

Robotics Arm

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Abstract: *A robotic arm is a programmable mechanical device designed to perform tasks similar to a human arm with precision, speed, and accuracy. It is widely used in various industries such as manufacturing, automation, healthcare, and space exploration. The robotic arm typically consists of joints, actuators, sensors, and end-effectors, all controlled by microcontrollers or computer systems. Each joint in the robotic arm provides a degree of freedom, allowing complex movements and operations such as lifting, rotating, and gripping objects. These arms can be controlled manually, through pre-programmed instructions, or by using artificial intelligence and machine learning algorithms for autonomous operation.*

The main objective of developing a robotic arm is to reduce human effort in repetitive, hazardous, or precise tasks. It increases productivity, ensures consistent quality, and enhances safety in working environments. In manufacturing industries, robotic arms are used for welding, painting, assembling, and packaging operations. In the medical field, they assist in surgeries, rehabilitation, and laboratory automation, offering superior accuracy and stability. In space exploration, robotic arms help in handling equipment and conducting experiments in environments unsafe for humans.

Modern robotic arms are integrated with sensors such as infrared, ultrasonic, or vision-based systems to detect obstacles and improve task performance. With the advancement of control systems, these arms can perform tasks that require fine motor skills and adaptive responses. The use of artificial intelligence and Internet of Things (IoT) has further enhanced their capability, allowing real-time monitoring, learning, and decision-making. The robotic arm's efficiency depends on its design, the precision of its actuators, and the sophistication of its control algorithms.

Keywords: Robotic Arm, Automation, Artificial Intelligence, Sensors, Actuators, Microcontroller, Industrial Robotics, Precision, Control System, End-Effector, Machine Learning, IoT, Human-Robot Collaboration, Manufacturing, Productivity, Safety, Robotics Engineering, Motion Control, Automation Technology, Intelligent Systems

