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MAIN TYPE OF ROBOTIC ARMS - UNIVERSAL ROBOTS

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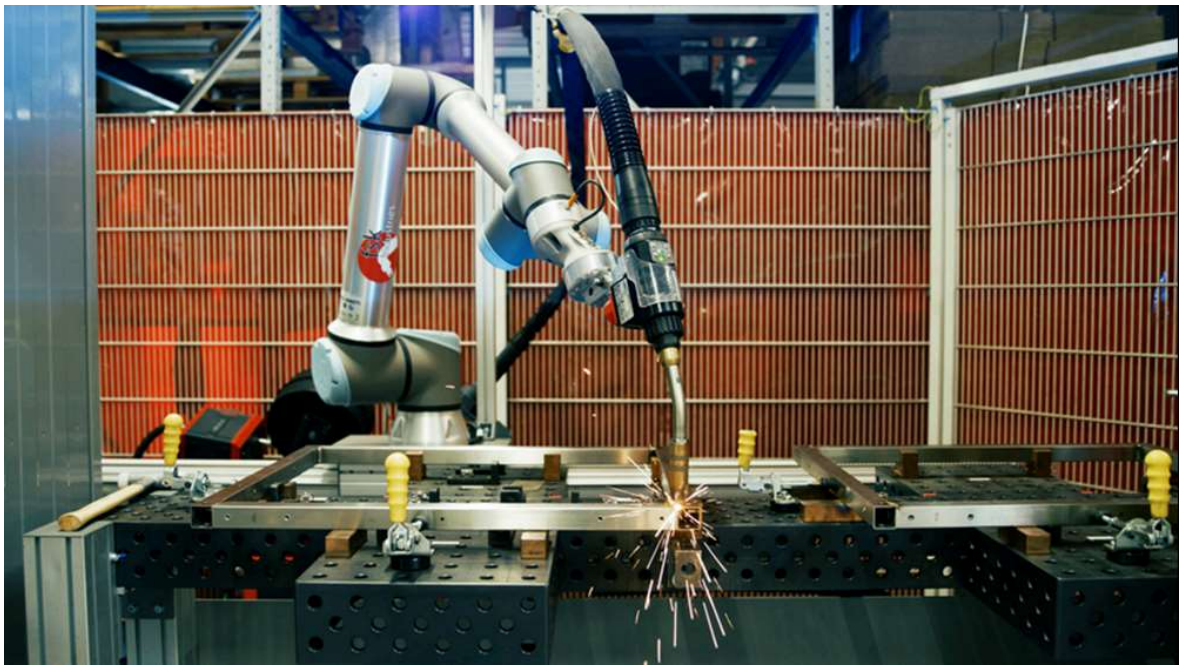

PREFACE

In the beginning of this century, robots were considered to be the future of manufacturing. Over the span of two decades since then, robots started becoming a vital part of several major manufacturing processes and have helped companies in achieving greater efficiencies in their domains. The advantages of robots in the manufacturing sector are numerous. Let us understand what robots are and how they are used in an

industrial setup. Here is a look at the major types of **robotic arms.**

INTRODUCTION

The primary types of robots that are used in industrial setups are **robotic arms**. **Robotic arms** have contributed to an increase in the efficacy of several industrial processes and an even higher increase in company profits worldwide. However, industrial arms are not all the same. Several different types of industrial arms are used for a variety of purposes in the industry. Some of these arms are used for more common goals, while others have been retained only for particular tasks. Here, we shall go over what **robotics arms** are and then try and understand the working and usage of the different types of **robotic arms** involved in industrial automation.

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WHAT IS A ROBOTIC ARM?

A **robotic arm** is an industrial equipment used to carry out repetitive tasks through a programmed motor. A **robotic arm** is primarily made up of a set of joints that allow the arm to access different locations in the space around it.

Typically, a **robotic arm** will have joints, actuators, and manipulators as some of its main components. The **robotic arm** is designed to replicate the motion of an actual human arm to the greatest extent possible. A robotic hand can be a standalone equipment used for individual tasks or can also be used as part of an extensive and more comprehensive machine. Many **robotic arms** that are used in different industries around the world are mounted on benchtops and can even be modular. Other **robotic**

arms are portable and can be programmed to do a wide variety of tasks.

An essential requirement for the operation of **robotic arms** is programming. Modern robotic hands are created to perform multiple sets of tasks. They are built to be versatile and carry out different tasks based on the input given by the programmer.

Among the major concepts associated with **robotic arms**, a feature that stands out is the **'degrees of freedom'**. Degrees of freedom represent the number of dimensions each joint of a robotic arm can rotate and translate. The degrees of freedom of the joints of a **robotic arm** are determining factors for its flexibility and versatility. They determine the fraction of the surrounding volume that the **robotic arm** will be able to access and the types of tasks it will carry out.

