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THE ROLE OF INDUSTRIAL ROBOTS IN MECHANICAL ENGINEERING AND WAYS TO CREATE SOFTWARE FOR ROBOTS

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Abstract
This article explores the current landscape of industrial robotics and the concurrent development of software tailored for these systems. Recognizing the increasing relevance of industrial robots and their associated software, the discussion highlights their significant footprint in various sectors. As information and communication technologies rapidly advance, the article observes a compelling trajectory towards a future where personalized intelligent robots become commonplace. The exploration of this evolving landscape contributes to a deeper understanding of the integral role industrial robots and their software counterparts play in shaping our technological future.
Keywords: Robot, industry, enterprise, automation, production, system.

Introduction

Robots are used to perform several important tasks for machine-building enterprises. The following topics illustrate the role of robots in enterprises:

Workflow Automation: Businesses will have automated processes. Robots are employed in operating the machines used and interlinking the work processes. They are used to automatically receive, return, and place materials, work on moving conveyor systems, detect and track errors, and perform other automated tasks [1-4].

Product manufacturing: Companies use robots in manufacturing processes. Robots are used to master tasks such as assembling and organizing automobiles, assembling and assembling electronic devices, performing rework processes, ticketing mid-production, and identifying and correcting errors.

Quality monitoring: Robots play an important role in monitoring the quality of products manufactured by enterprises. They help to monitor technological parameters, conduct laboratory tests and trials, identify and repair errors, monitor quality in the warehouse and determine new quality for customers [5-9].

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Worker control: It is used to monitor and manage the performance of the company's robots and employees. They are used to monitor the actions of employees, implement work plans, determine employment, direct employees to the direction and communicate with employees.

Materials and methods

Infrastructure Management: Robots also play an important role in the management of enterprise infrastructure. They are used to monitor energy systems, control systems, control automatic units, perform connections between structural devices and devices, and control facility systems.

Preservation and Replenishment: Enterprises play an important role in the preservation, conservation and replenishment of robots, products and materials. They help in carrying out tasks such as storage of products in cold rooms, changing atmospheric conditions, packaging and branding, and ensuring completion following industry rules and standards.

Thus, enterprise robots are used for multiple tasks, including automation of operations, external and internal security, logistics, maintenance, data analysis, quality monitoring, worker supervision, component management, maintenance and repair. contains z. This is effective for enterprises and important in external development [7-11].

Thus, robots play an important role in automating tasks for businesses and are used to make processes better, faster and more efficient.

Figure 1. Industrial robots [2]

As for exactly what kind of machines can be called robots, it states that a typical robot should have the following qualities: Not natural, i.e., made by a conscious being. can be intuitive). Can interact with the environment.Somewhat intelligent, i.e. can make (independent or preprogrammed) decisions.Can be programmed.Can move with axes of rotation or parallel translation.Can perform dexterous manipulations. Can show his will (this quality is not important, because it refers to anthropomorphism [12-15.]

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In short, a robot can be thought about for a long time, even if we think about it briefly, it takes up a lot of space. It is safe to say that with the rapid development of information and communication technologies, each of us can soon have our own smart robot. After all, the most popular operating system for mobile devices,

Modern robots can vary greatly in appearance and design. Today, industrial enterprises use various robots whose appearance (for technical or economic reasons) is far from "human". In addition, it can be controlled by a robot or an operator or by a pre-installed program.

Examples of modern robots - the first practical use of self-driving mechanical people - date back to the Hellenistic period. At that time, four golden water-covered statues of women were installed on the lighthouse on Pharos Island. During the day they shine in the sun, and at night they are always lit up in bright colors to be seen from afar. After a while, these statues turn and give a signal; at night they sound their trumpets to warn swimmers of the shore.

The fantastic robots that exist and have been invented have become so popular that the Robot Hall of Fame was established in 2003 - www.robothalloffame.org. The Robotics Hall of Fame was established in 2003 by the Carnegie Mellon School of Computer Science in Pittsburgh, USA.

The goal of the Robot Hall of Fame was to perpetuate the achievements in robotics that underpin the development of robotics and the images of robots in science fiction that inspired the creation of real robots. Anyone who wants to be inducted into the Robots Hall of Fame can recommend adding robots. Its inclusion is decided by a jury of scientists, writers and researchers. The representatives of the first pantheon of robots were announced on November 10, 2003, at an event held at the Carnegie Science Center (Pittsburgh).

Manipulators are mechanical structures used to control objects and objects in robotic systems. These structures use electric drives to control motion and convert mechanical power using electric drives. Otherwise, some of the widely used electrical drives in manipulators are:

1. Servo Motors: Servo motors are DC motors adapted to control movement with a depth level. They have a regulator system to keep the robot in a certain position. The servo motors are controlled by a gearbox and work with an electronic synchronization system. This ensures the correct operation of the manipulator at any point.

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Figure 2. Servo motors [3]

2. Stepper motors: Stepper motors are electrical drives used for discrete (stepping) movement. They are used for moving at a discrete step level. In step motors, movement can be controlled by pulsations. This type of handling is widely used for positioning and controlling objects in manipulators.

Figure 3. Stepper motors [4]

3. Linear Motors: Linear motors are electrical drives used to provide longitudinal motion. They are linear field-based and operate with mutual synchronization between their stator and rotor. Linear motors allow the manipulator to control the streets along the length.

