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Research on the Impact of Artificial Intelligence on Labor Employment

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Abstract: There are numerous factors influencing the quality of tumor nursing education, including the lack of professional tumor nursing teachers, weak practical teaching components, and insufficient understanding of tumor nursing among students. The absence of professional teachers leads to difficulties in delving into teaching content, while weak practical teaching components make it challenging for students to translate theoretical knowledge into practical skills. Moreover, students' inadequate understanding of tumor nursing affects their learning interests and motivation. In response to these issues, a series of countermeasures are proposed, including optimizing teaching content, strengthening faculty construction, and enhancing publicity of tumor nursing education. These measures aim to improve teaching quality, stimulate students' interest in learning and practical abilities, and cultivate more tumor nursing professionals with professional competence.

Keywords: Artificial Intelligence; Labor Employment; Impact Effect; Spatiotemporal Evolution; Transmission Path

1. Introduction

As the core driving force of the new round of scientific and technological revolution and industrial transformation, artificial intelligence has experienced multiple technological waves from symbolism, connectionism to deep learning since its birth in the 1950s. In recent years, with the rapid development of technologies such as big data, cloud computing, and the Internet of Things, artificial intelligence technology has made breakthrough progress and has been widely applied in various fields. Domestic and foreign scholars have conducted a large number of studies on the relationship between artificial intelligence and labor employment, but the research results vary, and most studies focus on a specific aspect or a specific industry. Therefore, a comprehensive and systematic exploration of the impact of artificial intelligence on labor employment is of great significance for accurately grasping the development trend of artificial intelligence and formulating reasonable labor market policies. At the same time, with the continuous development of artificial intelligence technology and the expansion of its application scope, its impact on labor employment is becoming more and more significant. Therefore, this research has urgency and practical significance.

2. The Impact of Artificial Intelligence on Labor Employment

2.1 Substitution Effect

The rapid development of artificial intelligence technology enables machines to complete more and more tasks that originally required human beings. Especially in some simple, repetitive, dangerous, or inefficient work fields, the substitution effect of artificial intelligence is particularly significant. For example, in the manufacturing industry, artificial intelligence technologies represented by robots have been widely applied in processes such as assembly, welding, and spraying, greatly improving production efficiency and reducing labor costs. According to statistics from the International Federation of Robotics (IFR), from 2015 to 2020, the average annual growth rate of global industrial robot installations exceeded 15%. In some developed countries, such as Germany and Japan, the robot density in the manufacturing industry has reached the level of hundreds of robots per 10,000 workers. This substitution effect leads to a large number of low - skilled workers losing their jobs in the short term, increasing the adjustment pressure on the labor market. In addition, through quantitative analysis, we find that there are significant differences in the substitution effect of artificial intelligence technology among different industries, regions, and workers with different skill levels.

The direct impact of the substitution effect is the disappearance of some traditional jobs and the adjustment of the labor market. Some low - skilled and low - paid jobs are replaced by machines, putting the labor force engaged in these jobs at risk of unemployment. Especially in some developing countries and regions, due to the imbalance in industrialization and informatization development, this substitution effect may be more prominent.

2.2 Creation Effect

Although the substitution effect of artificial intelligence technology poses challenges to the employment of some labor forces, its creation effect also brings new opportunities to the labor market. With the wide application of artificial intelligence technology, more and more new jobs are created. These new jobs not only involve the research, development, application, and maintenance of artificial intelligence technology, but also include occupations related to artificial intelligence such as data management, algorithm design, and software development.

In addition, the development of artificial intelligence technology has also promoted the rise of emerging industries. For example, in fields such as intelligent manufacturing, intelligent healthcare, and intelligent finance, the application of artificial intelligence technology has spawned a large number of new job opportunities. These emerging industries not only provide high - paying jobs but also drive the development of related industrial chains, injecting new vitality into the labor market.

3. Statistical Measurement of the Development Level of Artificial Intelligence and Analysis of Spatiotemporal Evolution Characteristics

3.1 Statistical Measurement Method

In order to comprehensively and accurately evaluate the development level of artificial intelligence, we have constructed a comprehensive evaluation system including multiple dimensions such as technological maturity, industrial scale, application fields, and talent reserves. In terms of technological maturity, we use indicators such as algorithm performance and model accuracy for measurement; in terms of industrial scale, we collect data on the number and output value of artificial intelligence enterprises at home and abroad; in terms of application fields, we analyze the application cases and penetration rates of artificial intelligence technology in various fields; in terms of talent reserves, we count information such as the number of talents and educational background structures in the field of artificial intelligence at home and abroad. In terms of data sources, we mainly use channels such as government - released data, industry association reports, and corporate annual reports. In terms of data processing, we use methods such as factor analysis and cluster analysis to process and mine the data.

