On the Impact of Artificial Intelligence on Science and Technology Competitions in Electrical and Its Automation Programs

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Abstract: Research has shown that artificial intelligence technology has brought significant changes in the content and form of the competition of electrical and its automation as well as the future development of the specialty, and at the same time, it has brought new opportunities and challenges. This paper looks forward to the future development trend of artificial intelligence technology and the science and technology competition of electrical and its automation profession, takes the overview of artificial intelligence technology as the entry point, discusses the current situation of the application of artificial intelligence technology in the competition, elaborates on the advantages of adopting artificial intelligence technology, and analyzes the specific application of artificial intelligence technology. Its impact on the ability requirements of electrical professionals is discussed, as well as the challenges that may be faced in the future of the eventual application of artificial intelligence technology, and it is hoped that the contents of the paper will be helpful to the relevant staff.

In recent years, the rapid development of artificial intelligence technology has had a profound impact on all walks of life, and the field of education is no exception. In the science and technology competition of electrical and its automation majors, the application of AI technology is becoming more and more widespread, which not only changes the content and form of the competition, but also puts forward new requirements on the competence of the participants. This study aims to explore the multifaceted impact of AI technology on the science and technology competitions of electrical and its automation majors, analyze the opportunities and challenges it brings, and put forward corresponding coping strategies, with a view to providing references for promoting the effective application of AI technology in professional science and technology competitions.

1. Current Status of the Application of Artificial Intelligence in Science and Technology Competitions

At present, in electrical engineering automation, the application of artificial intelligence information technology has achieved remarkable results. In terms of power load forecasting, through big data processing and deep learning algorithms, it can accurately predict power demand and provide a scientific basis for power grid scheduling. In power system fault diagnosis, pattern recognition technology is widely used to quickly detect and accurately locate faults, reduce outage time and improve system reliability. The research and development and application of intelligent protection devices combine artificial intelligence technology with traditional electrical protection devices to realize more efficient. More intelligent protection function, effectively improve the safety and stability of the system.[1]

In recent years, the design of the topics of science and technology competitions for electrical and its automation majors has increasingly focused on the integration and application of artificial intelligence technology. Taking smart grid optimization as an example, the competition questions often require participants to use deep learning

algorithms, such as convolutional neural networks (CNN) or long short-term memory networks (LSTM), to predict power load and renewable energy generation. This not only tests participants' mastery of traditional power system analysis, but also requires them to be able to skillfully apply AI algorithms to process time-series data for feature extraction and pattern recognition.

In the area of automated control system design, Reinforcement Learning algorithms are being introduced into the competition questions. Participants need to design intelligent controllers to realize adaptive control of complex industrial processes through algorithms such as Q-learning or Deep Q Network (DQN). This topic design reflects the trend of practical application of AI technology in industrial automation in the context of Industry 4.0.

The application of AI technology has also driven the digital transformation of competition formats. The application of virtual simulation platform is a typical example. In the motor control competition, we began to use a virtual experiment platform based on Digital Twin (Digital Twin) technology. Participants can build a motor control system in a virtual environment, use MATLAB/Simulink for modeling and simulation, and optimize the control parameters through AI algorithms. This form not only reduces the cost of experimentation, but also improves the safety of the competition.

Another notable change is the popularity of online competitions. Through cloud computing platforms, participants can remotely access high-performance computing resources for large-scale data processing and model training. For example, in the Power System Stability Analysis Competition, participants can use cloud-based GPU clusters to train deep neural networks to predict system stability. This format breaks down geographical restrictions and enables more students to participate in high-level science and technology competitions.

The application of artificial intelligence technology has also brought about a change in the evaluation criteria of the competition. The traditional evaluation method mainly focuses on the technical feasibility and innovativeness of the solution, but now the application effect of AI technology has become an important evaluation index. For example, in the smart grid scheduling competition, the evaluation criteria not only include the feasibility of the scheduling solution, but also pay attention to the actual effect of AI algorithms in reducing network loss and increasing the rate of renewable energy consumption.

In addition, some competitions are beginning to introduce AI-assisted automated scoring systems. These systems use Natural Language Processing (NLP) techniques to analyze entry reports and assess the innovativeness and completeness of proposals. In hardware design category competitions, computer vision techniques are used to automatically evaluate board layout and soldering quality. This intelligent evaluation method improves the objectivity and efficiency of scoring, but it also puts higher demands on participants, who need to pay more attention to the specification and interpretability of their proposals.

