中国智・惠世界

中国智·惠世界 '』』 | 1

序言 | PREFACE

习近平主席强调:人工智能是人类发展新领域,是新一轮科技革命和产业变革的重要驱动力量。

当前,全球人工智能技术快速发展,对经济社会发展和人类文明进步产生深远影响,也为促进联合国可持续发展目标实现提供重要助力。

中国坚持"以人为本""智能向善"的发展和治理理念,以增进人类共同福祉为目标,在农业、医疗、教育等多个领域积极探索人工智能应用赋能方案,支持人工智能技术助力可持续发展,应对气候变化、生物多样性保护等全球性问题。与各国政府、国际组织、企业、科研院校、民间机构和公民个人等各主体秉持共商共建共享理念,协力推动构建一个开放、合作、共享的全球人工智能发展格局,确保人工智能发展惠及全人类。

在 2024 世界人工智能大会即将召开之际,我们组织编写了《中国智·惠世界》 图文集,收录了部分中国人工智能产品和技术在亚洲、非洲、欧洲、美洲和 大洋洲等国家和地区赋能发展的生动实践,希望告诉世界,我们正在并将长 期致力于运用人工智能技术造福全人类。

当然,这些案例只是中国智惠世界的缩影。我们相信,随着人工智能技术的 不断发展,中国智慧和中国方案将更多地走向世界,不远万里,不怕万难, 为推动人类文明的进步和发展贡献中国力量。 Chinese President Xi Jinping has stressed that artificial intelligence (AI) is a new frontier in human development and a pivotal force driving the new round of technological revolution and industrial transformation.

Currently, AI technology is experiencing meteoric development worldwide, exerting profound influence on economic and social development and the progress of human civilization. It also provides major support for achieving the United Nations Sustainable Development Goals.

China adheres to the people-centered and "AI for good" principles of development and governance, with the aim of enhancing the common well-being of humanity. It actively explores AI empowerment solutions in various fields, such as agriculture, healthcare and education. China supports the use of AI technology in assisting sustainable development, addressing global common challenges like climate change and biodiversity conservation. Together with other governments, international organizations, enterprises, research institutions, non-governmental organizations and individuals, China advocates planning together, building together, and benefiting together to foster an open, cooperative and shared global AI development pattern, thus ensuring that AI development benefits all mankind.

On the occasion of the upcoming 2024 World Artificial Intelligence Conference, we have compiled the "AI from China Benefits the World" collection of cases and photos, with prime examples of Chinese AI products and technologies empowering the development of countries and regions all around the globe. The collection aims to show the world how Chinese companies are using and will continue to use AI technologies to benefit all humankind.

These cases, however, are just a microcosm of Chinese solutions benefiting the world. We believe that with the constant development of AI technology, Chinese wisdom and solutions will bring tangible benefits to more corners of the world. Braving long distances and tough challenges, Chinese wisdom will continue to contribute to the progress and development of human civilization.

2024 年 7 月 July 2024

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开源大模型助全球 AI 发展前行

Alibaba Cloud ET

Open-Source Large Models
Advance Global Al Development

阿里云 Logo。阿里云供食

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魔搭社区 (ModelScope) 情况介绍。阿里云供图。

ModelScope: China's largest community for AI models. (Provided by Alibaba Cloud)

即将开幕的巴黎奥运会将实现奥运史上的 AI 突破。国际奥委会与阿里云合作,利用阿里云通义视觉模型技术为奥运历史影像精准上色,阿里云通义大模型也将应用于巴黎奥运会的场景之中。

2023年8月以来,阿里云先后开源了通义千问5亿、18亿、40亿、70亿、140亿、320亿、720亿、1100亿参数基础模型,并面向全球推广应用。这些模型基于高性能和开源特性,吸引了大量全球开发者和研究者,并在日本、美国、法国、越南、新加坡等国家受到欢迎,促进AI技术在全球范围的应用创新和交流合作。

阿里云通义开源系列模型,主要通过中国的魔搭社区 (ModelScope) 和国外的 Hugging Face 社区进行下载和使用,目前下载量已超 1600 万。 以魔搭社区为例,魔搭会提供详细的使用文档、最佳实践、数据集 和训练框架等,帮助开发者通过社区更好地使用大模型。 The upcoming Paris Olympics will mark the groundbreaking application of AI technology in Olympic history. The International Olympic Committee has partnered with Alibaba Cloud to utilize the Tongyi visual model technology to colorize historical Olympic footage accurately. Alibaba Cloud's Tongyi large models will also be applied in various scenarios during the Paris Olympics.

Since August 2023, Alibaba Cloud has successively opened the source code for its basic models of Tongyi Qianwen with 500 million, 1.8 billion, 4 billion, 7 billion, 14 billion, 32 billion, 72 billion and 110 billion parameters, and has promoted their application worldwide. These models, based on their high performance and open-source features, have attracted a large number of global developers and researchers and have been well-received in countries such as Japan, the United States, France, Vietnam and Singapore, promoting AI application innovation, exchanges and cooperation on a global scale.

Alibaba Cloud's Tongyi open-source models are mainly downloaded and used

创新无界,助力全球智能化升级

通义千问在海外已经拥有多个受众群体。日本创业公司 Rinna 基于通义千问 70 亿和 140 亿参数基础模型持续进行日语训练,推出了 Nekomata 模型。"通义千问的分词技术显著提高了 Nekomata 模型 处理日文文本的效率。" Rinna 公司负责人说。阿里云的通义千问系列凭借 152,000 词的词汇量,在日语推理上实现了高效率。Rinna 公司基于通义千问的大语言模型,进一步开发并推出了四款遵循指令的语言模型,以交互方式响应用户指令,这些模型的发布有助于提升日语 AI 研究与开发的层次。

通义千问在国外社交媒体同样受到广泛关注。来自美国加州的塔尼奇·马修·亚伯拉罕表示,中国正在为 AI 生态系统和社区做出重大贡献,不需要任何特殊提示,通义千问 720 亿模型(Qwen-72B)就能给出回答。越南网友 qnguyen3 称赞 Qwen-72B "开箱即用,无需微调",当有网友吐槽 Qwen-72B 模型太大,不能轻松测试时,该越南网友立刻推荐了通义开源大模型家族下的 140 亿模型。Dify.AI 日本推广人 Sangmin 表示,中国 AI 研究正以惊人的速度发展,Qwen-72B 拥有最接近 GPT-4 的能力,期待通义千问新版本的更新发布。

阿里云还将生成式 AI 能力整合到 LVMH 路威酩轩集团的技术中, 其中就包括大语言模型通义千问和人工智能模型构建平台——阿里 云百炼。"使用云计算和人工智能技术的变革能力,以及阿里巴巴 在电子商务运营方面全球领先的专业知识,双方具有前瞻性的合作 through China's ModelScope community and the Hugging Face community abroad. The downloads has exceeded 16 million. Taking the ModelScope community as an example, it provides detailed usage documents, best practices, datasets, and training frameworks to help developers better use the large models.

Boundless Innovation Boosting Global Intelligent Upgrades

Tongyi Qianwen has already garnered many follower groups overseas. Rinna, a Japanese startup, has been continuously training its Nekomata model using Qwen-7B and Qwen-14B. "Tongyi Qianwen's word segmentation technology significantly improves the Nekomata model's efficiency in processing Japanese text," said a Rinna executive. With a vocabulary of 152,000 words, Alibaba Cloud's Qwen series achieves high efficiency in Japanese reasoning. Based on Tongyi Qianwen's large language models, Rinna has further developed and launched four instruction-following language models that respond to user commands, contributing to the advancement of Japanese AI research and development.

