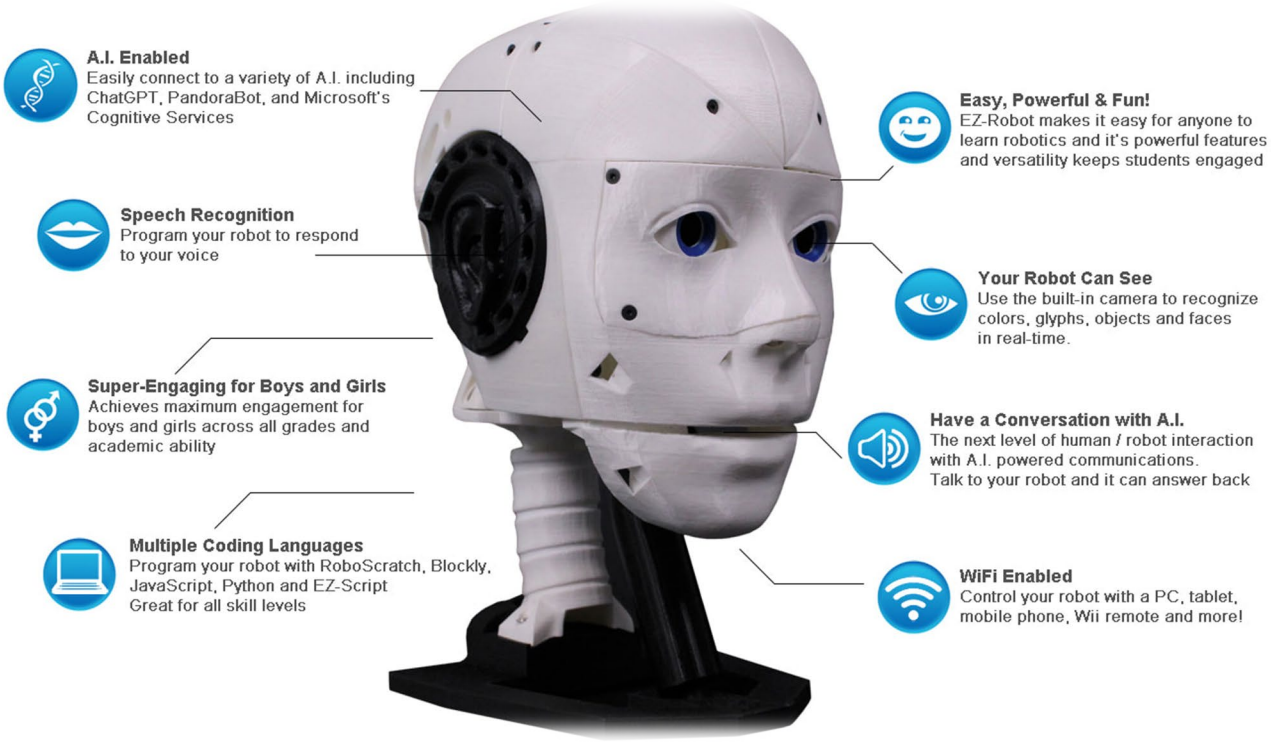
STRUCTURAL COMPONENTS AND FUNCTIONS

Structural Components And Functions

Head

Houses sensors (e.g., cameras, microphones) for perception and interaction.

The head may also include displays for visual feedback or communication.

