The application and prospect of AI technology in the construction of bidding platform

Dai Jingyang, Ye Ruixing

Guangzhou Xinhua University of Accounting, Guangzhou, China

Abstract: *The application of artificial intelligence technology in the field of bidding is gradually deepening, not only improving the efficiency and transparency of the bidding process, but also reflecting the social value of promoting an open, fair, just and honest market environment.This paper first analyzes the status quo of AI in bidding activities, including the wide use of intelligent auxiliary tools, the deep integration of technology and business, the rise of intelligent compliance platforms, and the initial exploration of the intelligent architecture of the whole process. The problems and challenges in the application of AI are pointed out, such as single function, lack of integration of man-machine collaboration, and transparency of system decision making.The solutions and optimization strategies are put forward, such as continuously promoting technological innovation, strengthening man-machine collaboration, improving the explainability of decision making, and increasing personnel training. It looks forward to the future development trend of AI in the field of bidding, calls for strengthening industry cooperation and standard formulation, and promotes the standardized application of AI technology in order to fully release its potential value.*

Keywords: *artificial intelligence; Bidding; Man-machine collaboration; Industry cooperation*

1. Introduction

With The release of the "Fourteenth Five-Year" plan, artificial intelligence (AI) has been promoted an important position as a national strategic scientific and technological force.The plan emphasizes strengthening the innovative application of key digital technologies, especially artificial intelligence technologies, to nurture and strengthen emerging digital industries, thereby building new advantages of the digital economy. In this macro context, artificial intelligence, as a representative of new quality productivity, is rapidly penetrating into all walks of life and becoming a key force to promote economic and social development.

The application of AI technology in the field of bidding is not only an inevitable trend of technological development, but also contains far-reaching social significance. From society, enterprises to the masses, promoting the intelligent assistance of AI in the bidding and bidding process aims to build an open, fair, just and honest market environment, improve the efficiency of the use of funds, protect the fair competition right of small and medium-sized enterprises, maintain transaction order, and enhance the sense of gain of the masses.In 2022, the AI industry, university and research community has made major breakthroughs in the fields of general large models and industry large models, which has brought profound opportunities for change to the bidding industry. This paper will discuss the application status of AI technology in optimizing the bidding process, improving the user experience, and promoting the high-quality development of the industry, and look forward to the future development trend, analyze the challenges and risks in the implementation process, and propose countermeasures and suggestions for innovative cooperation, so as to promote the deep integration and wide application of AI in the field of bidding and effectively release its value potential.

2. Literature review

In the context of the rapid development of artificial intelligence technology, its application in different fields has become a hot topic in academia and industry. Some scholars focus on the of artificial intelligence technology in specific fields and the industry changes it promotes. Feng Jifu (2024) et al. explored the role of artificial intelligence in improving computing efficiency and reducing energy consumption, emphasizing technology optimization for the "two-carbon" goal[1].Luo Shengli Meng Qiaoling (2023) analyzed the application of rehabilitation robot technology in assisting the

exercise relearning of the elderly, highlighting its social value.Aiming at how to build a technology platform[2], He Ruiling et al. (2022) emphasized the application potential of virtual reality technology in education and cultural communication through their research, and proposed a new way to display campus science and technology culture.In the paper "Human-machine Hybrid Enhanced Intelligence: Research and Application" [3](2022), Xue Jianru et al. discussed the concept and technology of human-machine hybrid enhanced intelligence. They believe that introducing human role or cognitive ability into machine intelligence and forming human-machine collaborative hybrid enhanced intelligence is an important way to solve the risks of artificial intelligence technology[4].

The above literature review shows that artificial intelligence technology plays an important role in platform construction and system design in various industries.From the construction of the bidding platform, this paper studies how the application of artificial intelligence technology can improve efficiency in the procurement and bidding process of enterprises and public institutions, explore better paths, achieve the goal of promoting green and low-carbon development, enhancing user experience, and promoting industrial innovation and upgrading.

3. Application status of artificial intelligence in bidding activities

3.1 The wide application of intelligent auxiliary tools

The application of artificial intelligence in bidding activities is gradually developing from point to surface, from a single function to a systematic and intelligent direction. For example, the application of China Mobile's AI bidding platform has realized that bidding agencies at all levels have successively developed intelligent auxiliary tools, such as automated bidding document preparation tools, intelligent bid evaluation tools, and one-click procurement plan preparation tools.