Tongyi Qianwen has also gained widespread attention on foreign social media. Tanich Matthew Abraham from California said China is making significant contributions to the AI ecosystem and community. Without any special proof, Qwen-72B can provide answers. Vietnamese netizen qnguyen3 praised Qwen-72B as "ready to use without fine-tuning." When another netizen complained that the Qwen-72B model was too large to test easily, the Vietnamese netizen immediately recommended the Qwen-14B from the open-source Tongyi model family. Dify.AI's Japan promoter Sangmin noted that Chinese AI research is advancing at an astonishing pace, with Qwen-72B having capabilities closest to GPT-4, and expressed anticipation for new updates to Tongyi

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将在整个高端购物过程中为客户提供优质体验。"LVMH集团董事总经理史蒂芬·比安奇指出。

2024年5月23日,阿里云宣布将在全球5个国家(韩国、马来西亚、菲律宾、泰国和墨西哥)投资新建数据中心,重点布局 AI 基础设施。同时,阿里云 AI 技术将首次"出海"。大模型服务平台百炼国际版即将上线,提供一站式、全托管的大模型定制与应用服务,最新版基座模型通义千问2.5也已通过百炼平台提供API。

拥抱开源,助推 AI 不断前行

通义千问自问世以来,一直是市场焦点。"在海外市场我们有多语种支持,这也是通义大模型系列非常突出的部分,特别是在东南亚地区语言上的性能得到的反馈都是非常积极的。所以这方面我们还会持续地投入。"阿里云 CTO 周靖人表示。周靖人再次强调了对开源的坚持,"开源生态对整个全球技术领域的贡献毋庸置疑。"

人工智能是人类发展的新领域,带来重大机遇,也伴随着难以预知的风险挑战,需要国际社会共同应对。由中国提出的《全球人工智能治理倡议》提出,发展人工智能应坚持相互尊重、平等互利的原则,各国无论大小、强弱,无论社会制度如何,都有平等发展和利用人

Qianwen.

Alibaba Cloud is also integrating generative AI capabilities into the technology of LVMH group, including the Tongyi Qianwen large language model and the AI model-building platform: Alibaba Cloud Bailian. "Using the transformative power of cloud computing and AI, along with Alibaba's globally leading expertise in e-commerce operations, this forward-looking collaboration will provide customers with a premium experience throughout the high-end shopping process," said Stéphane Bianchi, group managing director of LVMH.

On May 23, 2024, Alibaba Cloud announced plans to invest in new data centers in five countries (the Republic of Korea, Malaysia, the Philippines, Thailand and Mexico), focusing on AI infrastructure. Additionally, Alibaba Cloud's AI technology will make its overseas debut. The international version of the large model service platform Bailian is set to launch, offering one-stop, fully delegated large model customization and application services. The latest foundational model, Tongyi Qianwen 2.5, will also provide API access through the Bailian platform.

Embracing Open Source to Push AI Forward

Since its inception, Tongyi Qianwen has been a market focal point. "In the overseas market, we support multiple languages, which is a very prominent feature of the



LVMH 集团与阿里巴巴宣布深化云计算合作。阿里云供图。

LVMH and Alibaba announce deepened cloud computing cooperation. (Provided by Alibaba Cloud)

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通义千问 72B 基座大模型及对话大模型包揽中文数据集测试前二。阿里云供图。

Qwen-72B basic large model and its chat model are the top two in a Chinese dataset testing. (Provided by Alibaba Cloud)

工智能的权利。鼓励全球共同推动人工智能健康发展,共享人工智能知识成果,开源人工智能技术。

虽然大模型赋能千行百业早已成为行业共识,但是大模型从零开始 训练的成本高、数据准备时间长、训练难,仍然是横于众多企业踏 入大模型领域前的一道门槛。

阿里完整的技术体系和基础设施构建能力,正在以开源和平台服务的方式向外界全面开放,不仅提供了稳定、高效的 AI 基础服务体系,还将创建开放、繁荣的 AI 生态。开源 AI 模型不仅代表了一种技术发展模式,更展示了一种开放合作的理念。通过拥抱开源,企业和开发者可以共同推动 AI 技术的进步,实现更高效、更公平的发展。无论是在当前还是未来,开源 AI 模型都将在技术创新和社会进步中扮演重要角色,成为推动 AI 领域不断前行的强大动力。(汪慕涵)

Tongyi large model series, especially in the Southeast Asian region, where the performance feedback has been very positive. We will continue to invest in this area," said Zhou Jingren, CTO of Alibaba Cloud, reiterating the commitment to open source. "The contribution of the open-source ecosystem to the global technology field is undeniable."

AI is a new frontier for human development, bringing significant opportunities and unpredictable risks that require international cooperation. The "Global AI Governance Initiative" proposed by China emphasizes that the development of AI should adhere to principles of mutual respect, equality and mutual benefit. All countries, regardless of size, strength or social systems, have the right to equally develop and utilize AI. It encourages the global community to promote the healthy development of AI, share AI knowledge outcomes, and open the source code of AI technologies.



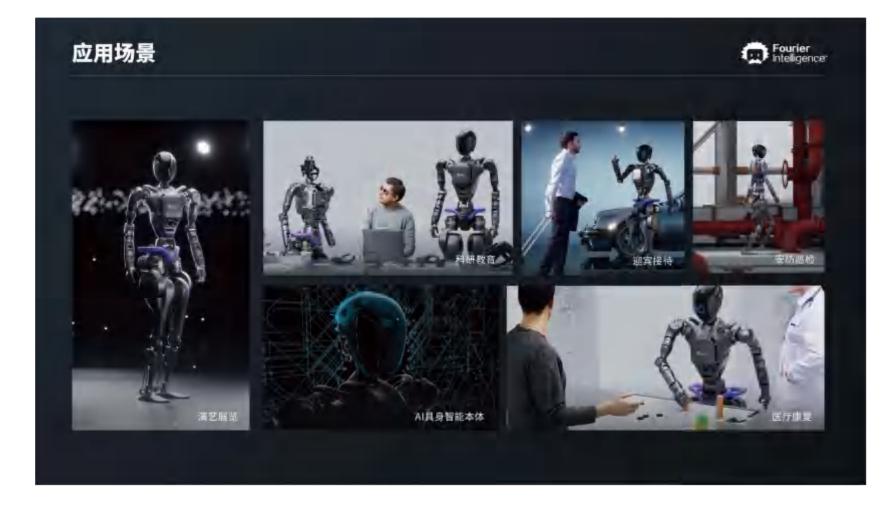
阿里云 CTO 周靖人在通义千问发布会介绍开源进展。阿里云供图。

Alibaba Cloud CTO Zhou Jingren talks about open source progress at a Tongyi Qianwen press conference. (Provided by Alibaba Cloud)

Although the empowerment of various industries by large models has long been an industry consensus, the high costs, long data preparation time and the difficulties in training large models from scratch remain barriers for many companies entering the large model field.

