

Develop a Functional Robotic Arm Using 3D Printing

Omkar Handore, Swaroopa Shinde, Aliza Shaikh, Sanamraj Singh, Prof. Priyanka V. Kadam

Students, Guru Gobind Singh Polytechnic Nashik, Maharashtra, India¹⁻⁴

Faculty, Guru Gobind Singh Polytechnic Nashik, Maharashtra, India⁵

priyanka.kadam@ggsf.edu.in

Abstract: A robotic arm is a highly advanced mechanical device designed to perform tasks that replicate or exceed human arm capabilities. It is widely used in industries such as manufacturing, automotive, aerospace, healthcare, and even entertainment. These robotic systems excel at tasks requiring precision, speed, and reliability, such as assembly, material handling, welding, packaging, surgery, and scientific exploration. The versatility of robotic arms has made them essential in environments where accuracy, efficiency, and consistency are critical.

The goal of development of Robotic Arm is to enhance motor performance by increasing torque and reducing speed. This enables the arm to lift heavier loads, perform precise movements, and operate smoothly. By optimizing power transmission, the gearbox ensures efficient, stable, accurate operation, which is essential for tasks like assembly, welding, or material handling.

Main objective of this project work is to enhance the performance of the arm by optimizing power transmission. It increases torque, reduces speed, and improves precision, enabling the robotic arm to perform tasks efficiently, handle heavy loads, and maintain stability and accuracy. This ensures the arm can operate reliably in diverse applications, from industrial automation to delicate medical procedures. This innovative approach showcases the practical application of modern manufacturing techniques in robotics.

Keywords: Robotic Arm, 3 D Printing, AUTOCAD software, Torque, Speed, Industrial Automation, Gearbox, Manufacturing Technology.