

Discussing the Reshaping of Employment Structure by Artificial Intelligence: Opportunities and Challenges

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Abstract: This paper first introduces the development trend of AI, including more powerful and universal models, deep integration with various fields, the rise of reinforcement learning, integration with edge computing, the importance of AI ethics, the development of embodied robots, and the popularization of AI applications. At the same time, the importance of changes in employment structure was emphasized, such as optimizing human resource allocation, promoting industrial upgrading and transformation, enhancing the quality and skills of workers, promoting economic structural adjustment, and narrowing regional development gaps. Then, the opportunities brought by artificial intelligence were analyzed, such as the emergence of new professions related to data and algorithms and models, as well as the demand for digital skill enhancement and cross-domain skill integration. Then, the challenges brought by artificial intelligence were discussed, such as job substitution (repetitive and regular job positions) and employment polarization (the potential impact of the growth in demand for high skilled talent and the dilemma and polarization of low skilled workers). Finally, strategies to address the challenges were proposed, covering education and training reform (curriculum system adjustment, vocational training strengthening, and enhancing employment competitiveness) and policy guidance and protection (employment policy adjustment, social security improvement).

Keywords: Artificial Intelligence, Employment Structure, Development Trends, Opportunities and Challenges, Response Strategies

1. Introduction

1.1 Development Trends of Artificial Intelligence:

(1) More powerful and versatile models: Large models such as GPT, BERT, etc. have become more efficient and versatile, becoming the core "engine" of many applications, providing powerful computing and analysis capabilities. Multimodality has also become a standard configuration for large model bases, naturally supporting various types of data (such as text, sound, image, video, etc.), improving the understanding and interaction ability of models[1].

(2) Deep integration with various fields:

Medical and biotechnology fields: can be used for disease diagnosis, drug development, genomics, etc., bringing revolutionary changes to medical research and clinical practice, improving medical standards and people's quality of life[2].

Education field: Promote personalized learning, customize learning plans for students, and adaptively adjust learning progress. Assist teachers in teaching, conduct homework grading, curriculum design, etc[3].

Financial field: used for risk assessment, credit rating, investment decision-making, etc., to improve the operational efficiency and decision-making accuracy of financial institutions.

Manufacturing industry: realizing intelligent production, quality inspection, supply chain optimization, etc., to improve production efficiency and product quality[4].

The rise of reinforcement learning: It shows great potential in the fields of autonomous driving, gaming, and robotics, where agents learn through interaction with their environment to maximize expected cumulative rewards.

(3) Integration of AI and edge computing: combine with edge devices to achieve faster and more real-time decision-making and response, improve data processing efficiency and privacy protection, and promote the

development of the Internet of Animals[5].

(4) AI ethics and transparency are highly valued: With the popularization of AI technology, issues of fairness, transparency, and responsibility are becoming increasingly prominent. In the future, stricter regulations will be formulated to regulate AI applications and ensure that they do not cause potential social and ethical problems[6].

(5) Development of embodied robots: The combination of robot technology and AI has developed more advanced "embodied" capabilities, simulating human cognition and physical interaction, possessing all the sensors of humans and excellent sensors in the animal world, and has broad application prospects in many fields.

(6) The popularization of AI applications: Starting from the ChatGPT app store, to the domestic Zhipu AI intelligent agent store and DingTalk AI assistant platform competing, we will usher in a wave of user cheers for the application year. AI will play a key role in many industries and may lead significant changes in certain industries.

1.2 The Importance of Changes in Employment Structure:

Optimizing human resource allocation: promoting the flow of labor from traditional industries to emerging industries, directing talent towards areas with greater development potential and innovative vitality, and improving the overall utilization efficiency of human resources. For example, with the development of the digital economy, a large amount of labor is flowing from traditional manufacturing to emerging industries related to digital technology, such as software development and data analysis.

