

The Role of Artificial Intelligence in Stroke Leison Treatment

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Abstract

Stroke is a major global health concern that requires prompt and careful interventions for effective treatment since it significantly increases morbidity and mortality. Artificial intelligence (AI) has been a game-changer in stroke care in recent years, transforming rehabilitation tactics, therapeutic choices, and diagnostics. Artificial intelligence (AI) technologies are significantly improving the effectiveness and results of treating stroke disease, from improved imaging analysis to individualized treatment programs. This study examines the many AI applications for treating stroke patients.

Introduction

Stroke is regarded as the second most hazardous disease in the world due to its severity. Effective stroke management depends on timely medical interventions as well as smooth communication, data exchange, and the use of contemporary information technology (IT) solutions. With the introduction of cutting-edge IT solutions, stroke care has undergone a paradigm shift in recent years, improving patient outcomes and streamlining healthcare procedures. By strengthening communication between healthcare professionals, increasing accessibility, and engaging patients in their recuperation process, modern information technology is completely changing the way that strokes are managed. A new era of comprehensive and patient-centered stroke care has been brought about by the integration of wearable technology, mobile applications, telestroke services, electronic health records, and artificial intelligence. The combination of IT and healthcare promises even more creative solutions as technology develops, which will ultimately enhance outcomes and stroke survivors' quality of life. There are also several challenges in the implementation of AI techniques in stroke disease treatment such as privacy and security of data algorithm implementation etc.,[1].as In this paper, various Artificial Intelligence tools available in stroke treatment are discussed.

1. Rapid and Accurate Diagnostics with AI Imaging Analysis

An accurate and prompt diagnosis is one of the most important components of stroke treatment. Artificial intelligence (AI) algorithms have proven to be remarkably adept in interpreting medical imaging, including MRIs and CT scans, enabling quicker and more accurate diagnosis. These algorithms can determine the degree of damage, spot tiny irregularities, and help doctors decide on the best course of action. The type of Lesion can easily be identified using these technologies.[2] AI-driven picture processing speeds up diagnosis considerably, allowing for timely intervention in the crucial early stages of a stroke. Artificial intelligence (AI) systems have the ability to identify minute features that human observers might miss, which helps produce more accurate and consistent diagnostic results.

2. Personalized Treatment Plans through Machine Learning

Algorithms for machine learning (ML) are being used more and more to examine large datasets, such as genetic data, treatment results, and medical records. ML algorithms can help create individualized treatment regimens that are specific to each patient by finding patterns and correlations within these datasets. By using machine learning algorithms to forecast a patient's unique reaction to medicine, doctors can select the most efficient and well-tolerated course of care for stroke patients. ML models provide preventive actions to stop further strokes by evaluating individual risk factors and forecasting the chance of complications. However, cutting-edge deep learning approaches are changing these conventional machine learning algorithms. Machine learning (ML) has been revolutionized with the advent of automatic and efficient feature detection and processing within a concealed analytic network, eliminating the need for pre-selection of features. Notably, traditional ML techniques typically plateau at comparatively lower performance levels, but deep learning (DL) is known to perform better when access to larger datasets[3].

3. Telemedicine and Remote Monitoring for Post-Stroke Care

AI integration in telemedicine platforms is revolutionizing post-stroke care by facilitating prompt interventions and remote monitoring. Wearables with AI capabilities can track vital signs continually, keep an eye on physical activity, and spot possible problems, giving medical professionals important information. Artificial intelligence (AI)-powered wearables provide real-time information on blood pressure, heart rate, and activity levels, providing a complete picture of a patient's health. Reducing blood pressure (BP) is linked to a

lower risk of stroke recurrence, with hypertension being the most risk factor for recurrent stroke[4]. AI-driven analytics can spot trends that point to problems, allowing for quicker medical intervention and a lower chance of subsequent strokes.

4. Robotics and AI-Assisted Rehabilitation

An important part of stroke patients' recovery is rehabilitation. AI-driven robotics are being used to improve rehabilitation programs by offering workouts that are tailored to each individual's progress and are both personalized and adaptive. Stroke sufferers can now participate in focused and rigorous rehabilitation programs thanks to these technology. By analyzing patient data, AI algorithms customize rehabilitation exercises to meet individual demands and maximize the healing process. Artificial intelligence-enabled robotic systems are able to adjust in real-time to a patient's progress, making rehabilitation both difficult and attainable. With the help of AI techniques there are several systems which implements rehabilitation of stroke patients by using questionnaires and interviews[5].

5. Predictive Analytics for Proactive Stroke Prevention

The predictive analytics capabilities of AI enable medical personnel to detect stroke risk patients before an event happens. By analyzing a combination of genetic, lifestyle, and medical data, AI models can stratify populations and highlight those who may benefit from targeted preventive interventions[6]. Predictions powered by artificial intelligence (AI) enable the use of tailored preventative interventions, including medication schedules or lifestyle changes, which lower the overall risk of stroke. By targeting those who are more likely to experience a stroke with preventive measures, healthcare resources can be used more effectively.

Conclusion

With the rapid expansion of AI applications in stroke disease therapy, a new age of precision medicine and better patient outcomes is being ushered in. Artificial intelligence (AI) is proven to be a useful ally in the fight against stroke, offering accelerated diagnosis, individualized treatment plans, and creative rehabilitation techniques. The use of AI in stroke care promises to change the standard of care as technology develops, giving stroke survivors hope for more successful therapies and an improved quality of life. Artificial intelligence and healthcare experience working together could revolutionize stroke care and ultimately change

the way that neurological care is provided.

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