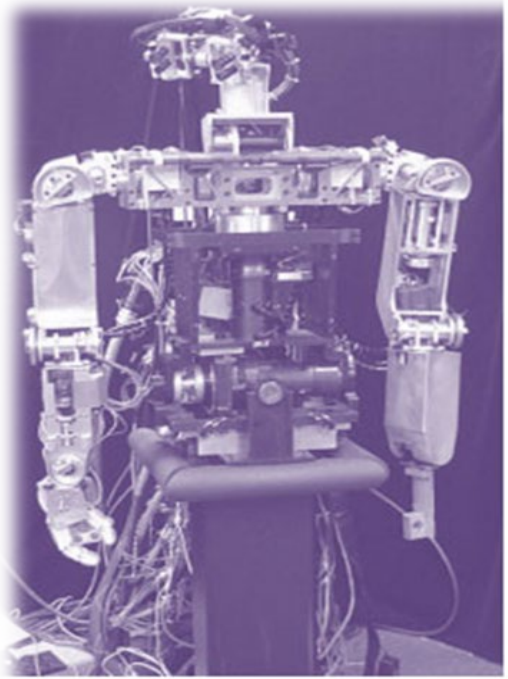


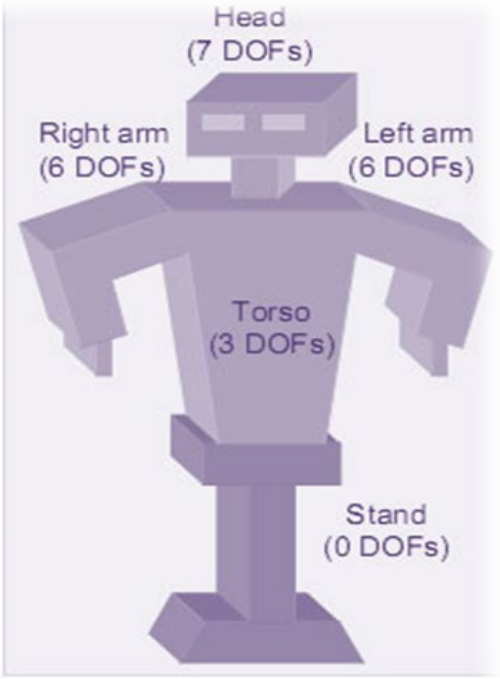
Structural Components And Functions

Torso

Provides support for the robot's body and houses vital components like batteries and control systems.

It also connects the head and limbs, enabling stability and movement..



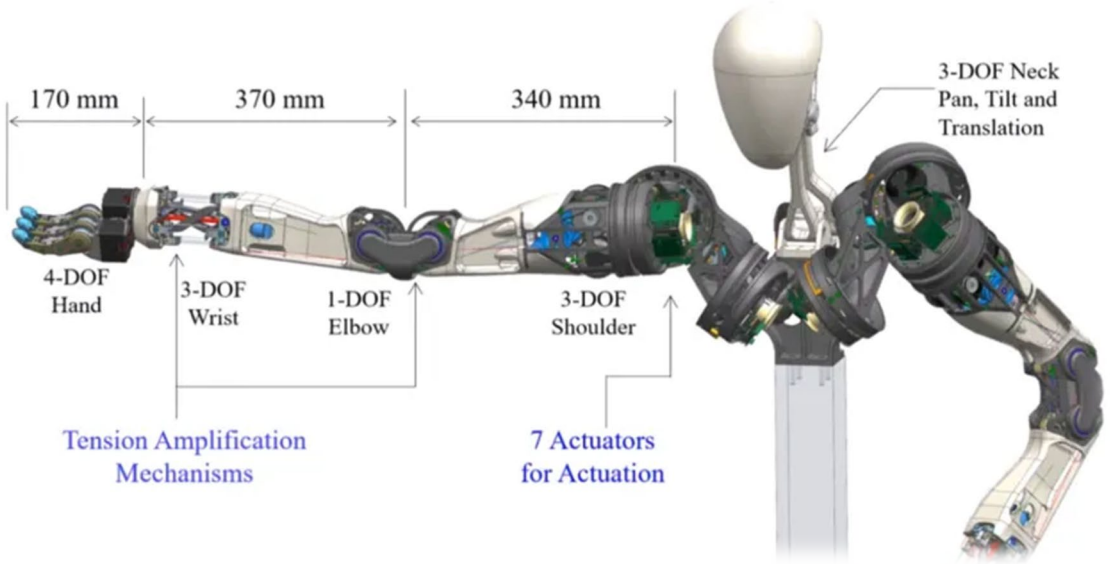


Structural Components And Functions

Limbs (Arms and Legs)

Allow the robot to move, interact with objects, and perform tasks that require dexterity.