Alibaba's comprehensive technological system and infrastructure construction capabilities are being fully opened to the outside world through open-source and platform services, not only providing stable and efficient AI foundational services but also creating an open and thriving AI ecosystem. Open-source AI models represent not just a mode of technological development but also the pursuit of open cooperation. By embracing open source, enterprises and developers can jointly advance AI technology to achieve more efficient and equitable development. In the future, open-source AI models will play a vital role in technological innovation and social progress, and become a powerful driving force for the continuous advancement of AI technology. (Wang Muhan)





通用人形机器人潜在应用场景。傅利叶智能供图。

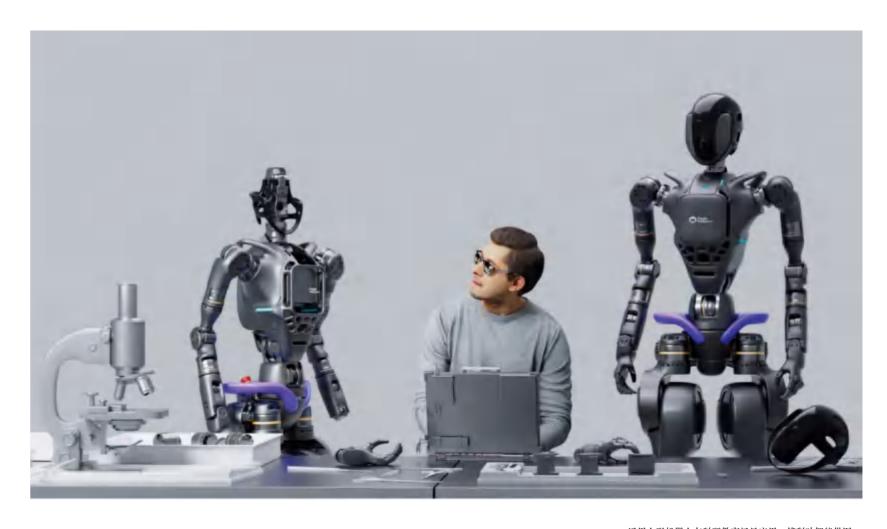
The photo shows the application of general-purpose humanoid robots in some potential scenarios. (Provided by Fourier Intelligence)

20多年前,一位学子梦想要做一个机器人。20多年后,一个身高 1.65 米,体重 55 公斤的机器人正大步流星地行走着。ta 身材苗条、视野开阔,可以轻松躲避障碍,可以向你招手打招呼,手指灵活程度媲美真人。ta 就是由傅利叶智能全自主研发,中国首个商业化可交付的通用人形机器人——GR-1。

GR-1 机器人的步行速度可达 5km/h, 负重可达 50 公斤, 环境适应能力强。凭借流畅的外观、优异的运动机能,以及高质量的量产交付能力, 傅利叶智能逐渐吸引全球业界的关注。

More than two decades ago, a student dreamed of building a robot. Now, a 1.65-meter-tall, 55-kilogram humanoid robot is striding forward with confidence. This robot, named GR-1, is slender and has a wide field of view, allowing it to easily avoid obstacles. It can wave at and greet you, and its fingers move with the dexterity of a real person. Developed independently by Fourier Intelligence, GR-1 is China's first commercialized, deliverable general-purpose humanoid robot.

The GR-1 robot can walk at a speed of up to 5 kph, carry loads of up to 50 kilograms, and adapt well to the environment. With sleek appearance, excellent motor



通用人形机器人在科研教育场景应用。傅利叶智能供图。

The photo shows the application of general-purpose humanoid robots in a scientific research and education scenario. (Provided by Fourier Intelligence)

近年来全球主要发达国家纷纷加强人形机器人的整机制造、核心零部件和人工智能等领域布局,并上升到国家战略层面。同时,全球产业巨头纷纷推出自己的人形机器人产品,为行业发展注入了强劲动力,机器人产业正迎来重要机遇期。

20 年前的梦想成为了现实,傅利叶智能 CEO 顾捷说: "相比现在形形色色的专用机器人,人形机器人对环境的适应性更强,应用场景更为广泛。人形机器人还可代替人类在特定领域中的工作,如核电厂、发电站巡逻、迎宾等,在这些对人类而言比较危险或者枯燥的地方,

skills, and Fourier Intelligence's high-quality mass production capabilities, the robot is attracting growing attention of worldwide industry insiders.

Over the past years, major developed countries around the world have been strengthening their network in the fields of whole-robot manufacturing, core components and AI technology for humanoid robots, and have elevated these efforts to the level of national strategy. At the same time, global industry giants have launched their own humanoid robot products, injecting strong momentum into the development of the industry. The robotics industry is ushering in an important period of opportunity.

人形机器人的完成度优于人类。"

2020年在公司大会上,顾捷许愿: "未来我们人形机器人要做到全球第一。"带着这份热爱,傅利叶智能向技术难度更大的通用机器人领域发起了挑战,逐步实现通用人形机器人用关节执行器、高精度传感器、智能控制卡等核心部件的自研自产和国产替代。在技术上,人形机器人运动控制、人机交互、多机协同、灵巧操作等技术难题逐一被突破。

作为人工智能进入物理世界交互的载体,具身智能将人工智能技术与机器人实体相结合,让"大脑"有了可支配、可感知、可交互、可行动的"身体",成为人类的重要伙伴和助手,带来巨大便利和效益。机器人应用场景逐渐开启了从"人工"到"人文"的跨越。

当前,傅利叶智能已开始探索康养陪护场景下的应用,并向高校、研究机构及其他场景应用方开放底层软硬件技术,供进行二次开发, 共同突破人形机器人行业共性关键技术,实现迭代升级。

未来,人形机器人有望可识别人类情感,在家庭生活中,担任起陪伴老人和儿童的角色,减轻照顾家庭成员的负担;在野外,人形机器人在复杂地形中自如行走,在极端环境下展现稳定的工作状态;在医院,人形机器人通过精准的操控和高清的三维视觉系统,与人类合作完成复杂的手术,提高手术的成功率和患者的康复速度。人形机器人将更多地进入教育、零售、服务业等领域。

截至 2023 年底,中国已成为人形机器人技术专利申请数量和有效专利数量最多的国家,累计申请数量已达 6618 件,处于世界领先水平。专利技术的爆发式增长,折射出中国人形机器人产业链的日趋成熟。

人形机器人的存在,将丰富人类的情感生活,深刻变革人类生产生活方式并推动整个社会前进,在人类文明的长河中留下辉煌的一笔。正如在首届人工智能安全峰会上发布的《布莱奇利宣言》所说,"人工智能带来巨大机遇,有潜力增强人类福祉、和平和繁荣,并已部署在日常生活的许多领域"。(王晓雯)

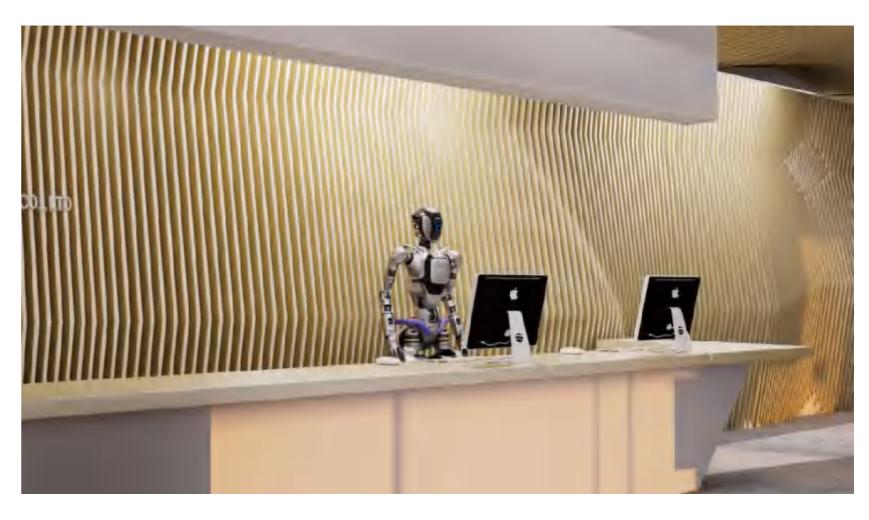
The dream of over 20 years ago has become a reality, said Fourier Intelligence CEO Gu Jie. "Compared with today's myriad special-purpose robots, humanoid robots have stronger environmental adaptability and a wider range of application scenarios. Humanoid robots can also replace humans in specific work areas, such as patrolling nuclear power plants and power stations or greeting visitors. In these places where humans may find it dangerous or boring, humanoid robots can do a better job than humans," Gu Jie said.