Promoting industrial upgrading and transformation: The rise of emerging technology industries, which interact with industrial development, creates new job opportunities and employment models, attracts high-quality talents to gather, and provides human resources support for industrial upgrading. For example, the application of artificial intelligence in the medical field has given rise to new positions such as medical data analysts and researchers of intelligent medical devices, promoting the transformation of the medical industry towards intelligence.

Improving the quality and skills of workers: It

requires workers to continuously learn new skills to adapt to the demands of new employment positions, thereby enhancing the overall quality of workers. In the era of artificial intelligence, workers need to master relevant skills such as data analysis, programming, and algorithms, which drives the continuous optimization of education and training systems to cultivate talents that adapt to the new employment structure.

Promoting economic structural adjustment: Changes in employment structure reflect the evolution of economic structure, and a reasonable employment structure helps to promote the development of economic structure to a higher level and achieve sustainable economic growth. For example, the increase in the proportion of employment in knowledge and technology intensive industries is conducive to improving the quality and efficiency of economic development.

Narrowing the regional development gap: Different regions can develop corresponding artificial intelligence industries and related service industries based on their own advantages, attract talent inflows, drive regional economic development, and help narrow the gap in economic development level and employment opportunities between regions. For example, some second - and third tier cities have attracted a large number of talents to return and find employment by developing distinctive digital economy industries, promoting local economic development

2. Opportunities Brought by Artificial Intelligence

2.1 Birth of New Professions

(1) New professions related to data

Data annotator: mainly responsible for annotating raw data, such as marking the category, position, and other information of objects in image data. Mark the content of the speech, the speaker's emotions, and other information in the speech data. Perform part of speech tagging, entity recognition, and other tasks in text data. Their annotation results provide a foundation for subsequent machine learning and artificial intelligence algorithm training.

Data analyst: needs to collect, organize, and analyze a large amount of data. By using data analysis tools and algorithms, uncover potential

patterns, trends, and relationships in the data. For example, in the e-commerce industry, data analysts need to analyze user browsing behavior, purchase history, and other data to provide analysis reports on user profiles, market trend predictions, and other aspects to help companies make decisions.

With the continuous development of artificial intelligence algorithms, the demand for high-quality annotated data is exploding. A large amount of data requires manual annotation before it can be used for training and optimizing models, which has led to the emergence of a large number of data annotator positions.

Enterprises have accumulated massive amounts of data in the process of digital transformation, and extracting valuable information from this data has become crucial. Data analysts can help businesses transform data into valuable business insights, hence the increasing demand in various industries.

In the Internet industry, the demand for data announcers has grown at an annual rate of about 30% in the past few years. For example, the data annotation team of a large Internet company has grown from dozens of people at the beginning to hundreds of people now.

Data analysts have a wide demand in industries such as finance, e-commerce, and telecommunications. According to relevant statistics, about 60% of companies in the financial industry have increased their recruitment of data analysts in the past two years. In the e-commerce industry, the number of data analyst positions has increased by over 40%.

(2) New professions related to algorithms and models

Algorithm Engineer: Responsible for designing, developing, and optimizing various algorithms. In the field of artificial intelligence, they need to research and implement machine learning algorithms, deep learning algorithms, and so on. For example, in the field of image recognition, algorithm engineers need to design efficient convolutional neural network algorithms to improve the accuracy and speed of image recognition. At the same time, they also need to evaluate and improve the performance of the algorithm to adapt to different application scenarios and data characteristics.

Artificial Intelligence Model Trainer: The main job is to train and optimize artificial

intelligence models. They need to choose a suitable model architecture, such as the application of Transformer architecture in natural language processing, and then adjust the model parameters based on specific tasks and data. During the training process, it is necessary to monitor the performance indicators of the model, such as accuracy and recall, and adjust and optimize the model based on these indicators. For example, in the development of intelligent voice assistants, model trainers need to continuously optimize speech recognition models to improve their ability to recognize speech features such as different accents and speech rates.