3.1.1 Deep integration of artificial intelligence technology

Artificial intelligence is no longer just a simple auxiliary function, and it has begun to play an important role in key links.For example, China Mobile has widely applied AI technology in the automatic generation of bidding documents, intelligent bid evaluation, and automatic generation of bid evaluation reports, greatly improving the processing speed and accuracy. Using natural language processing (NLP) technology, the AI system can automatically generate structured bidding documents according to the specific needs of the bidding project.It not only reduces manual writing time, but also reduces the risk of errors and omissions. AI technology is also able to analyze the large amounts of data generated during the bidding and procurement process to provide data-driven decision support for management.

3.1.2 The rise of smart compliance platforms

Compliance is the core requirement of bidding activities.AI technology is applied to compliance review, improving the transparency and fairness of bidding activities by identifying potential violations, and providing technical guarantees for bidding in accordance with the law.The AI bid evaluation system analyzes bid documents through machine learning algorithms to automatically evaluate technical responsiveness, business terms, etc. The system can identify the key information in the bidding documents and match the requirements of the bidding documents, so as to assist the bid evaluation experts to make more objective and accurate judgments.After the bid evaluation, the AI system can automatically summarize the bid evaluation results and generate a bid evaluation report. This function not only speeds up the preparation of the bid evaluation report, but also ensures the consistency and accuracy of the report content. For example, China Mobile has developed an intelligent compliance platform, which carries out intelligent verification of the compliance of bidding schemes and bidding documents before the implementation of bidding procurement projects. AI systems can identify potential violations and prevent risks in advance.

3.1.3 The exploration of the whole process intelligent architecture

Although AI applications are still concentrated in a single step, some organizations are trying to build whole-process intelligent solutions that cover the entire procurement lifecycle, from requirements analysis to compliance monitoring, to leverage the integrated benefits of AI. The application of AI technology has also improved the experience of users participating in bidding activities.For example, China Mobile intelligent customer service can provide 24-hour consulting services, and automatic bid opening tools simplify the bid opening process and improve transparency. AI systems have the ability to learn and optimize themselves, constantly improving their performance based on historical data and

user feedback. This continuous learning and adaptation mechanism is the key to the successful application of AI technology in the field of bidding.China Mobile's AI bidding application also involves collaboration between different platforms and systems. For example, the data sharing between the intelligent compliance verification platform and the bidding and procurement platform, as well as the integration with other enterprise management systems, ensure the smooth flow of information and the continuity of business processes.

3.2 The dilemma and challenge of intelligent auxiliary tools

3.2.1 Technology adaptation and data challenges

At present, the application of AI technology in the field of bidding faces technical adaptation challenges, requiring compatibility with existing IT infrastructure and smooth transition. At the same time, the performance of AI systems is limited by the quality and scale of available data, especially when it comes to obtaining large-scale annotated data while protecting data security and privacy. In addition, the interface and data format between different systems are not uniform, which increases the complexity of system integration.

3.2.2 Intelligence level and model generalization

Although AI has made progress in auxiliary work such as document generation and bid evaluation and analysis, its intelligence level still needs to be improved. AI systems are limited in their ability to handle complex decisions and judgments, and may encounter difficulties in generalizing to diverse bidding scenarios. This requires AI models not only to excel at specific tasks, but also to have some generalization ability to adapt to the unique needs of different projects.

3.2.3 User acceptance and training needs

The introduction of AI technology requires wide acceptance and effective use by users. The user's familiarity with AI tools directly affects the application effect of AI systems, so it is particularly important to adequately train users to improve their understanding and use of AI tools. This involves not only the training of operational skills, but also an understanding of the principles behind AI technology.

3.2.4 Legal ethics and Social responsibility

The application of AI in the field of bidding raises a number of legal and ethical issues, including intellectual property rights, liability attribution and privacy protection. The existence of these problems may limit the implementation and effectiveness of AI technology. At the same time, the introduction of AI technology may also have an impact on traditional positions, requiring retraining or career planning of affected employees, reflecting the social responsibility of enterprises in the process of technological progress.