At a company conference in 2020, Gu Jie made a wish - "In the future, our humanoid robots will be the best in the world." With this passion, Fourier Intelligence has taken on the challenge in the field of general-purpose robots, which has higher technological difficulty, and gradually achieved self-research, self-production, and domestic replacement of core components, such as joint actuators, high-precision sensors, and intelligent control cards for general-purpose humanoid robots. Technological difficulties such as humanoid robot motion control, human-robot interaction, multi-robot collaboration and dexterous operation have been broken through one by one.

As a carrier for AI technology to interact with the physical world, embodied intelligence combines AI with a physical robot, giving the "brain" a controllable, perceivable, interactive and mobile body. Such robots can become important partners and assistants for humans, bringing great convenience and benefits. The application scenarios of robots have gradually changed from "artificial" to "humanistic."

At present, Fourier Intelligence has begun to explore applications in the fields of healthcare and companionship, and has opened up underlying hardware and software technologies to universities, research institutions and users seeking other application scenarios for secondary development. This allows for jointly breaking through common key technologies in the humanoid robot industry and achieving constant upgrades.

In the future, humanoid robots are expected to recognize human emotions and play the role of companions for elderly people and children in family life, reducing the burden of caring for family members. Outdoors, humanoid robots can walk freely in complex terrain and show a stable working state in extreme environments. In hospitals, these robots can cooperate with humans to complete complex surgeries



通用人形机器人在商用服务场景的应用。傅利叶智能供图。

The photo shows the application of a general-purpose humanoid robot in a commercial service scenario. (Provided by Fourier Intelligence)

through precise control and high-definition three-dimensional vision systems, improving the success rate of surgeries and raising the speed of patient recovery. Humanoid robots will enter education, retail, services and other industries.

By the end of 2023, China had become the country with the largest number of patent applications and valid patents for humanoid robot technology, with a total of 6,618 applications. The explosive growth of patent technologies reflects the increasingly mature industrial chain of China's humanoid robot industry.

The existence of humanoid robots will enrich human life, deeply change the way humans live and work, and promote the progress of the entire society, leaving a brilliant mark in the long course of human civilization. As stated in the Bletchley Declaration released at the first AI Safety Summit, "AI presents enormous global opportunities; it has the potential to transform and enhance human well-being, peace and prosperity. AI systems are already deployed across many domains of daily life." (Wang Xiaowen)

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文化交互引擎页面。远期人工智能研究中心供图。

 $\textit{The photo shows a web page of the Cultural Interactions Engine.} \ (\textit{Provided by the Center for Long-term Artificial Intelligence})$

"文化交互引擎不仅为我提供了一个全新的文化探索方式,还让我意识到文化交流与互鉴的重要性。我现在更加关注和热爱世界文化遗产,也迫切地希望探索和理解世界各地的文明与文化。"一名来华学习交流的巴基斯坦留学生说。彼时,他正饶有兴致地在文化交互引擎上对比着颐和园和奥地利的美泉宫。

这名留学生提到的文化交互引擎,是一个由远期人工智能研究中心和中国科学院自动化研究所人工智能伦理与治理研究中心联合打造的平台。该平台通过人工智能技术,分析和比较联合国教科文组织世界遗产名录上的各种文化遗产,揭示它们之间的联系和互动,展示人类文明的共性和多样性。文化交互引擎已经吸引了来自五大洲、

"The Cultural Interactions Engine has not only provided me with a whole new way to explore culture, but also made me realize the significance of cultural exchange and mutual learning. I'm now more captivated by and passionate about world cultural heritage, and I'm also eager to explore and understand civilizations and cultures around the world," said a Pakistani exchange student studying in China. At that time, he was comparing China's Summer Palace and Austria's Schönbrunn Palace with great interest on the website.

The Cultural Interactions Engine mentioned by this student is a platform jointly created by the Center for Long-term Artificial Intelligence and the International Research Center for AI Ethics and Governance under the Institute of Automation,

84个国家的用户访问,为保护与传承世界文化遗产提供了新模式。

以 AI 促进、保护全球文化多样性

世界遗产分布在不同的地理位置且各具特色,如繁星点点、熠熠生辉。它们之间是否存在关联,如何发现它们之间的联系?

"通过深入分析不同文化遗产的关联性与特性,我们能够更加深刻 地发掘不同文化之间的共通性,并在此基础上增进我们对文化多样 性的理解、包容与尊重。这不仅有助于减少文化间的偏见,更将因 此促进全球文化的和谐共生。"文化交互引擎首席科学家、远期人 工智能研究中心创始主任、联合国人工智能高级别咨询机构专家曾 毅说。

文化交互引擎无疑就是一个促进与保护文化多样性的人工智能系统。它基于人工智能语义分析技术绘制互动视觉图,以直观形式展示世界遗产的多样性和相互联系。相似或相关文化描述的遗产被绘制得更近,形成密集关联的节点,织就一张世界文化遗产网络图谱。同时,该平台还借助人工智能的基础语言模型,对世界遗产从25个维度进行自动化分析。

颐和园有没有"国际兄弟"?

颐和园是我国古典园林艺术造诣登峰造极的代表,也是世界文化遗产。当我们惊叹于颐和园的文化底蕴时,不禁会思考:在世界其他角落,在那些我们陌生的、遥远的文明中,有没有与颐和园类似的文化遗产呢?

Chinese Academy of Sciences. Through AI technology, the platform analyzes and compares various cultural heritages on the UNESCO World Heritage List, revealing their linkages and interactions and showcasing the commonality and diversity of human civilizations. The engine has attracted users from 84 countries across five continents and provided a new paradigm for the protection and inheritance of world cultural heritage.

Harnessing AI to Promote and Protect Global Cultural Diversity

World Heritage sites scatter like twinkling stars across the globe, each with its own unique character and charm. But are these sites connected? How can we uncover the hidden links that bind them together?

"By delving into the interconnection and characteristics of diverse cultural heritage sites, we can gain a deeper understanding of the commonalities that transcend cultures," said Zeng Yi, chief scientist of the Cultural Interactions Engine, founding director of the Center for Long-term Artificial Intelligence, and expert at the UN High Level Advisory Body on AI. "This deeper understanding fosters understanding, inclusion and respect for cultural diversity, not only reducing cultural biases but also promoting harmonious coexistence among global cultures."

Undoubtedly, the Cultural Interactions Engine is an AI system advancing and protecting cultural diversity. Leveraging AI semantic analysis techniques, it generates interactive visual graphs, vividly showcasing the diversity and interconnection of World Heritage sites. Heritage sites sharing similar or related cultural descriptions are drawn closer together, forming densely connected nodes that weave a tapestry of global cultural heritage. Additionally, the platform employs AI-powered language models to automatically analyze World Heritage sites in 25 dimensions.

Distribution of World Heritages

This interactive visual treemap demonstrates the geographical distribution of the UNESCO world heritages. Click any cell to zoom in, or the top banner to zoom out.