MAIN TYPES OF ROBOTIC ARMS

While the general build of a **robotic arm** is standard across the board, there are several different classifications of the equipment. Here are the different types of **robotic arms** that are used in the industry.

- **Cartesian Robotic Arm:** The cartesian **robotic arm** is the oldest and the most basic type of **robotic arm**. It is named so since it can move in three directions - the X, Y, and Z axes. This type of robotic hand consists of three articulating joints that are programmed along the three axis to determine the arm's position. It also has a wrist joint that provides the capability of rotation. The **robotic arm** can be mounted overhead, horizontally and vertically and can be used for transportation and other essential tasks.

- **Cylindrical Robotic Arm:** Just as the cartesian robotic arm is based on the cartesian coordinate system, the cylindrical robotic arm is based on the cylindrical coordinate system. The cylindrical coordinate system defines a radius, a height, and an angle. This type of industrial **robotic arm** generally has prismatic and rotary joints and is used for purposes

such as welding and assembly.

- **Polar Robotic Arm:** After cartesian and cylindrical, the third type of coordinate system used widely is the polar coordinate system. The polar coordinate system has a radius element and two angle elements in two different directions. The polar **robotic arm** has a rotational joint, a linear joint, and two rotary joints. The general usage of a polar robotic arm is very similar to that of a cylindrical robotic arm since they both operate within a particular locus. It is used for welding, handling tools, and casting.

- **SCARA Robotic Arm:** The SCARA Robotic Arm is an industrial **robotic arm** used for assembly and transportation. SCARA stands for Selective Compliance Assembly Robot Arm. This explains the fact that these arms can handle some flexibility in specific dimensions and remain more rigid in others. The selective compliance of this type of robotic arms also makes them very versatile.

WHAT ARE ROBOTIC ARMS USED FOR?

Robotic arms are used for a host of different tasks in the industry. Here are just some of the industrial processes that utilize **robotic arms**.

- **Transportation:** The most evident use of a **robotic arm** is in transportation. Most frequently, **robotic arms** are used for operations that require picking and placing things between locations since the **robotic arm** itself is fixed at a place and has a definite locus. However, cartesian **robotic arms** can be used for transporting objects among large distances on the shopfloor as well, especially if they are fixed overhead.

- **Welding:** Welding is a repetitive job, and it can carry a hazard for humans. At the same time, it is simple enough for a **robotic arm** to be able to complete. The **robotic arm** can be programmed to carry out the welding operations at specific locations on a product.

- **Assembly:** Assembly is yet another repetitive task that is perfect for **robotic arms** to carry out. Assembling large products can often be hard for a single worker and require a repetitive job to be done over several hours by several different workers. Rather than spending invaluable human resources on such tasks, companies intelligently choose to use **robotic arms** instead. The fact that **robotic arms** can generally carry larger loads than single humans, and hence the same assembly can be completed in much less time with much greater accuracy helps this case.

WHICH INDUSTRIES COMMONLY USE ROBOTIC ARMS?

The application of robotics, specifically **robotic arms**, has been increasing in various industries in the past few years. Here are the major industries that use **robotic arms**.

- **Healthcare:** The healthcare industry was late in inculcating **robotic arms** into its fold but has become a significant consumer of their services in recent years. In healthcare, **robotic arms** are primarily used to manufacture medical devices. These devices are required to be precise and comply with several regulations, and hence the accuracy of **robotic arms** can be beneficial. Furthermore, **robotic arms** have started being used as surgical aids for doctors as well.

- **Automobile:** Perhaps among the first industries to start using the mechanical arm was the automobile industry. Given the large scale of this industry and the number of vehicles it is expected to manufacture each year, efficiency and output of the production cycles can only be maintained and maximised with the aid of a **robotic arm**.

- **Military:** The military, or more specifically the defense manufacturing industry, is also a great consumer of **robotic arms**. They have, over time, developed into an essential component of several different types of weapons and machinery used in the military.

Universal Robots create **robotic arms** and cobots that are highly flexible and can be used across various industries. These **robotic arms** are really easy to use for daily production, easy to reprogram, as well as easy to transport.

FAQS

Which motor is used in the robotic arm?

While various types of motors can be used in a **robotic arm**, the type of motors most frequently used in them are servo motors. This is because servo motors are much more resilient and high-capacity than other types.

What are the typical five components that make up the robotic arm?

The **robotic arm** is made of five main components. These components are controllers, arms, end effectors, drives, and sensors.

How are robotic arms controlled?

Robotic arms are controlled using specified controllers, which are programmed to make the arms carry out tasks. You can code a program for a **robotic arm** in your computer, feed this program into the controller and attach it to the **robotic arm** to see your code come to action.

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