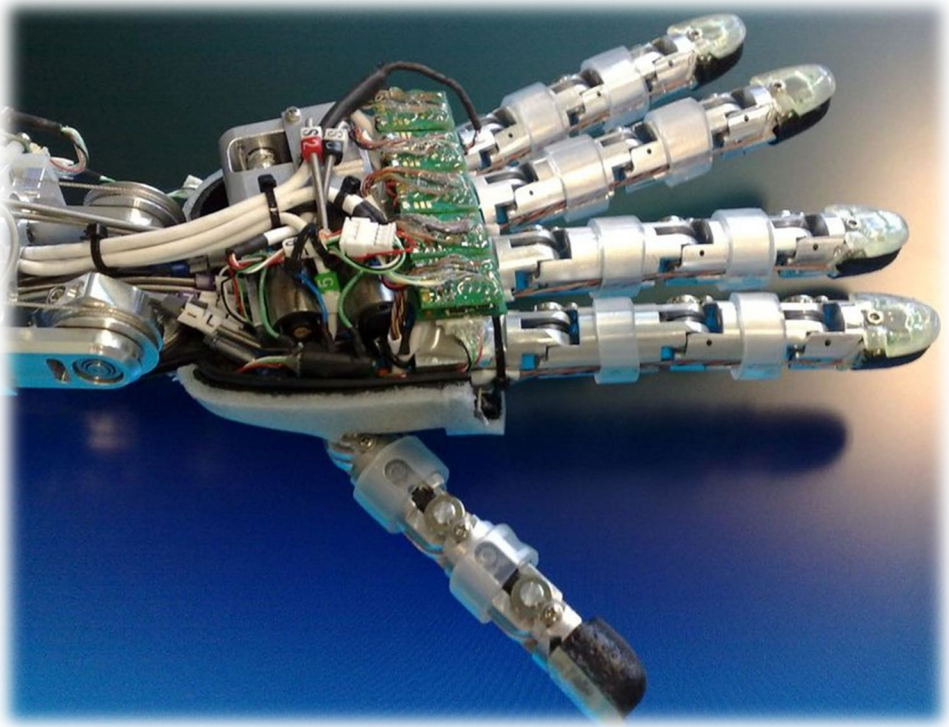
Arms typically have multiple joints for a range of motion, while legs enable walking or other locomotion methodst.

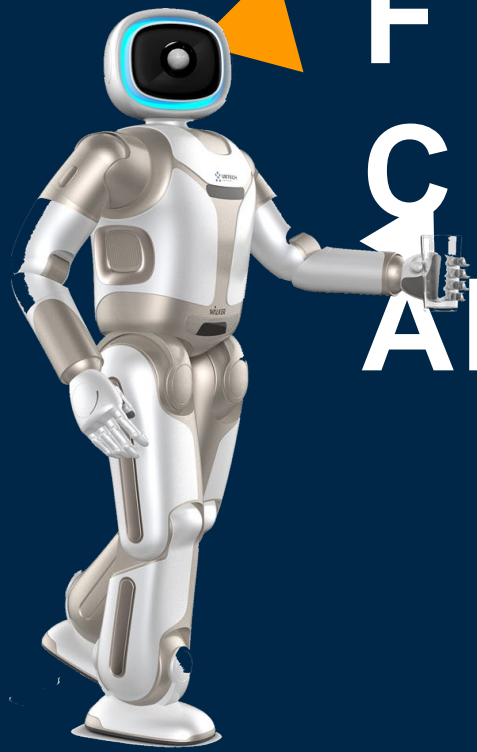


Structural Components And Functions

Hands

Equipped with fingers or gripping mechanisms for manipulating objects. Some humanoid robots have advanced hands capable of performing delicate tasks..



