International Experience in Artificial Intelligence Application for Education and Lessons for Vietnam

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Abstract: *Artificial intelligence (AI) has become an important component in the social, technological and industrial life of the industrial revolution 4.0. In the field of education, especially due to the impact of the Covid-19 pandemic, the role of Artificial Intelligence is increasingly important. Artificial intelligence contributes to improving the quality of teaching and learning, increasing the number of knowledge sources and references, especially promoting policy reform in the field of education and training. This study will synthesize and analyze the effects of artificial intelligence on the current education and training sector in Vietnam, and make some recommendations to promote the application of artificial intelligence in education. research and training.*

Keywords: Artificial intelligence, Education, training, research, policy

1. Introduction

Artificial Intelligence or commonly used abbreviation is AI is the intelligence of machines created by humans, especially created for computers, robots, or machines with computational components. electronic math. Artificial intelligence is a field of science and technology that aims to make machines have the capabilities of human intelligence and intelligence, such as thinking and reasoning to solve problems, communicating. continue by understanding language and speech, learning and self-adaptation

For science and technology, Artificial Intelligence is one of the new fields developed since 1956 by John McCarthy [1]. People still take the 1956 summer conference at Dartmouth College in the US as the birth event of Artificial Intelligence. This first conference was organized by Marvin Minsky and John McCarthy and attended by several dozen scientists, including Allen Newell and Herbert Simon. These four people have always been considered the founders of the Artificial Intelligence industry. Many of the Dartmouth conference attendees went on to become leaders in Artificial Intelligence research for decades, including Professor Donald Michie, a European AI pioneer who was founded the famous Artificial Intelligence Laboratory at the University of Edinburgh in the UK. It was at the Dartmouth conference that McCarthy suggested the name 'artificial intelligence'. Although controversial for a while, the name is still recognized and used today.

Artificial intelligence can be classified into three different types of systems: analytic, human-inspired and artificial intelligence [2]. Analytical AI has only the characteristics that are suitable for cognitive intelligence; create a cognitive representation of the world and use learning based on past experiences to inform future decisions. Human-inspired

artificial intelligence with elements from cognitive and emotional intelligence; understand human emotions, beyond cognitive factors, and consider them in decision making. Personified AI shows the characteristics of all kinds of competencies (i.e. cognitive, emotional and social intelligence), capable of self-awareness and self-awareness in interactions.

In 2011, at a competition television show performing Jeopardy, IBM's question-answering system, Watson, defeated champions Brad Rutter and Ken Jennings, by a significant margin. tell. Faster computers, improved algorithms, and access to large amounts of data enable advances in machine learning and cognition; Data-hungry deep learning methods began to dominate accuracy-related experiments around 2012 [3]. In March 2016, AlphaGo won 4 out of 5 Go matches in a match against Go champion Lee Sedol, becoming the first computer-based Go system to defeat a professional Go player without no need to accept troops. During the 2017 Future Conference, AlphaGo won a three-game match of the then-world No. 1 player for two years. This marks the completion of an important milestone in the development of artificial intelligence as Go is a relatively complex game, even more so than chess [4].

In Vietnam, Decision No. 127/QD-TTg of the Prime Minister promulgates the National Strategy on Research, Development and Application of Artificial Intelligence until 2030. This strategy aims to promote research, develop and apply Artificial Intelligence, making Artificial Intelligence an important technology field of Vietnam in the Fourth Industrial Revolution. By 2030, Vietnam will become a center of innovation, development of solutions and applications of Artificial Intelligence in the ASEAN region and around the world. The goal by 2030 to make Artificial Intelligence become an important technology field of

Vietnam; striving for Vietnam to be in the group of 4 leading countries in the ASEAN region and the group of 50 leading countries in the world in research, development and application of Artificial Intelligence; built 10 prestigious Artificial Intelligence brands in the region; developed 3 national centers for big data storage and high-performance computing; connecting domestic systems of high-performance data centers and computing centers to form a network of sharing big data and computing capacity for Artificial Intelligence.

Through the artificial intelligence development strategy, Vietnam hopes to form 50 open, interconnected and connected data sets in economic sectors, socio-economic fields for research and development. and Artificial Intelligence applications. By 2030, Vietnam will form three national innovation centers on Artificial Intelligence; there is at least 1 representative in the ranking of the top 20 research and training institutions on Artificial Intelligence in the ASEAN region…

To achieve the above objectives, the Strategy provides the following orientations: Building a system of legal documents and legal corridors related to Artificial Intelligence; Developing the Artificial Intelligence ecosystem.