In technology companies, algorithm engineers and artificial intelligence model trainers are important components of the core R&D team. For example, in the artificial intelligence research and development department of large technology companies, the proportion of personnel in these two types of positions is usually over 50%. They are involved in various product lines of the company, such as search engines, intelligent recommendation systems, autonomous driving, and other fields.

In the financial field, algorithm engineers are mainly responsible for developing risk assessment models, quantitative investment models, etc. For example, some large banks and financial institutions have established dedicated algorithm development teams to optimize pricing and risk control models for financial products. Artificial intelligence model trainers play a role in financial data analysis and model optimization, such as training credit assessment models to improve the accuracy of customer credit risk assessment. The importance of these positions in the financial field is increasingly prominent, and the number of related positions has shown a steady growth trend in the past few years

2.2 Skill Enhancement Needs

(1) Enhancement of digital skills

Intelligent application of office software: Traditional professionals need to be proficient in the intelligent functions of office software. For example, in Excel, learn to use advanced features such as pivot tables and functions for data analysis. Utilize intelligent typesetting, grammar checking, and other functions in Word to improve document processing efficiency.

Data visualization tools: Master data

visualization tools such as Tableau, PowerBI, etc., and be able to display data in intuitive chart form. For example, in the sales field, sales data can be transformed into bar charts, line charts, etc. through data visualization tools to more clearly display sales trends and performance.

The impact on production efficiency (taking traditional manufacturing as an example):

In traditional manufacturing workshops, after mastering digital skills, workers can view the real-time operation status and production data of equipment through intelligent device monitoring systems. For example, through digital analysis of equipment failure data, workers can predict equipment failures in advance, perform maintenance and upkeep in a timely manner, thereby reducing equipment downtime. According to statistics, the equipment failure rate on the production line where workers with digital skills are located has decreased by about 20% compared to before.

In terms of production planning, utilize digital tools for scheduling and resource allocation. For example, through specialized production management software, intelligent production scheduling can be carried out based on factors such as order quantity, delivery time, and equipment capacity, making production plans more scientific and reasonable. After workers in a manufacturing enterprise mastered digital skills, the efficiency of production plan execution increased by about 30%, effectively shortening the production cycle.

(2) Cross disciplinary skill integration

In the fields of computer and healthcare, there is a need for talents who understand both computer technology and medical knowledge. For example, in medical imaging diagnosis, developing image analysis algorithms based on deep learning requires computer professionals to have certain knowledge of medical imaging in order to better understand and process medical imaging data.

In the field of computer and art, with the development of digital art, there is a need for talents who integrate computer programming and art design skills. For example, developing virtual reality art works requires mastery of artistic skills such as 3D modeling and animation production, as well as knowledge of computer graphics, programming languages, and other related fields.

In the medical field, cross disciplinary teams have developed AI based auxiliary diagnostic systems. This team is composed of computer scientists, medical experts, and data analysts. They combined computer vision algorithms with medical knowledge to develop a system that can automatically analyze lung CT images, helping doctors diagnose lung diseases more quickly and accurately. The system has been tested in multiple hospitals, and the diagnostic accuracy has increased by about 15% compared to traditional methods.

In the field of art, some artists have created unique interactive artworks using computer programming techniques. Through programming, real-time control of lighting, sound, and images can be achieved, allowing viewers to interact with the artwork and bring a brand new artistic experience. This cross disciplinary creative approach has received widespread attention in art exhibitions, promoting innovation and development of art forms.

3. Challenges Brought by Artificial Intelligence

3.1 Job Replacement

(1) Repetitive job positions

Customer service industry: In fields such as telecommunications and e-commerce, a large amount of customer service work involves repetitive problem-solving. For example, in telecom customer service, when users inquire about common issues such as phone bill packages and network failures, artificial intelligence customer service can quickly provide accurate answers through pre-set programs and algorithms.

Assembly industry: In some electronic product manufacturing companies' assembly lines, some simple component assembly work has a high degree of repeatability. For example, the operation of installing specific parts onto the motherboard can be accurately and quickly completed by the robot according to the set program without fatigue.