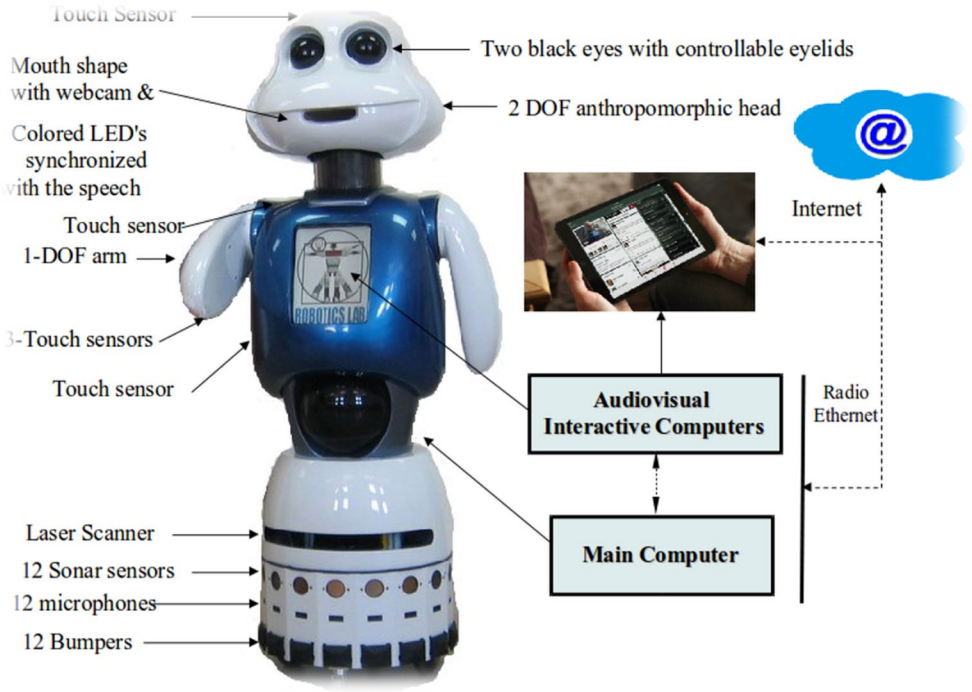


FUNCTIONAL COMPONENTS AND FUNCTIONS

Functional Components And Functions

Sensors

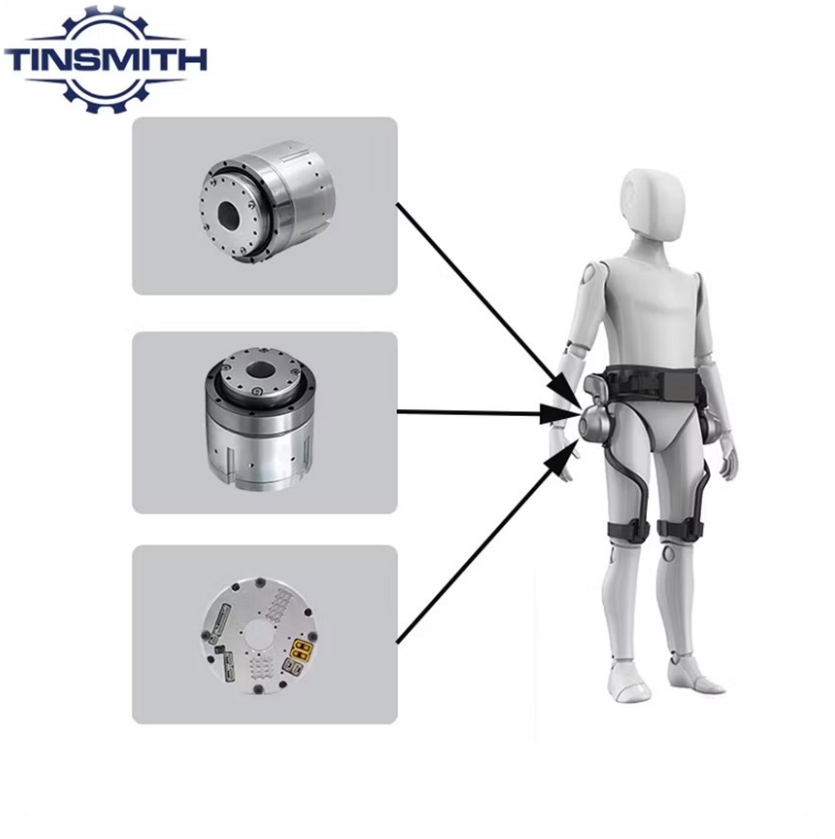
Examples cameras, microphones, infrared sensors, touch sensors, and gyroscopes. Enable the robot to perceive its environment, recognize objects, detect obstacles, and interact with humans.