文化交互引擎展示的遗产分布及可视化。远期人工智能研究中心供图。

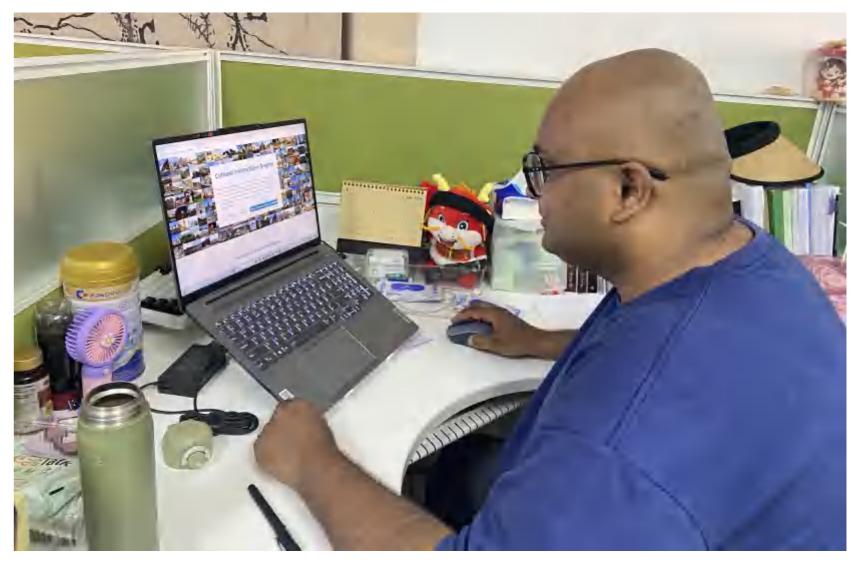
The photo shows the distribution and visualization of heritage sites displayed by the Cultural Interactions Engine. (Provided by the Center for Long-term Artificial Intelligence)

文化交互引擎展示了与颐和园最相似的六个文化遗址,包括承德避暑山庄、沈阳故宫、韩国昌德宫与天坛。此外,文化交互引擎还提示了两个不属于东亚文化圈的文化遗产——伊朗德黑兰的古列斯坦王宫与奥地利维也纳的美泉宫。这些遗址之间的相似性,是由人工智能算法通过自动化相关度计算得出的。

Does the Summer Palace Have "Global Cousins"?

The Summer Palace, a UNESCO World Heritage site, stands as the pinnacle of Chinese classical garden art. As we marvel at its rich cultural value, a question arises:

Do other cultural sites around the world, in civilizations far from our own, share similar characteristics?

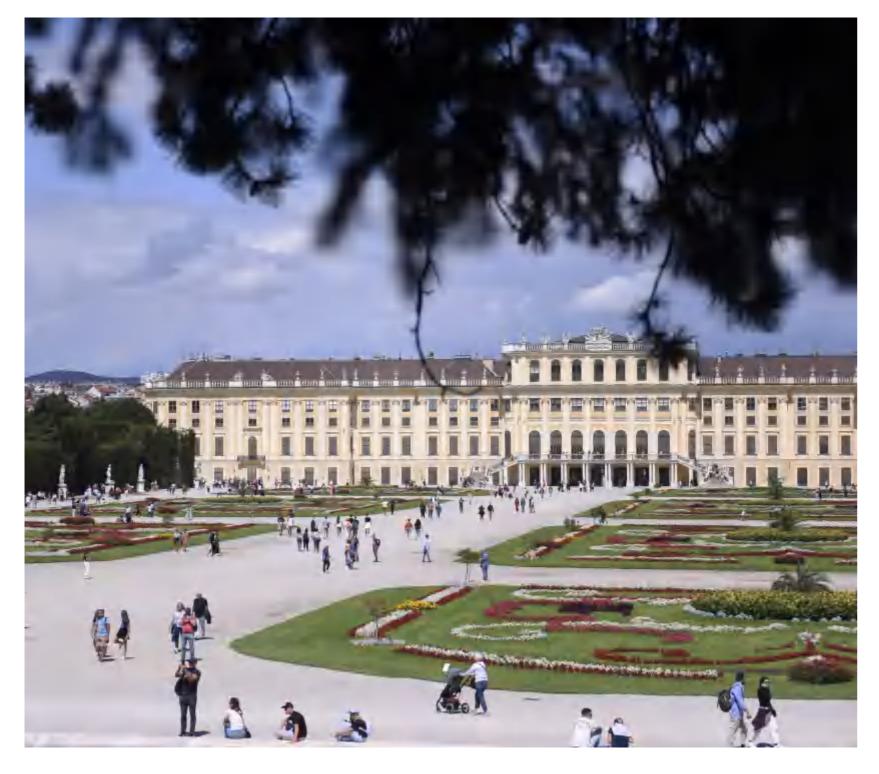


国际用户在使用文化交互引擎。远期人工智能研究中心供图。

 $The \ photo \ shows \ an \ international \ user \ of \ the \ Cultural \ Interlations \ Engine. \ (Provided \ by \ the \ Center \ for \ Long-term \ Artificial \ Intelligence)$

虽然颐和园、古列斯坦王宫与美泉宫之间距离千山万水,但是通过 文化交互引擎的分析,我们可以发现它们之间有着极其丰富的关联 性。它们都曾经在政治上起过重要作用,有丰富的文化底蕴,有花 园环绕的宫殿。同时它们在具体的装饰风格上有所差别,因地制宜 地使用了不同的建筑材料。古列斯坦王宫以波斯建筑和瓷砖工艺为 特色,美泉宫拥有巴洛克风格的宫殿和皇家花园。 The Cultural Interactions Engine finds six cultural sites that bear the closest resemblance to the Summer Palace, including the Chengde Mountain Resort, the Shenyang Palace Museum, the Changdeokgung Palace of the Republic of Korea, and the Temple of Heaven. Interestingly, the engine also identifies two cultural sites outside East Asia: the Golestan Palace in Tehran, Iran, and Schönbrunn Palace in Vienna, Austria. Their similarities were found after automated relevance calculations





2023年8月8日在奥地利首都维也纳拍摄的美泉宫。新华社照片。

 $\textit{The photo taken on August 8, 2023 shows the Sch\"{o}nbrunn Palace in Vienna, Austria. (Provided by Xinhua News Agency)}$

再如,硫磺石山要塞国家公园、罗马帝国边界与长城。它们虽然地处不同的大洲,但都是历史上的边防要塞,为保护文化认同和多样性作出了重要贡献。悉尼歌剧院与弗尔克林根钢铁厂的建设时期均为现代,建筑材质均为混凝土和钢铁。尽管它们的设计样式和建筑理念各不相同,但它们共享着现代建筑的共性特征和艺术场景的功能定位。

自推出以来,文化交互引擎已经吸引了来自五大洲、84个国家的用户访问。联合国教科文组织的高级官员对文化交互引擎的推出表示非常认可。"这个平台利用人工智能技术探索和揭示不同文化遗产之间的联系,为我们展示了全球文明的共性和多样性。通过对世界各地的文化遗产进行智能分析和比较,我们可以更深入地了解人类文明的丰富性,促进不同文化之间的相互理解与尊重。我们将全力支持和推动这一项目的发展。"

文化交互引擎不仅为全球范围内的文化遗产保护和传承提供了新的 视角和方法,更为促进不同文化之间的交流与理解搭建了一座桥梁。 "通过这个平台,我可以更加积极地参与到文化保护和传承的事业中, 为推动全球文化多样性和和谐共生贡献自己的力量。"开篇提到的 那名巴基斯坦留学生说。(余蕊) performed by AI algorithms.

Despite the vast geographical distances between the Summer Palace, the Golestan Palace and the Schönbrunn Palace, the engine's analysis revealed a remarkable degree of connectedness. All three sites played significant roles in their respective political landscapes, boast profound cultural legacies, and feature palaces surrounded by gardens. However, they also exhibit distinct decorative styles, employing locally sourced building materials. The Golestan Palace showcases Persian architecture and tilework, while the Schönbrunn Palace exudes Baroque grandeur with its palace and royal gardens.