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Figure 4. Linear motors[5]

These are just examples of some electrical circuits, and other electrical circuits can also be used in manipulators. Depending on the characteristics and purpose of each manipulator, it is necessary to choose adapted electric drives. In this case, it is necessary to ensure the implementation of the manipulator's procedure, correct movement and targeted external forces. Control devices. Robot controllers are important components for controlling the movement, operation and control of the robot. Controllers are used to read, return, make decisions, manage the robot's running process, and exchange information with communication. The following types of controllers are average types of controllers for robotic systems:

1. Microcontrollers: Microcontrollers are small-sized computer systems that are used to control sensors, exchange messages, store data, and manage interactions. They are powerful, compact, and reasonably comfortable for tasks. Microcontrollers are widely used in robots, cars, automation and other fields.

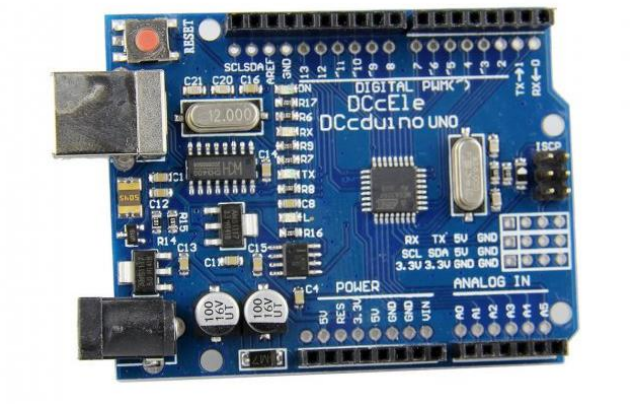

Figure 5. Microcontroller [4]

2. PLC (Programmable Logic Controller): PLC is a control controller specially designed for automated control systems. They are used in industrial devices, in particular for automated work. The PLC allows you to configure it by programming a special editor to read the sensors, refer to the database, issue commands and perform other actions.

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Figure 6. PLC (Programmable Logic Controller) board [5]

3. PC-based controllers: These controllers are based on personal computers and run through editor programming. They act as big data processors and management tools. PC-based controllers are used for critical tasks as well as having a wide range of usability, power and other data processing capabilities.

Figure 7. PC-based controller [4]

4. FPGA (Field Programmable Gate Array): FPGA is a control controller used to create reconfigurable projects. They use quality devices and have features that are popular with important requirements. FPGAs are widely used to read sensors, generate control commands, and execute operating logic.

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Figure 8. FPGA (Field Programmable Gate Array) board [5]

1. Algorithms and Programming: Choosing the right algorithms and programming languages is critical for creating software in mechanical robots. This is important in determining the robot's goals, tasks, understanding and acceptance of information related to the environment. When the algorithms and programming languages are well chosen, the robot can work easily and effectively in solving other problems.
2. Image of the environment: One challenge of software development for mechanical robots is to get an accurate image of the environment and understand it. This requires converting information from sensors into understanding objects in the environment, distinguishing similar objects, and understanding changes in the environment. This can be done through cameras, lidar, radar, ultrasonic sensors and other sensors.
3. Learning and Adaptability: Mechanical robots must have the ability to learn and adapt. This provides the ability to adapt to changes in the environment, learn new tasks, adjust oneself and change demands. It helps in learning algorithms, data analysis, feature learning and decision-making.
4. Interaction with users: In the application of mechanical engineering robots, it is necessary to have easy and effective interaction with users. Users should be able to easily control robots, perform tasks, understand objects in the environment, and be able to respond to them. This requires user-friendly interfaces, easy ways to accept changes, and communication systems that allow interaction with users.
5. Safety and Ethical Issues: Safety and ethical issues are important when developing software for mechanical engineering robots. It is necessary to ensure safety in the operation processes of robots, to preserve the safety of users and the environment when accepting changes, to protect personal data and to ensure work in accordance with ethical norms.
6. Data and training: Data is very important for mechanical robots. Software development requires learning important information and training processes. This includes gathering, analyzing, assimilating and learning from data. Data analysis algorithms, mechanical learning methods, nuclear learning, experiential learning, etc. can be used in this.

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7. Platforms and integration: Software delivery requires the integration of mechanical robots and easy integration through platforms. It provides easy integration of interrelated systems, programming languages, interfaces and services. Better integration of mechanical robots into each platform will increase their interoperability and usability.
8. Security of software and manuals: Security of software and manuals is important in the software development process. This requires ensuring the prevention of supply errors such as misuse of programs and data, misinterpretation, resulting from rarity, etc. Data and software copies, data protection protocols, and secure communication tools may be used for backup.
9. Testing and Optimization: Testing and optimization is one of the important processes in software development. This includes identifying software errors, improving performance, and managing and ensuring effective optimization. The testing process can be carried out during the program or at its initial state, and the optimization process ensures the achievement of the introduced goals.

Conclusions

In this article in short, about robots and how to build software for them. Nowadays, it can be thought that industrial robots and creating software for them are very relevant nowadays, even if we think about it briefly, it takes up a lot of space. It is safe to say that with the rapid development of information and communication technologies, it has been shown that each of us will soon have our intelligent robot.

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