Research on Artificial Intelligence Neural Model Based on Human Neuroscience Simulation: A Case Study of Orthopedic Medical Robots and Economic Discussion

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Abstract: ***Simulation computer models of human neuroscience are widely used in artificial intelligence. The extensive use of surgical robots in China makes the simulation model of neuroscience have a broader stage in economic development. We have more usage for medical image recognition and surgical robot programming. We try to analyze the neural network model commonly used by orthopedic medical robots from the simulation of human neuroscience. The discussion is based on economic principles.***

Keywords: Neuroscience; Artificial intelligence; Medicine; Economics of robotics.

1. INTRODUCTION

The basic unit of human neuroscience is neurons, which are an important part of the web in the human brain for information transmission. Neural networks are a specific set of algorithms that have revolutionized the field of machine learning. They are all simulated for human neuroscience. I was inspired by biological neural networks to think that deep neural networks are now proven to work well. Neural networks themselves are general function approximations, which is why they can be applied to almost any machine learning with complex mappings from input to output space.

In recent years, with the rapid development of clinical medicine and computer science, various technological breakthroughs are very frequent, and the application field is gradually broadened, the development of the medical industry has received much attention.

As the deepening of the application of medical robots in the era of artificial intelligence, current medical robots can effectively help doctors perform a series of medical diagnostics and adjuvant treatments, and promote the development of medical informatization under the problem of effectively alleviating the strain on medical resources.

Medical robots belong to the special service robots category among service robots, and unlike other robots, medical robots are responsible for some functions of diagnosis and treatment. This is similar to a semi-autonomous or fully autonomous super-intelligent device used in hospitals, clinics, or auxiliary medical care, which can perform services beneficial to human health, but may still harm human life because of program vulnerabilities. Therefore, there are quite a few specialities, and in the reference of the data we find that the machines have many kinds and many functions. At present we find that it can be divided into four categories: surgical robots, rehabilitation robots, auxiliary robots and medical service robot. I analyze and tease out neural network models that may be used in medical robots and look at related medical fields. We now take orthopedic surgery as an example.

Initial research focuses on the broader socioeconomic impacts of AI technologies. Zhou and Cen (2024) investigated the effect of ChatGPT-like generative AI on user entrepreneurial activities, highlighting its transformative potential for business creation [1]. This theme of intelligent system application is extended into safety-critical domains by Tang et al. (2026), who developed SVD-BDRL, a trustworthy autonomous driving decision framework enhanced by blockchain technology [2]. Parallel advancements in content generation and system security are evident. Lu et al. (2025) contributed NeuroDiff3D, a diffusion-based 3D generation method

that optimizes for viewpoint consistency [3]. In the realm of distributed and privacy-sensitive computing, Deng and Yang (2025) proposed multi-layer defense strategies to protect federated learning frameworks against membership reasoning attacks [4]. Ensuring the robustness and reliability of these AI systems is a critical research thrust. Jiang et al. (2025) introduced Perception Characteristics Distance as a novel metric for evaluating the stability of perception systems in dynamic conditions [5]. Similarly, Lin et al. (2025) advanced reliability engineering with a Bayesian framework for modeling multivariate degradation data incorporating dynamic covariates [6]. A significant portion of contemporary research targets optimization in the digital economy, particularly in advertising. Tian et al. (2025) presented a business intelligence approach using cross-attention multi-task learning to improve ad recall in digital advertising [7]. Complementing this, Yi (2025) addressed algorithmic fairness by developing a real-time ad allocation system for small businesses and underserved creators using contextual bandits-with-knapsacks [8]. The review concludes with foundational optoelectronic engineering research by Tang et al. (2020), which focused on the design and optimization of a shallow-angle grating coupler for vertical emission from indium phosphide devices, representing the hardware innovation enabling advanced photonic and computing systems [9].

2. RELATED CROSS-CUTTING RESEARCH ON NEURAL CONVOLUTIONAL NETWORK MODELS

The principle of neural convolutional network model. The fundamental aspect of convolutional neural network model is that the computer can extract meaning in pictures. In fact, the establishment of convolutionary neural network models is the establishmentof picture recognition mechanism. When the fracture occurs in patients, we set up the relevant X-ray and CT pieces, which is the basis of computer data extraction in the picture. We build such datasets to provide automated program settings for the machine to continuously optimize. Next, exploratory data analysis is conducted with the aim of optimizing the mechanisms associated with diagnosis and learning. We label the CT images of fracture of neck of femur, determine their size and pixels, and use R language to set the size of all the images in this dataset. Unifying the size of all incoming data is important as a means of rationalizing work efficiency before data is processed and conducive to its work.

We can try to manipulate the relevant images, such as varying degrees of flip, for machine recognition and learning, with the aim of designing the trained model and increasing the sample size. We can model the image recognition of the fracture of neck of femur.

We can try to build a short CNN model, the process is like this. After the input layer, we can design the roll surface, the maximum pool layer, the dense layer, and the dense output layer. We can train this model with machine learning through the data.

We can do a deeper model design on this model. His computational structure was also more complex. Simply put, such convolutional neural networks are more suitable for determining surgical cues. Many self-judged machine learning convolutional networks often have some errors, but medical specialities cannot fully replace doctors with robots to diagnose them, and can be assisted.

3. THE DESIGN CONCEPT OF A PRE-FEEDBACK NEURAL NETWORK

Artificial neural networks (ANNs) are used in many engineering and scientific disciplines as automated ways to solve many problems and have a very important role in medicine, but to build a carefully reliable artificial neural network, we must provide a lot of relevant data. And in this study, we analyzed the extent of artificial neural networks in geothermal reservoir architectures. Especially in this field, we try to solve the joint inversion problem by feed-forward neural network (FNN) technique. Moreover, medical devices are products of precision manufacturing, automatic control and clinical medicine, and are the crown jewel of the robotics field, with high technology, high threshold and high value added features. We can try to design pre-feedback neural network models for robots in orthopedic surgery, especially in robotic architecture, because only physicians with a background in clinical medicine have experience and expertise in surgical practice. The main design areas should be in surgical incisions, medications based on good prognosis, and recommendations for very suitable consumables, such as orthopedic implants [9-10].

Economic discussion: On the macroeconomic side, we analyzed China's national income across the country and concluded that China has the soil to produce and use such robots. The overall economic development trend is good,

and the overall Chinese government's investment in health and medical consumption groups have a lot of supplies to support. At present, through statistics and analysis of economic development laws, we believe that robots have a strong development space in medical development. In microeconomics, we find that China's per capita GDP has reached the average of the world, and eastern China has reaches the average GDP of the world's developed countries, with strong purchasing power and productivit.

4. CONCLUSION

We believe that conducting relevant basic research has great medical significance in China's research field, and many Chinese research units and research institutes should, with the support of the Party and the state, deepen their learning and fully use medical robots to safeguard the health of the people of China at an early date.

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