The Vietnam-Australia artificial intelligence cooperation network (Vietnam - Australia AI) has just been launched. This is a plan in the program to promote the National Strategy on Research, Development and Application of Artificial Intelligence to 2030, approved by the Government in January 2021, to create a "push" for the development. Vietnam's AI, contributing to socio-economic development and gradually turning Vietnam into a bright spot in AI in the region. The Vietnam Australia AI Network is chaired by the Department of High Technology (Ministry of Science and Technology), in collaboration with FISU Club (a member of the Vietnam Informatics Association) with the companion and support of ASUS4 Innovation - the program. development assistance of AU$13.5 million to strengthen Vietnam's innovation system. In the first phase, this network will create opportunities for members to cooperate with Australian partners to update the AI situation in Vietnam, Australia and the world. After that, the network will expand cooperation to many other countries and aim to build a sustainable AI community with many activities to develop this computer science industry in our country. The network aims to attract at least 100 businesses, training and AI development organizations and 1,000 individuals who are scientists, experts, application staff, etc. to register and join hands in development. developing the field of AI in Vietnam.

2. Experience in organizing, managing and promoting the application of artificial intelligence of some countries in the world

2.1 Canada

The Canadian Institute for Advanced Research (CIFAR) is given a grant of C$125 million to launch the Canada Artificial Intelligence Strategy to retain and attract top academic talent, while increasing the number of researchers and postgraduate trainees in the field of artificial intelligence.

Objectives: (1) Increase the number of outstanding researchers and skilled graduates in artificial intelligence in Canada; (2) Establishing science hubs in Canada's three major artificial intelligence centers in Edmonton, Montreal and Toronto-Waterloo; (3) Develop global thought leadership on the economic, ethical, policy and legal implications of advances in artificial intelligence; (4) Supporting the national research community on artificial intelligence; (5) Promote cooperation between AI research centers and industry [5]

Canadian Institute for Advanced Research (CIFAR) with a contribution of $125 million (in Canadian dollars) to launch a Pan-Canadian Artificial Intelligence Strategy to retain and attract top academic talent, and to increase the number of post-graduate trainees and researchers studying artificial intelligence. Objectives: (1) To increase the number of outstanding artificial intelligence researchers and skilled graduates in Canada; (2) To establish connections of scientific excellence in Canada's three major centers for artificial intelligence in Edmonton, Montreal and Toronto-Waterloo; (3) To develop global thought leadership on the economic, ethical, policy and legal implications of advances in artificial intelligence; (4) To support a national research community on artificial intelligence; (5) To foster co-operation between AI research centers and industry.

2.2 America

The Federal Government's five-year strategic plan for STEM education, based on a vision for a future where all Americans will have lifelong access to high-quality STEM education and the United States will be the global leader in STEM literacy, innovation, and employment. The Federal Government has a key role to play in furthering STEM education by working in partnership with stakeholders at all levels and seeking to remove barriers to participation in STEM careers, especially for women and other underrepresented groups. Accordingly, this report sets out a federal strategy for the next five years based on a Vision for a future where all Americans will have lifelong access to high-quality STEM education and the United States will be the global leader in STEM literacy, innovation, and employment. It represents an urgent call to action for a nationwide collaboration with learners, families, educators, communities, and employers—a "North Star" for the STEM community as it collectively charts a course for the Nation's success.

2.3 China

With more than 270 million students, more than 16 million teachers and more than 50 million schools in China, AI is becoming an important tool to promote equality, quality, lifelong learning and research and development capacity. innovation created by the Chinese education system. After the State Council issued the New Generation Artificial

Intelligence Development Plan in 2017, the Ministry of Education launched the Action Plan on AI innovation in colleges and universities. learn. The action plan lists 18 specific goals, centered around three overarching goals: (1) Improving the existing innovation framework for AI development; (2) Cultivate more great talents in the field of AI; (3) Promote commercialization of research results.

Resources will be devoted to big data-driven learning, multimedia collaborative processing, human-machine interaction, and autonomous intelligent systems. The action plan also emphasizes the importance of capacity building for innovation teams for both basic and applied research. In this respect, the Department of Education will support the introduction of AI-related sub-disciplines or interdisciplinary within existing computer science programs offered by universities.