For another example, the Brimstone Hill Fortress National Park, the Frontiers of the Roman Empire and the Great Wall, though located on different continents, all served as historical border fortifications, playing crucial roles in preserving cultural identities and diversity. Similarly, the Sydney Opera House and the Völklingen Ironworks are both constructed during the modern era and use concrete and steel as their primary building materials. Despite their contrasting design styles and architectural philosophies, they embody the shared characteristics of modern architecture and serve as functional artistic landmarks.

Since its launch, the engine has attracted users from 84 countries across five continents. A senior UNESCO official has expressed strong recognition for the platform: "This platform utilizes AI technology to explore and reveal connections between different cultural heritage sites, showcasing the commonalities and diversity of global civilizations. By intelligently analyzing and comparing cultural heritage sites worldwide, we can gain a deeper understanding of the richness of human civilization and promote mutual understanding and respect among different cultures. We will fully support and promote the development of this project."

The Cultural Interactions Engine not only offers new perspectives and methods for global cultural heritage protection and preservation, but also serves as a bridge for cross-cultural exchange and understanding. "Through this platform, I can participate more actively in cultural protection and inheritance endeavors, contributing my own efforts to promoting global cultural diversity and harmonious coexistence," said the Pakistani exchange student. (Yu Rui)







2024年1月在 CES 展会上海外嘉宾现场体验摩比思维机的"溯源学习法"。好未来供图。

In January 2024, international guests at the CES experience the "source learning method" of the Mobby Thinking Machine. (Provided by TAL)

"Amazing!"1月9日,全球规模最大的消费类电子展 CES 在美国拉斯维加斯开幕。在中国好未来教育集团(以下简称"好未来")旗下的学而思展台前,新发布的学习机 xPad 引得不少外国嘉宾连连惊呼。最受欢迎的学习交互来自"摩比爱写字",以隔空手势的交互方式教学汉字,只需十几秒,零基础的外国友人便能亲手写出自己的生肖汉字。

用 AI 打造"随时随地的智能课堂",好未来在 CES 上向世界展示了 科技与教育融合的场景化落地成果。近年来,好未来与联合国教科 文组织携手合作,共同实施"人工智能促进未来教育"计划,并作 为 AI+ 教育的"中国方案"被推向全球。 "Amazing!" On January 9, the CES, the world's largest consumer electronics show, opened in Las Vegas. At the booth of Xueersi, a subsidiary of China's TAL Education Group, the newly released learning machine xPad attracted many foreign guests. The most popular learning interaction comes from "Mobby Loves Writing," which teaches Chinese characters through air gesture interaction. In just over 10 seconds, even foreign friends with zero foundation can write the characters for their Chinese zodiac animals by hand.

Using AI to create "smart classrooms anytime, anywhere," TAL showcased the results of integrating technology and education at the CES. In recent years, TAL has joined hands with UNESCO to jointly implement the "Artificial Intelligence and the Futures of Learning" project, which has been promoted to the world as the "Chinese

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实施"人工智能促进未来教育"计划

2019年4月8日,在联合国教科文组织巴黎总部,联合国教科文组织与好未来签署为期3年的战略合作协议,双方将共同实施"人工智能促进未来教育"计划,助力教育发展。联合国教科文组织教育助理总干事斯特凡尼娅·詹尼尼、好未来副总裁吴杉杉等出席签约仪式。

"科技和人工智能对推动教育发展起着重要作用,也成为当今全球 热议的话题。"詹尼尼在签约仪式上表示,联合国教科文组织重视 和期待与中国企业进行战略合作,共同探索教育领域人工智能技术 的发展。

吴杉杉说,好未来期待通过与联合国教科文组织的战略合作,进一步探索"科技+教育"边界,吸纳更多前沿技术,推动国内外教育的融合创新,践行用科技推动教育进步的企业使命。

一年多后,2020年12月,好未来又继续延续资助领域,学而思教育科技将支持联合国教科文组织在全球范围内建立以互联网和AI等技术为基础、具备危机应对能力的开放性在线学习系统。双方还将通过合作,把中国在线教育发展经验带到撒哈拉以南的非洲国家和其他发展中国家。

solution" for AI+education.

Implementing "Artificial Intelligence and the Futures of Learning"

On April 8, 2019, at the UNESCO headquarters in Paris, UNESCO and TAL signed a three-year strategic cooperation agreement to jointly implement the "Artificial Intelligence and the Futures of Learning" project to help education development. UNESCO Assistant Director-General for Education Stefania Giannini and TAL vice president Wu Shanshan attended the signing ceremony.

"Science and technology and AI are key drivers for the development of education and hot topics in today's world," Giannini said at the signing ceremony. "UNESCO highly values and expects the strategic cooperation with Chinese companies so that the two sides can work together to explore the development of AI technology for education."

Wu said that with the strategic cooperation with UNESCO, TAL hopes to push the boundaries of "technology+education" in the future and absorb more frontier technologies to promote the integration of education with innovative technologies, thus fulfilling TAL's mission to advance education through science and technology.

More than a year later, in December 2020, TAL continued to extend its funding areas, and Xueersi announced to support UNESCO to establish an open online learning system



好未来教育集团 CTO 田密在"数字学习周"主论坛进行主题发言。好未来供图。

TAL CTO Tian Mi delivers a keynote speech at the main forum of "Digital Learning Week." (Provided by TAL)





2023年9月在联合国教科文组织巴黎总部,联合国教科文组织与好未来相关负责人合影。好未来供图。

In September 2023, UNESCO officials and TAL representatives pose for a group photo at the UNESCO headquarters in Paris. (Provided by TAL)

项目实施以来,好未来开发了"WISROOM学而思智慧课堂解决方案",围绕"人工智能促进未来教育"组织了一系列涵盖政府、研究机构、企业的讨论会议,形成了《AI and educaton: Guidance for policymakers》《K-12 AI 课程:官方认可的 AI 课程设计指南》等一系列研究成果。项目成果也将适用于联合国教科文组织的所有成员国。

"联合国教科文组织致力于在全球范围内普及推广优质的教育资源,将通过与好未来这样的教育力量进行连接,改善全球的教育现状及生态,助力成员国教育水平及质量的整体性提升。"詹尼尼说。

推进教育数字化转型

作为联合国下属专门负责科技的国际组织,教科文组织已经成为人工智能全球治理的奠基人和先行者。近年来中国积极与教科文组织合作,投身人工智能浪潮,为人工智能的国际治理与应用做出突出贡献。

2023年9月,联合国教科文组织在数字学习领域的年度盛会"数字学习周"在巴黎总部拉开帷幕。秉持"以技术促教育"的愿景,"数

based on internet and AI technologies with crisis response capabilities globally. The two parties also planned to work together to bring China's online education development experience to sub-Saharan African countries and other developing countries.

Since the project's implementation, TAL has developed the "WISROOM Xueersi smart classroom solution," organized a series of discussion meetings around "Artificial Intelligence and the Futures of Learning" involving governments, research institutions and enterprises, and formed a series of research results such as "AI and education: Guidance for policy-makers" and "K-12 AI curricula: A mapping of government-endorsed AI curricula." The project results will also be applicable to all UNESCO member states.

"UNESCO is committed to promoting quality educational resources worldwide. By connecting with educational forces like TAL, we aim to improve the global educational landscape and ecosystem, and enhance the overall educational standards and quality of member states," said Giannini.