2. Impact of Artificial Intelligence on Science and Technology Competitions

The value of integrating AI technology in electrical engineering lies in three points: firstly, it can reduce costs; AI technology has excellent on-site control ability and the ability to perceive the environment, which can guarantee that the electrical equipment is always in a good state of operation, avoiding equipment or material loss due to the execution of erroneous commands, and lowering the cost. Secondly, it can improve the control accuracy. AI technology has a strong logic computing ability, which can be combined with the requirements of the electrical engineering system to develop automation control programs, and always maintain a high level of precision control. Finally, strong adaptability. The traditional electrical automation control mainly take single circuit control and linear control, has a strong target, often only on specific products operation. ai technology can change the control mode with the aid of environmental changes to adjust, more quickly complete the electrical production and control work.[2]

Therefore, with the promotion of artificial intelligence technology technology in the field of electrical engineering,

the impact on the science and technology competition of electrical and its automation profession also arises. It is mainly embodied in the three aspects of changes in the requirements for the competence of the participants, the innovation of the content and form of the competition, and the change of the competition evaluation criteria.

In addition to the traditional knowledge of electrical automation, participants need to master the basic theory and practical skills related to artificial intelligence, such as machine learning algorithms and data processing. Machine Learning Algorithms: Participants need to be familiar with commonly used machine learning algorithms, such as Support Vector Machines (SVM), Random Forest, Convolutional Neural Networks (CNN). These algorithms are widely used in the fields of power load forecasting, equipment fault diagnosis and intelligent control.

Data processing and analysis: the application of artificial intelligence cannot be separated from the processing and analysis of large-scale data. Participants need to master techniques such as data preprocessing, feature engineering and model evaluation.

This need for interdisciplinary knowledge motivates participants to continuously expand their knowledge boundaries and improve their general competence.

The promotion of artificial intelligence technology has made the competition topics more focused on the practical application of artificial intelligence technology in the field of electrical automation, such as smart grid and industrial Internet of Things. At the same time, through the use of a virtual experiment platform based on Digital Twin (Digital Twin) technology, control systems can be built and tested in a virtual environment, which is more convenient to use; and in the cloud computing platform, participants can remotely access high-performance computing resources for large-scale data processing and model training. The digital transformation of the competition format provides participants with more flexible and convenient ways to participate, and also expands the scope of participation in the competition.

The penetration of artificial intelligence technology makes the evaluation system of the competition develop from a single technical index-oriented to a comprehensive evaluation paradigm of "technology-economy-society".

3. Strategies to Address the Impact of Artificial Intelligence

To cope with the impact of AI technology, universities and students need to adopt a multifaceted strategy. First, to establish the awareness of researchers with artificial intelligence literacy. Artificial intelligence literacy education does not mean specialized courses in artificial intelligence such as programming and algorithms, but focuses on cultivating researchers' artificial intelligence thinking, awareness of academic ethics, and the ability to apply artificial intelligence technology!" :, to stimulate the researchers' sense of innovation and risk awareness in academic research. Secondly, relying on the curriculum to enhance the deep integration of knowledge and technology and the ability of innovative application of interdisciplinary knowledge. Through multi-scenario application training, researchers can improve their data analysis ability and problem solving ability, internalize the thinking and application of technology as part of AI literacy, and develop a foundation for academic research in multiple fields with generative AI. Third, to strengthen the academic responsibility of researchers. Colleges and universities should play the role of value shaping, enhance researchers' understanding of academic ethics, laws and regulations, and social morality, and cultivate more researchers in the new era with scientific spirit, academic literacy, practical ability, and innovative thinking, so as to provide solid talent support for a strong scientific and technological country.[3]

Students can enhance their competitiveness by taking the initiative to learn AI-related knowledge, participate in online courses, read professional books and participate in AI-related projects to continuously expand their knowledge and improve their practical ability; they can also actively participate in AI-related scientific and technological competitions and innovation and entrepreneurship activities such as the Kaggle Competition and the National Intelligent Vehicle Competition for College Students, and enhance the AI technology through the

actual battle. Application level. In addition, students should also focus on interdisciplinary learning to master the combination of electrical automation and artificial intelligence technology, such as learning signal processing, control theory and the combined application of AI algorithms, so as to improve the ability to solve complex engineering problems, and lay a solid foundation for future innovation and development in the field of electrical automation.

4. Conclusions

In summary, AI technology has had a profound impact on the science and technology competition of electrical and its automation majors, bringing new opportunities and challenges for participants. The impact of AI technology can be effectively dealt with through strategies such as adjusting the curriculum, strengthening practical ability and promoting cooperation between industry, academia and research. In the future, AI technology will continue to promote the innovation of the content, form and evaluation system of the competition, and provide a new impetus for talent cultivation and scientific and technological innovation in electrical and its automation specialties. Colleges and universities and students should actively adapt to this trend, and constantly improve the application of AI technology, so that it can effectively integrate with computer technology, and can abandon the previous unreasonable design that does not meet the actual needs to ensure that artificial intelligence can gradually transform and develop in the direction of humanization, better serve the public, meet the actual development needs of market enterprises, and then achieve the goal of diversified development.[5]

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