The development of widely agreed international AI governance frameworks and standards will be promoted, on the basis of fully respected principles and practices of AI governance in all countries. the entire lifecycle of AI products and services. Further studies and predicting the potential risks of more advanced AIs will be carried out in the future to ensure that AI will always evolve in a human-friendly direction.

Figure 1: Basic principles of China for AI in Education

The Governance Principles were agreed and published after several rounds of public consultation and expert discussion; with the aim of more effectively coordinating the relationship between development and governance of artificial intelligence, thereby ensuring the reliability and safety of artificial intelligence, while promoting economic sustainability. economic, social and ecological: (1) Harmony and friendship: AI must conform to human values and ethics and must depend on human development; (2) Abuse must be avoided and abuse must be prohibited; (3) Fairness and justice: AI must protect the interests of all stakeholders and promote equal opportunities. Prejudice and discrimination must be eliminated in data collection, algorithm design, technology/product development and application; (4) Monopoly and sharing: AI must promote green development and must contribute to technology upgrading in all industries. AI education must be strengthened, especially among disadvantaged groups. Data and platform monopolies must be avoided, and open and regulated cooperation should be encouraged; (5) Respect for privacy: personal information should be protected, and privacy rules should be established in all stages of AI development, for example, collection, storage, processing and use. Authorization revocation mechanism for personal data will be improved; (6) Security and controllability: The development of AI must be

transparent and controllable. The monitoring, management, monitoring and supervision systems are gradually perfected; (7) Shared Responsibility: AI developers, users, and all other stakeholders will have a shared responsibility to ensure respect for laws, ethics, and standards. An AI accountability system will be established to clarify the responsibilities of each actor; (8) Open cooperation: cross-sector, cross-sectoral, trans-regional and cross-border exchange and cooperation will be encouraged, and coordination and interaction in AI development and governance will be promoted. push between international organizations, government agencies, research institutions, educational institutions, businesses, civil society organizations and the public.

2.4 India

Realizing the potential of AI in transforming the economy and India's need for strategic outreach, Finance Minister Hon'ble, in his 2018-19 budget speech, authorized NITI Aayog to establish the National AI Program, to guide the research and development of new and developing technologies. In pursuit of AI policy, NITI Aayog has adopted a three-pronged approach: implementing exploratory proof-of-concept AI projects in various sectors, creating a national strategy to build a vibrant AI ecosystem in India and partnering with a wide range of experts and stakeholders. Since the beginning of 2018, NITI Aayog has partnered with a number of leading AI technology companies to implement AI projects in key areas such as agriculture and health. The OECD AI Principles are emphasized: (1) Human-centered values and fairness; (2) Invest in AI R&D; (3) Building human capacity and preparing for labor market transformation. Relevant policy areas include agriculture, education, health and investment.

2.4 Sweden

Within the initiative, ten universities work together to create a knowledge platform and offer courses for practising professionals. The ten universities are Chalmers University of Technology, University of Gothenburg, Halmstad University, Royal Institute of Technology (KTH), Linköping University, Luleå University of Technology, Lund University, Mälardalen University, Umeå University and Örebro University. The initiative is designed to allow additional universities to join afterwards. The knowledge platform builds on and supplement ongoing initiatives at the universities related to artificial intelligence. The practical work with the knowledge platform has two emphases:

A joint homepage on which the universities show different educational opportunities geared towards the business and public sectors. The homepage illustrates and makes available the different educational initiatives that are conducted within AI Competence for Sweden. Örebro University manages the work with engagement by the other universities. We publish available courses on the homepage continually.

Regular meetings with key people from the ten participating universities that are engaged in the development of AI Competence for Sweden. The universities plan and carry out

the initiative in an efficient manner. It is about steering, leading and coordinating all activities and functions within the different parts of the initiative. Örebro University coordinates the effort and leads a national coordination group with representatives from each university.

The group has summarized the experiences from the first three years' (2018-2020) work in an experience report, "A Competence for Sweden – A National Life-long Learning Initiative". The report was presented at the conference EduLearn 2021. Click on the image below to download the article as a pdf document.