Advancing Digital Transformation in Education

As a specialized international organization under the United Nations responsible for

字学习問"聚焦数字学习平台和生成式人工智能对教育的影响,旨 在推动数字化时代的高等教育数字创新,促进跨界合作,构建更具 包容性和可持续性的教育体系。

好未来 CTO 田密以"基于 LLM (大语言模型) 技术实现大规模的因 材施教"为题,进行了主题发言。田密介绍了学而思 MathGPT (数学大模型) 研发的最新情况,分享了学而思将如何利用 LLM 技术实现大规模个性化学习,并透露将推出基于学而思数学大模型的产品级应用 AI Tutor。

在詹尼尼看来, "所有公民都需要具备一定程度的人工智能能力。 这包括'人工智能素养'所需的知识、理解、技能和价值观——这 已成为我们这个世纪的基本语法。"

"好未来将持续投入更多资源,在推动全球人工智能及其他前沿技术应用于教育领域上做出更大贡献。"好未来执行总裁位晨表示。

用科学完善"素养启蒙"

现如今,许多国家把"核心素养"视为国民教育发展的基因。国际学生评估项目(PISA)中提到的阅读素养、数学素养、科学素养等,都是素养教育的典型内容。学而思打造的摩比思维机,让孩子在自

science and technology, UNESCO has become a pioneer and pacesetter of global AI governance. In recent years, China has actively collaborated with UNESCO, engaging in the wave of AI and making significant contributions to the international governance and application of AI.

In September 2023, UNESCO's annual event in the field of digital learning, "Digital Learning Week," kicked off at its headquarters in Paris. Upholding the vision of "Steering technology for education," Digital Learning Week focused on the impact of digital learning platforms and generative AI on education. The event aimed to drive digital innovation in higher education in the digital age, promote cross-sector cooperation, and build a more inclusive and sustainable educational system.

Tian Mi, CTO of TAL, delivered a keynote speech titled "Achieving Large-Scale Personalized Learning with LLM (Large Language Model) Technology." Tian introduced the latest developments in the MathGPT developed by Xueersi and shared how Xueersi plans to use LLM technology to achieve large-scale personalized learning. He also revealed the upcoming launch of the AI Tutor, a product-level application based on the MathGPT.

"All citizens need to have a certain level of AI capability. This includes the knowledge, understanding, skills and values required for 'AI competency' – the fundamental grammar of our century," said Giannini.

主玩的过程中,逐步建立完整的思维培养体系。

"全球教育技术的发展和创新潜力巨大,我发现最令人兴奋的教育创新就在中国。"在今年 CES 展会上,微软全球教育销售战略总监克里斯蒂娜·托尔斯森向学而思抛出"橄榄枝": "微软以赋能为使命,助力个体、组织终身成长,这与学而思的理念不谋而合。我们期待双方能够进一步合作,用科技为教育赋能,让更多学习者受益。"

好未来表示,中国这几年发展迅速,人们熟悉的"Made in China"(中国制造)已经渐渐变成"Created in China"(中国智造),中国教育将成为全球教育中不可忽视的力量。(高少华)

"TAL will continue to invest more resources to contribute significantly to the application of AI and other cutting-edge technologies in the education sector globally," said Wei Chen, executive president of TAL.

Enhancing Competency Enlightenment with Science

Today, many countries regard "core competencies" as the gene for national education development. Typical components of competency education include reading, mathematical and scientific competencies, as mentioned in the Programme for International Student Assessment (PISA). Xueersi has created the Mobby Thinking Machine, allowing children to gradually establish a complete thinking training system while playing games.

"The growth and innovation potential of global educational technology is enormous. I find the most exciting educational innovations in China," said Christina Thoresen, director of Worldwide Education Industry Sales Strategy at Microsoft, at this year's CES. "Microsoft's mission is to empower individuals and organizations for lifelong growth, which aligns with Xueersi's philosophy. We look forward to further collaboration, using technology to empower education and benefit more learners."

According to TAL, China's rapid development in recent years has transformed the familiar term "Made in China" into "Created in China." Chinese education is set to become an indispensable force in global education. (Gao Shaohua)

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科学前沿全然 PLENARY SESSION MIFIC FRONTIER 通用

"预见"AI,让世界"气象万千"

Al Weather Forecast:

Decoding the Secrets of a Dynamic Sky





123 年 8 月,欧洲中期天气预报中心副主任弗洛里安帕彭伯格 Florian Pappenberger 参加 AI for Earth 论坛。上海人工智能实验室供图

In August 2023, Florian Pappenberger, deputy director-general of the European Centre for Medium-Kange weather Forecasts, purity director-general of the European Centre for Medium-Kange weather Forecasts, purity distribution of Laborators

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(Provided by Shanghai Artificial Intelligence Laboratory)

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白磊博士在 2023 年世界人工智能大会 AI for Earth 论坛与嘉宾讨论。上海人工智能实验室供图。

 $Dr.\ Bai\ Lei\ discusses\ with\ guests\ at\ the\ AI\ for\ Earth\ forum\ of\ the\ 2023\ World\ Artificial\ Intelligence\ Conference.\ (Provided\ by\ Shanghai\ Artificial\ Intelligence\ Laboratory)$

当世界还沉浸在香甜的梦境不愿醒来,64岁的渔民朱利安·巴塔和妻子从睡梦中惊醒,台风呼啸刮过,菲律宾马奈特岛沿海社区的居民对这样的声响再熟悉不过。因独特的地形和所处位置,马奈特岛面临多重自然灾害风险。

在与家人撤离前,朱利安赶去检查渔船,捕鱼是靠天吃饭的渔民们维持全家生计的主要经济来源。"天气预报太重要了,出不出海、去哪出海都得靠它,每次出发前必须要查。"朱利安说。

气象预报,是渔民的指南针和定心丸,更是渔民生命的保护锁。一 直以来,上海人工智能实验室青年科学家白磊博士都在关注着全球 气象变化,自然灾害造成的损失让他心痛,同时也更坚定了他推动 As the world remained lost in the embrace of slumber, 64-year-old fisherman Julian Bata and his wife awoke to the howling typhoon. The sound was all too familiar to the residents of the coastal communities on Manaet Island, the Philippines. Due to its unique topography and location, the island faces multiple natural disaster risks.

Before evacuating with his family, Julian rushed to check on his fishing boat. Fishing is the primary source of income for these fishermen, who rely on the sea for their livelihood. "Weather forecasts are crucial," Julian said. "They determine whether or not we go out to sea and where we go. We must check them before every trip."

Weather forecasts serve as a compass and reassurance for fishermen, and even more so, as a lifeline. For years, Dr. Bai Lei, a young scientist at the Shanghai Artificial

AI 气象大模型项目的信心。

用 AI "听风辨雨",让出海的人有归期

联合国政府间气候变化专门委员会 (IPCC) 2023 年发布的评估报告显示,全球温升预计在 2021 年至 2040 年内达到 1.5 °C。在这一背景下,2024 年世界气象日的主题确定为"气候行动最前线",以强调合作起来开展气候行动的紧迫性。围绕全球气候变化及其影响,及时发布气象预报预警信息已变得刻不容缓。

我国濒临的北太平洋西部海区,每年发生的台风数超过全球总数的三分之一,准确的台风预报对于减轻灾害损失至关重要。风乌气象大模型一经问世,恰逢2023年第5号台风"杜苏芮"登陆。"风乌"提前24小时将误差值缩小为38.7公里,精确度优于气象预报国际权威机构欧洲中期天气预报中心(ECMWF)的54.11公里和美国国家环境预报中心(NCEP)的54.98公里。美国科罗拉多大学教授彭顺台(Melinda Peng)说:"风乌气象大模型在对比测试中表现最为突出,希望可以和团队一起探索气象大模型。"

世界气象组织表示,由于气象观测的准确度、大气系统中物理过程的复杂性,以及求解大气模型所需资源规模巨大,过去数十年间,全球中期天气预报的有效性每10年才提高1天。而AI气象大模型"风乌"首次实现30秒生成未来10天全球气象高精度预报结果。"'风

Intelligence Laboratory, has been closely following global climate change. The devastation caused by natural disasters has left him heartbroken, but it has also strengthened his resolve to pursue his AI weather forecasting model project.