Functional Components And Functions

Actuators

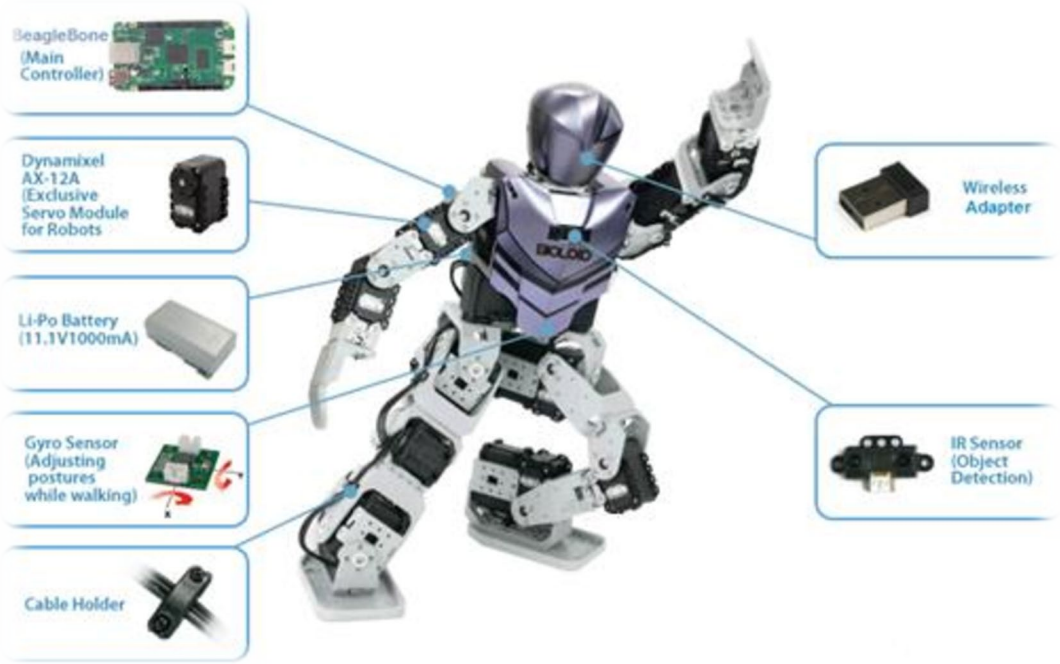
Can be electric motors, pneumatic systems, or hydraulic systems. Responsible for movement and manipulation, actuators convert electrical signals into physical motion, allowing joints to rotate and limbs to moves.



Functional Components And Functions

Control System

Acts as the robot's "brain," processing data from sensors and sending commands to the actuators. It often includes a microcontroller or a computer running software that controls the robot's behavior.



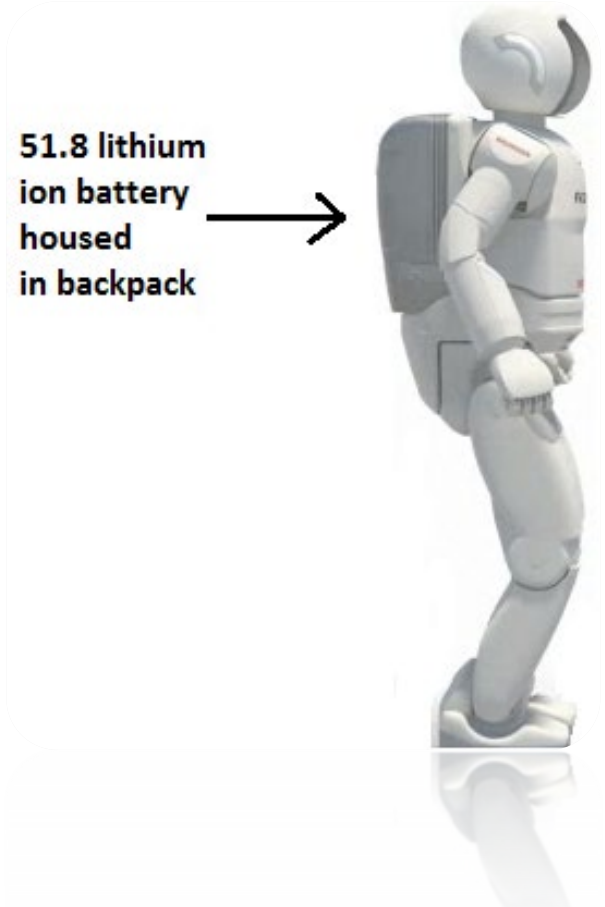
Functional Components And Functions

Power Supply

Batteries or other energy sources.