3. Artificial Intelligence Transforms the Learning Experience in Higher Education

Artificial Intelligence is a branch of science producing and studying the machines aimed at the stimulation of human intelligence processes. The main objective of AI is to optimize the routine processes, improving their speed and efficiency (provided it has been implemented and supported properly). As a result, the number of companies adopting AI continues to grow worldwide.

AI tools mostly comply with 3 basic principles: (1) Learning: Acquiring and processing the new experience, creating new behavior models; (2) Self-correction: Refining the algorithms to ensure the most accurate results; (3) Reasoning: Picking up the specific algorithms to resolve a specific task.
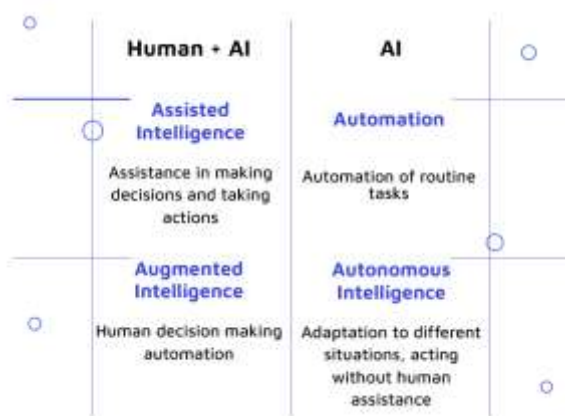

Figure 2: The forms of AI in the first row are incapable of learning from their experience

3.1 Personalize Education

Artificial Intelligence helps find out what a student does and does not know, building a personalized study schedule for each learner considering the knowledge gaps. In such a way, AI tailors' studies according to student's specific needs, increasing their efficiency. To do it, many companies train their AIs, armed by the Knowledge Space Theory, to define and represent the knowledge gaps, taking into account the complexity of scientific concepts relations between each other (one can stimulate the learning of another or become a basis for filling in the gap).
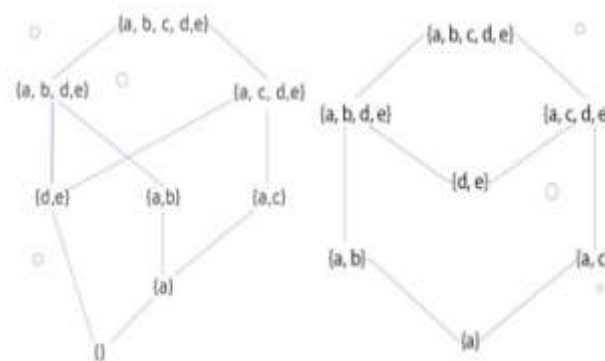

Figure 3: Artificial Intelligence helps for personalize Education

3.2 Produce Smart Content

Digital lessons: Digital learning interfaces with customization options, digital textbooks, study guides, bite-sized lessons, and much more can be generated with the help of AI. Information visualization: new ways of perceiving information, such as visualization, simulation, web-based study environments, can be powered by AI. Learning content updates: Besides, AI helps generate and update the content of the lessons, keeping the information up to date and customizing it for different learning curves.

Continuously evolving personal study programs take into account student's gaps to fill during individual lessons. Personal tutoring and support for the students outside of the classroom help learners keep up with the course and keep their parents from struggling to explain algebra to their kids. AI tutors are great time-savers for the teachers, as they do not need to spend extra time explaining challenging topics to students. With AI-powered chatbots or AI virtual personal assistants, students can avoid being embarrassed by asking for additional help in front of their friends.

3.3 Contribute To Task Automation

Administrative tasks simplification: grading, assessing, and replying to students is a time-consuming activity that could be optimized by the teacher using AI. Do you remember the hints Gmail provides in the messages you compose based on the overview of your current and past messages plus the business vocabulary essentials? It would be great to have such an option on any Learning Management System or learning platform envisaging the feedback.

Entrusting a set of routine tasks to AI helps teachers make room for something more important: concentrating on grading the assignments impossible to delegate to Artificial Intelligence, self-education, upgrading the quality of the lessons.

The adoption of innovative AI technologies opens up new ways of interacting for students with learning disabilities. AI grants access to education for students with special needs: deaf and hard of hearing, visually impaired, people with ASD… Artificial Intelligence tools can be successfully trained to help any group of students with special needs.

