**USES AND FUNCTIONS­**

The field of robotics has made remarkable progress in recent years through the emergence of Artificial Intelligence (AI), which revolutionized the capabilities of robots. By incorporating AI algorithms into their programming, robots can perform a wide range of task with great precision, accuracy, and autonomy. These tasks include working in collaboration with humans, performing challenging and high-level jobs, recognizing and sorting objects, processing vast volumes of data in real-time, and learning and adapting to new tasks and environments. Nowadays, robots become powerful tools because of their ability to think autonomously, achieved with the coexistence of AI and robotics. Artificial Intelligence (AI) is also employed in robotics through machine learning and edge computing. And there are multiple tasks incorporated to robots with the help of AI and machine learning involving computer vision, grasping the objects, navigation, motion control, real-world observation, and natural language processing.

Robots utilize Artificial Intelligence (AI) through machine learning, which enables them to learn and conduct specific jobs by observing and imitating human behavior. With AI, robots are equipped with computer vision to navigate, detect, and respond appropriately, allowing them to be more than just machines that perform repetitive tasks. They can now collaborate as cognitive partners with humans.

AI-based control systems and machine learning are also used in robotics to enable automation to grasp and manipulate objects, which has traditionally proven difficult for robots. Robots can grip and manipulate objects by analyzing visual input from camera and sensors using advanced algorithms, which allows them to comprehend the direction, orientation, characteristics, and forms of the items in their surroundings. With this knowledge, robots can plan and execute precise motions to control and grip the objects without human intervention.

Moreover, robots are more autonomous because of improved machine learning capabilities, eliminating the need for humans to organize and control process flows and navigation pathways. AI and machine learning assist robots in evaluating their environment, maintaining their balance, and directing their movements, allowing them to avoid obstacles. For instance, a robot with motion control could move through a congested warehouse, shifting its path when it comes across barrier or other moving objects.

For robots to operate with autonomy, they need to learn about their immediate environment. This comprehension is the result of natural process language and real-world observation. Machine learning has demonstrated an important potential for assisting computers in comprehending data and seeing patterns so they can take appropriate action. In addition, natural language processing allows robots to understand and interpret human language, including speech recognition. This skill is essential in applications where people must speak orally with the robot, like personal assistant robots. Hence, robots can understand spoken commands and reply accordingly by employing natural language processing algorithms, which improves their usefulness and usability.

Another way is employing AI in robotics through edge computing, where the information collected by robot-based sensors is examined in real-time near the machine, giving robots real-time awareness and the ability to respond quickly. The employment of many different sensors, including time-of-flight optical sensors, temperature and humidity sensors, ultrasonic sensors, vibration sensors, and millimeter-wave sensors, helps AI in assisting robots to learn and adapt. These sensors help robots become smarter and better able to behave and respond in various situations.

Therefore, AI has multiple uses in robotics, including accomplishing an array of tasks with high precision, accuracy, and autonomy with the aid of other disciplines, like machine learning and edge computing. Other activities incorporated into robots are computer vision, grasping objects, navigation, motion control, real-world observation, and natural language processing. Robots are getting more intelligent, accurate, and effective. And once humans realize the full potential of AI and robotic systems, they will advance further in the coming decades.

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**IMPORTANCE AND BENEFITS**

The earliest robots were remarkable, but they only had limited functionality. Back then, robots had little to no environmental awareness and could only execute specific tasks. However, with the breakthroughs in Artificial Intelligence (AI), humans can now create robots that can analyze and respond to their environment, allowing them to act independently and make decisions on their own. While some see the convergence of AI and robotic systems as the end of humanity, fearing the possibility of machines taking over, others argue that AI and robotics are tools with limitless power and enormous benefits. Moreover, Artificial Intelligence's capacity to transform basic robots into intelligent machines offers numerous benefits, including reduced errors, heightened productivity and efficiency, enhanced safety, and improved quality and accuracy for workers across multiple occupations.

Humans tend to commit errors, which may have severe repercussions, especially in critical tasks like performing surgery, piloting aircraft, running trains, handling finances, controlling nuclear power plants, and operating heavy machinery. Since AI-powered robots do not get tired, make emotional judgments, or deviate from their algorithms, they can take over these jobs and assist in lowering the risk of error while maintaining high accuracy and speed. In addition, robots may learn from their performance, further reducing the chance of making mistakes. However, machines can still make errors and cannot completely mimic human decision-making in complicated situations.

Another benefit of AI-integrated robots is that they aid in heightened productivity and efficiency. Businesses may function more effectively using autonomous robotics for routine and repetitive operations. With the help of intelligent machines, most tasks can be executed swiftly and accurately round-the-clock, without the need for rest or breaks. Incorporating AI-powered robots can also reduce labor expenses since human operators and supervisors are not needed.

Moreover, AI-enabled robots can enhance safety measures in hazardous environments without compromising human life. These robots may investigate dangerous locations like collapsed buildings, mines, oil rigs, or nuclear power plants. By utilizing AI and machine learning algorithms, robots can identify potential threats faster than humans and take necessary actions to mitigate risks. Robots can function as virtual security guards by surveilling buildings and alerting authorities in case of any suspicious activities. Oil and gas companies already use robots to undertake data collecting or safety inspection activities in hazardous settings to lower risk to people. Over time, these robots can learn to imitate human behavior and actions, making them valuable assistants in the workplace.

Furthermore, robots equipped with AI can achieve the laser precession that is challenging for humans. They may be educated and programmed to complete intricate tasks with outstanding accuracy, resulting in greater productivity and client satisfaction. AI robots also accomplish quality-control inspections on assembly lines, saving the firm money and time. For instance, Audi worked with Intel and Nebbiolo Technologies to optimize quality-control procedures and weld inspections using Intel-enabled robotic arms, machine learning, and predictive analytics.

Finally, integrating Artificial Intelligence (AI) into robotics led to intelligent machines that can understand and respond to their environment, execute tasks precisely, eliminate mistakes, increase productivity, and take better safety measures. While concerns about machines taking over jobs and threatening civilizations persist, the benefits of AI-powered robots are vast and undeniable. Nevertheless, this collaboration between people and machines will make processes safer and more efficient, creating new job positions that require diverse skill sets. Based on McKinsey's report, full automation is only possible for 5% of occupations, and robots cannot function without human programmers, maintainers, and decision-makers. Therefore, people should not fear that machines will dominate us since we will work alongside technologies to make work more creative rather than technical. Keep in mind that robotics and Artificial Intelligence (AI) are creations, not creators.

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