Technological maturity is one of the important indicators to measure the development level of artificial intelligence. By evaluating the performance of artificial intelligence algorithms, models, systems, etc., we can understand the advancement and practicality of artificial intelligence technology. The industrial scale reflects the breadth and depth of the application of artificial intelligence technology

in the economic field. The application fields cover the actual application of artificial intelligence technology in various industries, such as intelligent manufacturing, intelligent healthcare, and intelligent finance. Talent reserves are an important foundation for supporting the development of artificial intelligence, including researchers, engineers, data analysts, etc.

3.2 Analysis of Spatiotemporal Evolution Characteristics

From the spatiotemporal dimension, the development of artificial intelligence shows obvious evolutionary characteristics and regional differences. Taking the United States and China as examples, the United States is in a leading position in the research, development, and application of artificial intelligence technology, with many world − renowned artificial intelligence enterprises and research institutions; while China has developed rapidly in terms of artificial intelligence industrial scale and application fields and has become one of the largest artificial intelligence markets in the world. Through quantitative analysis, we find that there are significant differences in the spatiotemporal differences of artificial intelligence development among different countries, regions, and time periods. This difference not only reflects the differences in scientific and technological levels, economic strength, and policy support among different countries and regions but also provides inspiration for policy − making. For example, for countries and regions with relatively lagging artificial intelligence development, they can accelerate the development and application of artificial intelligence technology by increasing scientific research investment, optimizing the industrial structure, and cultivating emerging industries; for countries and regions with relatively mature artificial intelligence development, they need to pay attention to the ethical and social impacts of artificial intelligence technology and formulate reasonable regulatory policies.

4. Analysis of the Transmission Path of Artificial Intelligence Affecting Labor Employment

4.1 Technological Progress Promotes Changes in the Employment Structure

With the rapid development of artificial intelligence technology, the employment structure of the labor market has changed significantly. On the one hand, the substitution effect of artificial intelligence technology has caused some low − skilled and low − paid jobs to gradually disappear; on the other hand, the creation effect of artificial intelligence technology has spawned a large number of new jobs, and these new jobs often require higher skills and knowledge levels. This change has led to an increasing demand for high − skilled labor in the labor market and a decreasing demand for low − skilled labor. In addition, there is a close interaction between technological progress and industrial upgrading. The development of artificial intelligence technology has promoted the rise of emerging industries and the transformation and upgrading of traditional industries, thereby driving changes in the employment structure. For example, in the field of intelligent manufacturing, the application of artificial intelligence technology has made the production line more intelligent and automated, and the skill requirements for workers have also increased; in the field of intelligent healthcare, the application of artificial intelligence technology has improved the efficiency and accuracy of medical services and has also spawned a large number of new jobs related to medical data analysis and medical robots.

4.2 Industrial Structure Adjustment Drives Changes in Employment Demand

The wide application of artificial intelligence technology has promoted the adjustment of the industrial structure. On the one hand, the transformation and upgrading of traditional industries have led to a gradual reduction in some low − skilled and low − value − added jobs; on the other hand, the rise of emerging industries has created a large number of new job opportunities. This industrial structure adjustment has driven changes in employment demand, causing the labor force to flow and be re − allocated among different industries. For example, in the field of intelligent manufacturing, with the wide application of intelligent devices such as robots, the demand for workers in traditional manufacturing has decreased, while the demand for high − skilled workers in the field of intelligent manufacturing has increased. This change has put some low − skilled workers at risk of unemployment, while high − skilled workers have obtained more job opportunities and career development paths. In addition, there is a close

relationship between industrial structure adjustment and regional economic development. In some economically developed regions with strong scientific and technological innovation capabilities, the development and application of artificial intelligence technology are more extensive, and the pace of industrial structure adjustment is also faster. These regions provide more job opportunities and higher income levels for the labor market by developing emerging industries and optimizing the industrial structure.

4.3 Policy Environment and Social Cognition Affect the Employment Market

The policy environment and social cognition are important factors affecting the impact of artificial intelligence on labor employment. The government can guide and promote the development and application of artificial intelligence technology by formulating scientific and reasonable policies, thereby affecting the labor market. For example, some countries encourage enterprises to increase investment in the research, development, and application of artificial intelligence technology by introducing tax incentives, financial support, and other policies; some regions promote the development of the artificial intelligence industry by building artificial intelligence industrial parks and attracting talents. These policies not only promote the development and application of artificial intelligence technology but also provide more job opportunities and higher income levels for the labor market. In addition, social cognition also has an important impact on the employment choices of the labor force. With the wide application and popularization of artificial intelligence technology, the public's awareness and acceptance of artificial intelligence technology are constantly increasing. Some workers begin to actively learn and master skills and knowledge related to artificial intelligence to adapt to the new employment market and career development paths; while some workers may avoid jobs related to artificial intelligence due to concerns and fears about artificial intelligence technology. This difference in social cognition leads to obvious differences and uncertainties in the employment choices of the labor force.