3.4 Benefits of AI for Students

24/7 Access to Learning: With AI helpers based online, students always have access to learning. They are free to plan their day without being linked to a specific place. They can study on the go; at any place and time they want. They can build their schedule based on their most productive hours.

Better Engagement: Individualized schedules, custom tasks, interaction with digital technologies, and personal recommendations are part of the personal approach each student gets using AI. Besides, a personal approach helps students feel special, increasing their engagement and raising interest in studies in such a way.

Less Pressure: Lessons tailored to the needs of different learning groups allow students to stop comparing them to each other. Earlier, a student should have asked a teacher for help in front of the class. Now, it's enough to type a query using a personal virtual assistant and get an instant explanation. These opportunities offered by AI tools make personal progress come to the fore, reducing the pressure in the classroom. Less pressure means less stress and more enthusiasm to study.

4. Some recommendations to promote the application of AI in education in Vietnam

4.1 Technology and chemical engineering of higher education

Over the past decade, evolving technologies have revolutionized and changed the education landscape in many ways. Advanced technologies such as big data analytics, artificial intelligence, and the Internet of Things (IoT) are not only changing the content we teach, but the methods of teaching as well. The rapid digitalization of education leads to a number of challenges but also opens up new opportunities for education at different levels from education administration and management to day-to-day teaching. Therefore, there is an urgent need for educational researchers and practitioners to discover, understand and improve innovative learning environments, relevant curricula, and the future of education.

The application of artificial intelligence will encourage research contributions related to the development, use and implementation of technology in education, including but not limited to: learning theory, learning analysis, innovative learning environments, online (distance) learning, educational infrastructure, social impact, user experience, research methods and measurable outcomes as they relate technology and its support in improving teaching and learning.

4.2 Governance and university management

The unprecedented covid-19 pandemic has posed enormous challenges to every aspect of society, and education is no exception. Despite the difficulties, the outbreak is also an opportunity to gain insights into our education system. The topic of artificial intelligence in university management involves both theory and experiment, and the articles cover how universities manage their educational institutions. Studies on the application of artificial intelligence in university management around how to measure the effectiveness of university interventions and management change in education are also welcome to shape the picture. major in educational management during and after the crisis.

As a result, there have been urgent calls for reforming the education system to adapt to today's rapidly changing conditions, such as the Covid-19 crisis. Increased creativity and flexibility, improved teaching and learning methods, enhanced stakeholder linkages, and a large number of other initiatives have been implemented by schools and universities around the world. to deal with the unintended consequences of the pandemic.

4.3 Quality assurance of higher education

Due to the increasing competition in higher education, more emphasis has been placed on quality assurance activities such as global ranking, accreditation or various forms of assessment and evaluation. What is the purpose of quality assurance for higher education? How do higher education institutions, at the global or national level, respond to external and internal needs to ensure better quality activities? To what extent have different quality assurance activities changed teaching, learning and research in higher education? This theme opens up discussions and disseminates the work done by educational researchers, practitioners or policymakers who are dedicated to promoting an authentic culture of assurance. quality in higher education.

4.4 Teaching and learning activities at university level

This topic welcomes in-depth articles on learning, teaching and the relationship between them. Appropriate research topics will relate to learning and teaching activities in a variety of fields such as computer science, English as a second language (ESL), engineering, business, science social, etc In addition, research on how internal factors (e.g. motivation, attitudes, beliefs, perceptions) and external factors (e.g. social, cultural, learning environment, curriculum, educational policy) affecting learning or teaching is also encouraged in this topic. Furthermore, all articles related to equity, autonomy and democracy in learning and teaching are also taken into account. Especially in the face of the Covid-19 pandemic, we are interested in the new findings of digital transformation in the classroom as well as the notable advantages and disadvantages of applying technology in learning and Teaching. We expect well-designed reports, using methods appropriate to the research questions, drawn from actual data rather than predicted results. We accept not only empirical studies but also articles that summarize existing studies.

4.5 Policy on higher education

In higher education, AI-related policy is often studied at the global, national as well as university level, and often not

separately. Given its interdisciplinary nature, studying the impact of artificial intelligence on education and training policy requires a broad understanding of other social domains, including but not limited to political economy, and This is also true in the area of higher education policy.

