



ROLE OF LABORATORY ASSISTANT ROBOT IN MEDICAL SCIENCE

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Abstract

In medical science, the role of a laboratory assistant robot is very important and comprehensive. With the rapid development of technology in the field of modern medicine, laboratory assistant robots are of great help in medical diagnostic and research processes. These robots play an important role in reducing the human factor, improving outcome accuracy, speeding up the workflow, and ensuring safety.

Keywords: laboratory, robot, Medicine, analysis, diagnostics, treatment, research, reagents.

In modern scientific and technical environments, human errors and physical fatigue in many cases reduce performance and negatively affect the quality of results. For this reason, the creation of general-purpose auxiliary robots is a priority in order to further simplify laboratory work and reduce errors caused by the human factor. The main task of the robot is to perform complex and delicate laboratory actions accurately and quickly. It is equipped with a manipulator with five degrees of freedom, which expands its range of motion and allows you to capture and place various objects in high definition. These features allow the robot to perform laboratory work as delicately as done by human hands, but much faster and more reliably. Another important advantage of the robot is its multipurpose usability. It can be used in different laboratory conditions, in the performance of various tasks. At the same time, the robot has a self-propelled system, which allows it to freely move around the territory of the laboratory. This makes the workflow more efficient and convenient. As a control system, the robot has a voice and gesture-based interface. This allows users to control the robot in a convenient and intuitive way. The robot also has the ability to receive and adapt to the environment in real time using built-in sensors and intelligent algorithms. This increases the robot's ability to work independently and minimizes human intervention.[1]



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Laboratory assistant robots are widely used in medical laboratories to perform various analyzes. They minimize human errors when preparing blood, urine, tissue samples, analyzing and recording results. Thanks to the precise movements of the robots and programmed algorithms, the analysis will be reliable and reproducible. This allows for accurate and rapid diagnosis for patients, while helping physicians choose the right treatments. Laboratory assistant robots relieve human labor when performing complex and repetitive tasks. For example, performing a series of analyses sequentially and automatically performs tasks such as correctly placing samples, accurately measuring reagents. These works will take time when performed by a person and will be more likely to make mistakes due to fatigue. Robots, on the other hand, constantly perform high-quality work, which increases the efficiency of the laboratory. Laboratory assistant robots are also important in providing security. Some medical samples and reagents can be dangerous to human health. Robots, on the other hand, protect humans when working with such hazardous substances, helping to maintain their health. This increases the level of safety in the workplace and prevents the spread of diseases.[2]

Robots are also used in the management and analysis of data in medical laboratories. They automatically log the results into the system, store the data and provide them quickly at the right time. This increases the efficiency of laboratory work and reduces human errors when working with data. This is very convenient for doctors and researchers, since they will be able to quickly and accurately analyze the results. Laboratory assistant robots also play an important role in medical research. They provide high accuracy and repeatability in testing new drugs and treatments, genetic research, and other scientific research. This contributes significantly to the development of medical science. The high efficiency and accuracy of the robots increases the reliability of the research results.[3]

Another advantage of laboratory assistant robots in medical science is their ability to work continuously. Human employees get tired, lose focus, but robots can work continuously and stably. This ensures continuity of laboratory work and increases performance. Especially in emergency situations such as a pandemic, the role of robots increases even more, as they ensure the safety of people, allowing things to continue. Laboratory assistant robots also alleviate the problem of lack of human



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resources. A significant problem is the lack of qualified laboratory personnel in many countries. Robots, on the other hand, help to fill this gap, reducing the need for human labor by automating laboratory work. This serves to improve the quality and speed of medical services. Along with technological advances, laboratory assistant robots are becoming more complex and multifunctional. They not only perform simple analyzes, but are also able to perform complex diagnostic tasks by working on the basis of artificial intelligence. This makes it possible to provide a more accurate and individual approach to medicine. Through robots, it will be possible to deeply analyze the patient's condition, optimize the process of disease prevention and treatment. The introduction of laboratory assistant robots has a huge impact on improving quality and efficiency in the medical field. With them, it is possible to automate laboratory work, reduce errors and speed up the work process. This ensures fast and quality patient care. At the same time, the use of robots reduces the workload of medical personnel and allows them to focus on more complex and creative tasks.[4]

Conclusion

In conclusion, the role of laboratory assistant robots in medical science is huge and important. They increase the efficiency of the work of medical laboratories, ensure the accuracy of the results, increase safety and reduce the human factor. With the help of robots, medical diagnostics and research are carried out more qualitatively and quickly. They also help solve the problem of lack of human resources and meet the modern requirements of the medical field. In the future, the role of laboratory assistant robots will further increase and become an important factor in the development of medical science.

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