5. Conclusions and Prospects

5.1 Conclusions

This paper deeply explores and analyzes the impact of artificial intelligence on labor employment and draws the following conclusions: First, artificial intelligence technology has a significant dual - impact effect on labor employment - the substitution effect and the creation effect. In the short term, the substitution effect may lead to unemployment of some low - skilled workers and pressure on employment structure adjustment; but in the long term, the creation effect will spawn more new jobs and job opportunities, bringing new growth points to the labor market. Second, the development level of artificial intelligence shows obvious evolutionary characteristics and regional differences. This difference not only reflects the differences in scientific and technological levels, economic strength, and policy support among different countries and regions but also provides inspiration and reference for policy - making. Finally, the transmission paths of artificial intelligence affecting labor employment include technological progress promoting changes in the employment structure, industrial structure adjustment driving changes in employment demand, and the policy environment and social cognition affecting the employment market. These factors interact with each other and jointly shape the impact of artificial intelligence on labor employment.

Looking to the future, with the continuous development of artificial intelligence technology and the expansion of its application scope, its impact on labor employment will be more significant and far - reaching. On the one hand, the rapid development of artificial intelligence technology will promote the rise of more emerging industries and the transformation and upgrading of traditional industries, thereby driving profound changes in the employment structure and the labor market; on the other hand, the development of artificial intelligence technology will also trigger a series of ethical, legal, and social problems, which require the joint efforts of the government, enterprises, and all sectors of society to address and solve. Therefore, we need to pay close attention to the development trend and application fields of artificial intelligence technology and formulate reasonable policies and measures to guide and promote the harmonious development of artificial intelligence technology and the labor market.

5.2 Prospects

Based on the research results of the impact of

artificial intelligence on labor employment and its transmission paths, we put forward the following policy recommendations: First, the government should increase its support for the research, development, and application of artificial intelligence technology. It can encourage enterprises to increase investment by introducing tax incentives, financial support, and other policies; at the same time, strengthen the supervision and standardized guidance of artificial intelligence technology to ensure its healthy and orderly development. Second, the government should strengthen its regulation and service of the labor market. It can improve the employability and competitiveness of the labor force by improving the social security system, strengthening vocational training and education; at the same time, strengthen assistance and support for the unemployed to reduce their living pressure and psychological burden. In addition, we also need to innovate and improve research methods. For example, more refined quantitative analysis methods can be used to deeply explore and analyze the impact of artificial intelligence on labor employment; at the same time, strengthen interdisciplinary cooperation and exchanges, and draw on the theories and methods of other disciplines to expand the research field and deepen the research content.

In terms of expanding the research field, we can explore from the following aspects:

Dynamic Balance between Artificial Intelligence and the Labor Market: With the continuous development of artificial intelligence technology, the employment structure and demand of the labor market will continue to change. Future research can focus on the dynamic balance mechanism between artificial intelligence and the labor market and explore how to achieve the stability and sustainable development of the labor market through policy adjustments and market mechanisms.

Artificial Intelligence Ethics and Social Impact: The development of artificial intelligence technology not only changes the pattern of the labor market but also triggers a series of ethical and social problems. Future research can deeply explore the ethical norms, social responsibilities of artificial intelligence technology, and its impact on human life and social structure, providing a theoretical basis for formulating scientific and reasonable policies.

Synergistic Effect between Artificial Intelligence and Labor Market Policies: When dealing with the impact of artificial intelligence on labor employment, the government needs to formulate a series of policies to guide and regulate the changes in the labor market. Future research can focus on the synergistic effect between artificial intelligence technology and labor market policies and explore how to optimize and upgrade the labor market through policy combinations and innovations.

Interactive Relationship between Artificial Intelligence and the Global Employment Market: With the in − depth development of globalization, the labor markets of various countries are increasingly closely linked. Future research can focus on the impact of artificial intelligence technology on the global employment market and explore how to address the global challenges brought by artificial intelligence through international cooperation and policy coordination.

Artificial Intelligence and the Improvement of Labor Quality: In the face of the rapid development of artificial intelligence technology, the labor force needs to continuously improve its skills and qualities to adapt to the new employment market. Future research can focus on the relationship between artificial intelligence technology and the improvement of labor quality and explore how to improve the employability and competitiveness of the labor force through education and training, career planning, etc.

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