(2) Regular job positions

Accounting industry: Many basic accounting tasks, such as account registration and voucher review, follow certain rules and procedures. Artificial intelligence can quickly process large amounts of financial data and perform accounting processing through automated

software. For example, in some large enterprises, some accounting work in the financial shared center has been automated.

Partial legal work: In the legal field, some contract review work has strong regularity. Artificial intelligence can quickly scan and analyze standard terms in contracts to check for compliance issues. For example, in some law firms, artificial intelligence software has been used for preliminary review of common types of contracts such as housing lease contracts, labor contracts, etc.

In accounting work, manually processing monthly financial statements for a medium-sized enterprise may take several days, while using professional financial software combined with artificial intelligence algorithms, the same task can be completed in a few hours. From a cost perspective, although the introduction of automated accounting software requires some initial investment, in the long run, it reduces labor costs and improves work efficiency.

In terms of legal contract review, manual review of a complex contract may take hours or even days, while artificial intelligence software can conduct preliminary analysis of the contract in a short period of time and mark potential risk points. In terms of cost, for large enterprises, using artificial intelligence to assist in contract review can greatly reduce the workload of the legal department and reduce the cost of hiring a large number of junior legal personnel.

3.2 Employment Polarization

(1) The demand for high skilled talents is increasing

In the field of artificial intelligence research and development, with the widespread application of artificial intelligence technology in various industries, the demand for professional talents such as algorithm engineers and data scientists continues to increase. For example, in the field of autonomous driving, developing intelligent driving algorithms that can adapt to complex road conditions requires a large number of highly skilled R&D talents.

In terms of high-end algorithm design, professionals with a strong background in mathematics and computer science are needed for optimizing deep learning algorithms and designing efficient neural network architectures. Core algorithm design positions in fields such

as image recognition and speech recognition require extremely high levels of talent.

The salary and benefits of high skilled talents are showing a clear upward trend. Taking algorithm engineers as an example, in some first tier cities, experienced algorithm engineers generally earn an annual salary of over 300000 yuan, or even higher. And with the accumulation of experience and the improvement of skills, there is a lot of room for salary growth.

In terms of employment opportunities, high skilled talents are in short supply in the market. Many technology companies, financial institutions, and others offer generous benefits and broad development opportunities to attract these talents. For example, some large Internet companies have set up AI research institutes to provide special R&D platforms and project resources for highly skilled talents.

(2) The dilemma of low skilled workers

In the job market, low skilled workers face dual competition pressure from artificial intelligence and other workers due to their lack of professional skills and strong substitutability. For example, in the logistics industry, with the popularization of automated sorting equipment, some low skilled workers engaged in simple sorting work are facing the risk of unemployment.

Many low skilled workers often have to choose temporary, low paying jobs when looking for work. For example, in some cities' labor markets, low skilled workers are mainly concentrated in areas such as cleaning, security, and simple physical labor, and their jobs are unstable and may be replaced at any time.

(3) Potential impacts of polarization:

In terms of social stability, employment polarization may lead to further widening of the wealth gap in society, increasing the living pressure on low-income groups, and easily triggering social instability factors. For example, some low skilled workers may experience dissatisfaction with society and affect social harmony due to long-term unemployment.

In terms of economic development: From the perspective of economic development, a large number of low skilled workers cannot be fully employed, which will lead to the waste of human resources. At the same time, the shortage of high skilled talents may limit the development speed of some high-end industries

and affect the optimization and upgrading of the economic structure. For example, in some emerging industries, if there is a lack of sufficient high skilled talents, it may lead to slow industrial development and the inability to form effective market competitiveness.

4. Strategies for Addressing Challenges

4.1 Education and Training Reform

(1) Curriculum system adjustment

Professional settings: Schools should add majors related to artificial intelligence, such as artificial intelligence, big data, machine learning, intelligent robotics, etc. These majors can cultivate professionals who directly serve the artificial intelligence industry. At the same time, for traditional majors, there should be more directions for cross integration with artificial intelligence, such as setting up an intelligent machinery direction in mechanical engineering majors and a medical artificial intelligence direction in medical majors.