3.2.5 Continuous support and integration of industry knowledge

The continuous operation and optimization of AI systems requires constant technical support and maintenance. As markets change and technology advances, companies need to invest continuous R&D resources to keep their systems competitive. In addition, bidding domain specific business knowledge and rules need to be effectively integrated by AI systems, which requires AI technology to not only have strong data processing capabilities, but also be able to understand and apply industry-specific logic and standards.

4. Platform construction and path implementation

4.1 System architecture design

The system architecture design of the bidding platform should follow the principles of modularity, hierarchy and openness to ensure the flexibility and expansibility of the system. It is intended to be built based on Huawei MindSpore AI computing framework, which supports innovative technologies such as multiple parallel strategies, heterogeneous parallel and forward recomputing, and can efficiently train large models of 10 billion levels. At the same time, it integrates MindSpore Transformers suite, covering development paradigms in CV, NLP and other fields.The system architecture is mainly composed of three layers: data layer, application layer and presentation layer.The intelligent bidding platform needs to meet the paperless electronic bidding system of the whole process,

meet the national EBS Samsung testing and certification standards, and support different types of bidding for goods, projects, services, etc. Based on Huawei's MindSpore AI framework, it integrates emerging technologies such as big data and artificial intelligence to realize all aspects of intelligent bidding. Artificial intelligence is applied in every level, after the completion of each bidding business, complete the evaluation mechanism, feedback all case data to supplement data warehouse materials, and then deepen machine learning to improve learning efficiency, enrich the knowledge layer, form a spiral learning benefit increase channel, and constantly optimize and expand system functions.

4.2 Data layer design

The design of the AI bidding platform should follow the principles of data layer integrity, consistency, reliability and security; Construct knowledge layer such as knowledge graph to support knowledge maintenance and application; Provide good user interface, interaction logic and system responsiveness at the application level; Adopt security and privacy protection measures such as data encryption, access control and audit trail; And through modular design, standardized interface and automated testing, to achieve the scalability and maintainability of the system, so as to create a safe, efficient and intelligent bidding platform.

4.3 Function module

Table 1. Introduction of basic functions of AI bidding platform

number	name	Function introduction
1	Standardized whole process electronic module	It covers the whole process from tender information release, bid registration, bid opening, bid evaluation to winning the bid, contract management, etc., paperless operation to improve efficiency.
2	Cross-time and Space Bid Opening System	Provide a virtual bid opening room, support online sign-in, decryption, automatic bid singing, live broadcast, etc., break through the time and space restrictions.
3	Intelligent Bid Evaluation System	AI technology is integrated to realize auxiliary review functions such as bid information inspection, similarity analysis, abnormal reminder, etc., and improve the quality of bid evaluation.
4	Remote Off-site Distributed Bid Evaluation	Experts through video conference remote collaborative review, the whole process is confidential and controllable, effective supervision.
5	Expert management system	Realize the whole process management of expert registration, expert database management, intelligent extraction, expert assessment, etc.
6	Regulatory audit module	Configure flexible audit strategies, supervisors can view the whole process of project information and approval, and handle complaints.
7	Electronic archiving module	Automatic or manual two modes are combined to standardize the whole process of bidding documents.
8	Big data analysis module	Multi-dimensional analysis of expert database, extraction, attendance and other data is carried out to support decision making.

As shown in Table 1, this paper intends to construct basic functional modules of AI-based bidding platform from the theoretical level, including standardized full-process electronic module, cross-space bid opening system, intelligent bid evaluation system, remote and remote decentralized bid evaluation system, expert management system, regulatory review module, electronic archiving module, and big data analysis module. These 8 modules are related, inherited and cooperated with each other, which covers the whole process from issuing bidding information to signing contracts.The standardized electronic module of the whole process lays a paperless foundation for the whole platform, and the output data supports the subsequent links; The inter-temporal bid opening system and the intelligent bid evaluation system respectively carry out the bid opening and intelligent auxiliary bid evaluation by using the front-end standardized process data. Remote and remote decentralized bid evaluation module and expert management system optimize the bid evaluation process to improve efficiency and fairness; The supervision and audit module runs through the whole process to ensure compliance; The electronic archiving module collects the documents of each link; Big data analysis module based on archived data

to find patterns and feedback optimization.Through interlinking, data flow and functional complementarity, the eight modules form a highly intelligent and transparent closed-loop system, comprehensively improve the efficiency, fairness and fairness of bidding activities and decision-making level, promote the intelligent transformation in the field of bidding, and give full play to the value of artificial intelligence technology in improving the efficiency of capital use and maintaining fair competition.