Provides the necessary power for the robot to operate.

Energy management is crucial for ensuring the robot has enough power to perform its tasks.

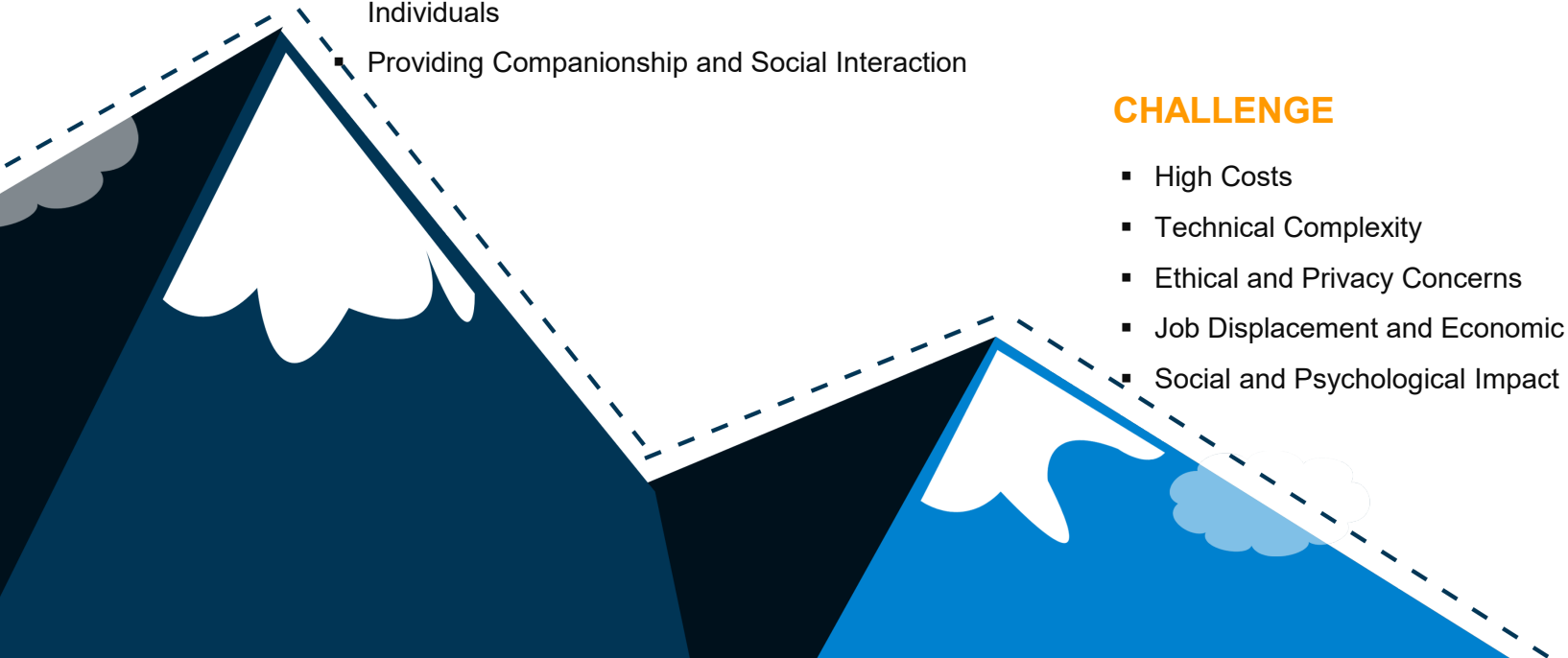


ADVANTAGES AND CHALLENGES OF HUMANOID ROBOTS

Advantages And Challenges of Humanoid Robots

ADVANTAGES

- Assist in Repetitive and Dangerous Tasksw
- Enhancing Human Productivity
- Educational Benefits
- Increased Accessibility and Assistance for Disabled Individuals
- Providing Companionship and Social Interaction



CHALLENGE

- High Costs
- Technical Complexity
- Ethical and Privacy Concerns
- Job Displacement and Economic Impact
- Social and Psychological Impact

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