Course content: In terms of course content, artificial intelligence related knowledge should be integrated into various disciplines. For example, in computer science courses, adding cutting-edge courses such as deep learning algorithms and natural language processing. Incorporate content such as big data analysis and intelligent marketing into business courses. In addition, attention should be paid to cultivating students' interdisciplinary thinking and innovation abilities, and offering interdisciplinary courses and project practice courses.

Emerging major construction: Many universities have established artificial intelligence colleges or opened artificial intelligence related majors. For example, a well-known university has established an artificial intelligence college, set up an artificial intelligence major, and equipped it with advanced laboratories and excellent faculty. The curriculum system of this major covers various fields of artificial intelligence, including computer vision, speech recognition, intelligent control, etc. At the same time, the college has established cooperative relationships with multiple enterprises to provide students with internship and employment opportunities.

Traditional professional transformation: Taking electrical engineering as an example, some

schools have added courses related to artificial intelligence such as smart grid and power system automation on the basis of traditional electrical engineering courses. Through this approach, students majoring in traditional electrical engineering are equipped with the ability to find employment in the field of intelligent power.

(2) Vocational training reinforcement

1) Vocational Training Program:

For employees: For employees, training content should focus on enhancing their application skills in the field of artificial intelligence. For example, providing training for financial personnel in enterprises on the use of intelligent financial software, data analysis, and other aspects. Provide training for manufacturing workers on automation equipment operation, industrial robot programming, and more.

For unemployed individuals: Training for unemployed individuals should focus on developing their basic employment skills and reemployment abilities. Training can be provided in areas such as computer fundamentals, office software usage, and professional ethics. At the same time, based on market demand and personal interests, they can be guided to learn introductory skills related to artificial intelligence, such as data annotation and simple programming.

2) Training method:

Online training: carry out online courses on the Internet platform to facilitate students to learn at any time and anywhere. Online courses can include video tutorials, online Q&A sessions, online tests, and other components. For example, some vocational training institutions have launched online learning platforms for introductory courses on artificial intelligence, where students can learn through mobile phones or computers and interact with teachers and other students.

Offline training: Hold face-to-face training classes, with professional teachers providing on-site teaching and guidance. This approach can provide a more direct teaching experience and practical operation opportunities. For example, in some industrial parks, the government has organized offline training for manufacturing workers on the operation of industrial robots, where trainees practice practical operations at training bases to improve their skill levels.

School enterprise cooperation training: Schools cooperate with enterprises to carry out training programs, allowing students to participate in practical project practices of enterprises while learning theoretical knowledge. For example, a vocational school collaborates with an artificial intelligence company to conduct a data analyst training program. After learning data analysis theory at school, students participate in practical data processing and analysis projects at the company to improve their practical abilities.

(3) The role of enhancing employment competitiveness:

Through vocational training, employees can continuously update their knowledge and skills, improve efficiency and quality in their work, thereby increasing their competitiveness in the workplace. For example, financial personnel trained in the use of intelligent financial software can process financial data more efficiently and accurately, and are more likely to obtain promotion opportunities or be favored by other companies in the job market.

For unemployed individuals, vocational training can help them regain employment skills and increase the success rate of re-employment. For example, unemployed individuals who participate in data annotator training and master data annotation skills can find jobs in data processing related enterprises and re-enter the job market.

4.2 Policy Guidance and Guarantee

(1) Adjustment of Employment Policy

1) Encourage industrial development and ensure stable employment:

Tax incentives: The government can provide tax reductions or preferential policies to enterprises in the artificial intelligence related industry, encouraging them to increase research and development investment and expand production scale. For example, for enterprises engaged in artificial intelligence algorithm research and development, intelligent device manufacturing, etc., tax incentives will be given based on a certain proportion of their R&D investment to stimulate the creation of more job opportunities.