4.4 System implementation path

The construction of AI bidding platform requires comprehensive demand analysis, data preparation, knowledge modeling, AI model development, system integration, user training, system deployment and continuous optimization. It should follow the principles of data and system architecture design, integrate AI technologies such as natural language processing and machine learning, combine domain knowledge such as knowledge graph, and pay attention to security, availability, and maintainability. In the process of implementation, it is also necessary to pay attention to challenges such as technical adaptation, user acceptance, legal ethics, and improve system performance through continuous optimization, and finally realize the efficiency, transparency and fairness of the bidding process.

5. Optimization strategy and suggestion

5.1 Strengthen basic research on AI and break through core algorithms

We will increase investment in AI theoretical research to expand and improve the theoretical system and address challenges such as system generalization and explainability. At the same time, we will tackle core algorithms such as natural language processing and computer vision to improve their robustness and accuracy. In addition, we will develop new algorithm models to give the system greater understanding, reasoning, and migration capabilities. Finally, we will build a multi-modal fusion intelligent architecture to support collaborative processing of heterogeneous data such as text, voice and image.

5.2 Optimize man-machine division of labor and realize man-machine collaboration

The construction of the AI bidding platform needs to scientifically divide the human-machine division of labor boundaries, ensure that human and machine each play their advantages, avoid overlapping or misalignment of capabilities, and build natural interactive interfaces and workflow integration mechanisms to support smooth human-machine collaboration. We also need to cultivate composite man-machine collaboration talents, reshape job Settings, and optimize performance appraisal mechanisms.

5.3 Empower continuous learning and knowledge transfer

When constructing the AI bidding platform, we need to build an intelligent knowledge base covering the whole field, which can not only continuously absorb cutting-edge knowledge, enhance the knowledge representation and logical reasoning ability of AI, improve the understanding and application level of complex knowledge, but also realize online continuous learning, acquire new knowledge from real-time data flow and interaction, and dynamically improve the ability. In addition, we need to improve the interpretability of decisions and establish interpretable AI decision auditing mechanisms.

5.4 Strengthen data quality control and privacy protection

We will establish data standards and automated quality control systems to continuously monitor and optimize data quality. At the same time, we will implement privacy protection policies such as data desensitization and access control to strengthen the protection of sensitive data. In addition, we will improve the data security management system, conduct regular risk assessments, and strengthen personnel training.

5.5 Strengthen industry cooperation and standard setting

In order to promote the sustainable development of the industry, we need to deepen the cooperation between industry, university and research, and integrate the superior resources of all parties to jointly tackle key problems. In this process, industry associations should actively play their own leading role, summarize the best practices in the industry, and form industry standards. At the same time, industry associations should also actively participate in the formulation of national AI standards and put forward technical requirements and management norms that meet the needs of the industry. In addition, in order to enhance China's competitiveness in the international arena, we also need to strengthen international exchanges and cooperation, learn from foreign advanced experience and practices, and actively export local excellent cases.

6. Conclusion

AI technology is promoting the transformation of the bidding field from traditional digital to intelligent, mainly applied to the automatic generation of documents, bid evaluation optimization and process transparency. Building an AI bidding platform requires key steps such as requirements analysis, data preparation, knowledge modeling, model development, system integration, and deployment.Key technologies, including natural language processing, machine learning and knowledge graph, need to be properly designed at the data layer, knowledge layer and application layer, and pay attention to system security, scalability and maintainability.The technology development direction includes continuous optimization of natural language processing capabilities to improve the quality and accuracy of document generation; Integrate computer vision, decision support and other technologies to expand the application scenarios of AI in bidding; Build a rich and dynamic domain knowledge base to enhance the intelligent level of the system; Strengthen the interpretability and auditability of AI models, and improve the transparency and credibility of decision-making; AI technology will bring far-reaching impact and benefits to the field of bidding, improve the efficiency of bidding, reduce operating costs, and enhance competitiveness; Enhance the transparency and fairness of decision-making and maintain a sound market order; Promote the optimal allocation of resources, improve operational efficiency, and reduce the risk of corruption; Promote the intelligent transformation of the industry, cultivate digital talents, and promote industrial development.

Acknowledgement

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