Existing research on the correlation between artificial intelligence and higher education policy – such as governance, privatization, research, finance, internationalization – has been quite well done and continues. expanding rapidly, but there is still a need to understand higher education policies more thoroughly. This topic invites recommendations for specific higher education policy analysis – particularly those that are contemporary and hotly debated, such as those related to COVID-19, governance, privatization and research – at all levels.

4.6 Higher education and sustainable development goals related to artificial intelligence

Sustainable development is one of the biggest challenges facing humanity, especially with the increasing applicability of artificial intelligence. Sustainability challenges call for a radical change in higher education. This is a potential catalyst for sustainable development for the next generation. The necessary changes are curricula, teaching methods, policies and institutional structures. Therefore, to ensure higher education and sustainable development goals related to artificial intelligence, researchers, practitioners and educators present and discuss the innovations, trends and the most recent concerns as well as practical challenges encountered and solutions applied in the fields of higher education and sustainability.

4.7 Philosophy of higher education

In light of the rapidly changing world in which we live and the post-crisis times we need to deal with, challenges associated with artificial intelligence can include: redefining roles and purposes of universities, the value of university autonomy, knowledge creation in higher education, the power relationship among higher education actors. Artificial intelligence contributions can be conceptual or empirical with insights into the historical, socio-cultural, economic and organizational contexts of higher education practice in response to the challenges awake like that. The purpose of the application of artificial intelligence is to enhance the educational philosophy of each country through open, critical dialogues about the meaning of higher education, the philosophical background, the sensitivity about its context and thus encourage meaningful action in post-crisis management.

4.8 Training teachers and developing teachers to apply artificial intelligence in teaching and learning

Policymakers, researchers and educators around the world have also discussed the persistent and emerging issues facing the teaching profession, particularly the effects of artificial intelligence. . These problems include low teacher salaries but high demand for the teaching profession, low enrollment in teacher training programs, but high dropout rates and diminished social trust. but expectations are rising from education stakeholders. In this time of pandemic and uncertainty, teachers at all levels in Vietnam as well as in different contexts are increasingly expected to be on the front lines as problem solvers, technologically, socially and emotionally, leaders and supporters. Artificial intelligence will be a tool and leverage to solve issues including but not limited to: policy on teaching profession; teacher training, professional development and beginner teacher programs; course design and evaluation of these programs; Innovative theories and practices in teacher training and professional development such as culturally appropriate teaching, equity and social justice, environmental and sustainability education, wellbeing and self-care teacher identity, and teacher leadership.

4.9 Internationalization of education based on artificial intelligence

The internationalization of higher education has been used by countries and universities as a powerful force to reform the quality of curricula, enrich the student experience, enhance prepare students for a globalized world and increase the school's ranking. In particular, the COVID-19 pandemic associated with health, economic, social, psychological and humanitarian crises, border closures and restrictions on the movement of international students, has exposed the vulnerability of the internationalization model of education in countries that are the main destination of international students. In many other countries, the digitization of higher education as an approach to adapting to the new normal created by COVID-19 has provided new possibilities for internationalizing teaching and learning as well as enhancing accessibility and equality in the internationalization of education. Synthesizing important themes in the policies and practices of internationalization of education, this section takes a close look at the fundamental issues related to how the internationalization of education adapts to the crisis.

5. Conclusion

In fact, Vietnam still has many limitations in the development of artificial intelligence, there is no foundation for intensive research and training in artificial intelligence at regional and international level; there is no national research center for artificial intelligence; open data systems are limited. Therefore, to promote the application and development of artificial intelligence in education, Vietnam should have: (1) Training system on data analysis at universities; (2) A unified artificial intelligence open learning platform for all educational levels; (3) A secondary AI vocational education system.

In addition, the development of artificial intelligence for education in Vietnam also needs to re-train experts to support AI promotion by: (1) Require universities to provide master's degrees second free on AI data analysis; (2) Train engineers that enable domestic AI hardware to be created; help teachers disseminate the use of modern technology.

Along with focusing on training human resources at the

expert and engineer levels, Vietnam should also focus on training programs to popularize knowledge, capacity and skills in analysis and application of artificial intelligence for all citizens, cadres, civil servants, leaders in all fields of business. The integration of high-tech parks, software parks, and start-up centers in promoting the development of artificial intelligence, focusing on building digital infrastructure, high-performance computing infrastructure, and data infrastructure, to human resource training, development of mechanisms and policies on artificial intelligence, application and transfer of artificial intelligence solutions.

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