Employment subsidies: The government provides employment subsidies to artificial intelligence enterprises that employ a large number of people. For example, every time a company absorbs a certain number of new

employees, the government provides corresponding financial subsidies to encourage the company to actively absorb employment while developing.

Guiding enterprise training: The government can formulate policies to guide enterprises to provide artificial intelligence related skills training for employees. For example, providing certain training expense subsidies to companies that conduct internal employee training can increase the enthusiasm of the company to train employees and enhance their employment stability.

2) Support policies for reemployment of unemployed individuals:

Re-employment training subsidy: The government provides re-employment training for unemployed individuals and bears all or part of the training costs. For example, unemployed individuals can attend training courses at government designated vocational training institutions, with tuition fees subsidized by the government to alleviate their financial burden.

Entrepreneurship support: For unemployed individuals with entrepreneurial aspirations, the government provides support policies such as entrepreneurship guidance and loans. For example, establishing an entrepreneurship support fund to provide low interest or interest free loans for unemployed people to start businesses, and helping them establish small and micro enterprises related to artificial intelligence, such as smart home service companies, smart security equipment sales companies, etc.

Employment information service: The government establishes a comprehensive employment information platform to provide timely and accurate employment information for unemployed individuals. For example, through online platforms and offline employment service centers, job postings for artificial intelligence related companies can be released, and specialized job fairs can be held to build employment bridges between unemployed individuals and businesses.

(2) Improving social security

A sound social security system can provide basic living security for those affected by the adjustment of employment structure, alleviate their economic pressure, and reduce social instability factors. For example, in the case where artificial intelligence causes some people

to lose their jobs, if the social security system is improved, unemployed people can receive unemployment insurance benefits to maintain their basic livelihood and avoid social conflicts caused by living difficulties.

The improvement of the social security system helps to enhance people's ability to bear the adjustment of employment structure and promote social equity. Both high skilled talents and low skilled workers can receive corresponding protection when facing employment risks, reflecting social fairness.

Expand the coverage of unemployment insurance: Include more employed individuals in the unemployment insurance system, especially those working in emerging forms of employment such as freelancers and part-time workers. For example, formulating relevant policies that clearly stipulate that freelancers who meet certain conditions can voluntarily participate in unemployment insurance and enjoy corresponding benefits.

Improve the level of unemployment insurance benefits: According to the level of economic development and price index, timely increase the standard of unemployment insurance benefits. For example, during periods of rapid price increases, it is appropriate to increase the amount of unemployment insurance benefits to ensure the quality of life of the unemployed.

Extending the period for receiving unemployment insurance: For some older unemployed individuals who face difficulties in re employment, the period for receiving unemployment insurance can be appropriately extended. For example, extending the unemployment insurance coverage period for some unemployed individuals from the current maximum of 24 months to 36 months, giving them more time to find suitable jobs.

5. Conclusion

The development trend of artificial intelligence is obvious, with deep integration with multiple fields and stronger models. This makes significant changes in the employment structure, such as optimizing resource allocation. Artificial intelligence brings opportunities, and new professions such as data annotators, data analysts, algorithm engineers, model trainers, etc. continue to emerge. At the same time, there is a demand for digital skill enhancement and cross domain skill integration. But it also brings challenges. In terms of job

positions, repetitive positions such as customer service and assembly, as well as regular positions such as accounting and some legal affairs, have been replaced, resulting in a decrease in related positions in enterprises. There is a polarization in employment, with a significant increase in demand for high skilled talents and difficulties faced by low skilled workers, which affects social stability and economic development. In the face of challenges, we can start with education and training reform, adjust the curriculum system, strengthen vocational training to enhance employment competitiveness, adjust employment policies, provide tax incentives, employment subsidies, support unemployed people to find new jobs, improve the social security system, expand the coverage of unemployment insurance, improve the level of benefits, and extend the receiving period. These strategies will help the employment market to develop steadily and sustainably in the era of artificial intelligence.

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