Al Weather Forecast Ensuring a Safe Return for Those at Sea

The 2023 assessment report of the Intergovernmental Panel on Climate Change (IPCC) indicated that global warming is projected to reach 1.5 degrees Celsius between 2021 and 2040. Against this backdrop, the theme of World Meteorological Day 2024 is "At the Frontline of Climate Action," emphasizing the urgency of collaborative climate action. Timely dissemination of weather forecasts and warnings has become crucial in addressing global climate change and its impacts.

The western North Pacific region adjacent to China experiences more than one-third of the world's annual typhoons, making accurate typhoon forecasting critical for mitigating disaster losses. The advent of the Fengwu weather model coincided with the landfall of Typhoon Doksuri, the fifth typhoon of the season in 2023. Fengwu reduced the error margin to 38.7 kilometers 24 hours in advance, surpassing the accuracy of 54.11 kilometers achieved by the European Centre for Medium-Range Weather Forecasts, a leading international weather forecasting authority, and 54.98 kilometers achieved by the U.S. National Centers for Environmental Prediction. "Fengwu weather model stood out in comparative tests," remarked Melinda Peng, a professor at the University of Colorado, expressing her hope to collaborate with the team on exploring weather models.

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乌'在效率上大幅优于传统模型。"白磊说。

2022年开始,白磊博士组建风乌气象大模型科研团队。"风乌"取名自秦汉时期的"相风铜乌",是世界上最早的测风设备。天气预报大模型"风乌"不仅承载了中国古人的智慧,也寓意实验室致力于在以气象为代表的 AI for Science 领域勇于突破、不懈探索。

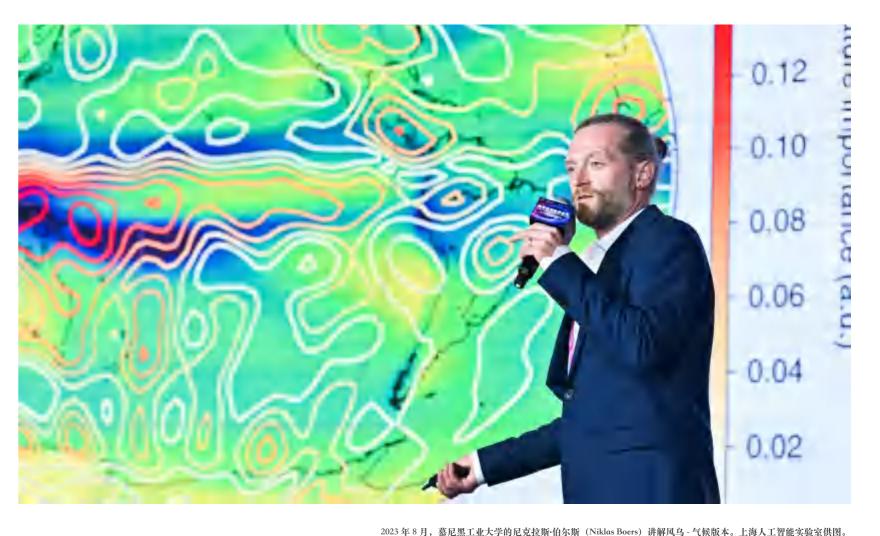
"AI 辅助天气预报的发展"被美国《科学》杂志评为 2023 年度十大 科学突破之一,大模型在这个领域将发挥重要作用。作为面向全球 的气象预报大模型,要想达到真正"好用"的体验,需要科研团队 的不断创新和对细节的不断苛求。

2024年,上海人工智能实验室与国内外研究机构共同协作,发布了全球高分辨率的人工智能气象预报大模型"风乌 GHR",首次借助 AI 实现了对中期天气进行 10 公里级的建模和预报。科研团队采用原创的 AI 新算法,将这个大模型的预报分辨率提升至 0.09 经纬度 (9km×9km),对应的地表面积约为 81 平方公里,比第一代"风乌"的精确预报范围大 7 倍。

The World Meteorological Organization has said that over the past few decades, the effectiveness of global medium-range weather forecasts has improved by only one day every decade, due to the accuracy level of meteorological observations, the complexity of physical processes in atmospheric systems, and the immense computational resources required to solve atmospheric models. In contrast, the AI-powered weather model Fengwu achieves high-precision global weather forecasts for the next ten days in just 30 seconds. "Fengwu significantly outperforms traditional models in terms of efficiency," said Bai.

In 2022, Bai established the Fengwu weather and climate large model research team. The name "Fengwu" is derived from the "Xiangfeng Tongwu" of the Qin and Han dynasties, meaning a crow-shaped bronze wind detector. It was the world's earliest wind measuring device. The weather forecast large model Fengwu not only embodies the wisdom of ancient Chinese people but also symbolizes the laboratory's dedication to breakthroughs and relentless exploration in the field of AI for Science, with meteorology as a representative.

"The development of AI-assisted weather forecasting" was named one of the top ten scientific breakthroughs of 2023 by the American journal Science. Large models will



2023 平 8 月,彖尼燕上亚天宇的尼克拉斯·旧尔斯(Niklas Doers)讲雕风马 - 气铁成本。上海人工管能头短至拱图。

 $In \ August \ 2023, Niklas \ Boers \ of \ the \ Technical \ University \ of \ Munich \ presents \ the \ climate forecast \ version \ of \ Fengwu. \ (Provided \ by \ Shanghai \ Artificial \ Intelligence \ Laboratory)$

上海人工智能实验室领军科学家欧阳万里说, "如今,全面升级的'风乌 GHR'相当于一个'4K 高清版'大模型,有助于实现更精细、更高效的气象预报。"

"'风乌 GHR'已经逐步发展成为一个由多个模型组成的气象海洋 预报系统,包含从短临、到中期、到多年大气、海洋整体预报系统。" 在 2024 年全球开发者先锋大会上,白磊博士介绍气象海洋预报大模 型时说。 play an important role in this field. To achieve a truly user-friendly experience for a global weather forecast large model, it requires continuous innovation and meticulous attention to detail from the research team.

In 2024, the Shanghai Artificial Intelligence Laboratory collaborated with domestic and international research institutions to release the global high-resolution AI weather forecast large model "Fengwu GHR." For the first time, AI was used to achieve 10-kilometer modeling and forecasting of medium-term weather. The research team used an original AI algorithm to improve the forecasting resolution of this large

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探索 AI 能力边界,让"天有可测风云"

来自慕尼黑工业大学的尼克拉斯·伯尔斯教授介绍,近期双方共同研发的风乌-气候版本已经完成,通过人工智能方法对海洋气候进行预测,该模型的预报效果超过了目前已有的海洋模式,进一步提高了人类对次表层海洋热浪、厄尔尼诺等气候预测的能力。

2023年8月,风乌气象大模型团队在应邀参加联合国亚太经社会/世界气象组织台风委员会举办的年会期间,介绍了人工智能气象大模型的应用,得到了柬埔寨、越南等国气象部门的关注。同时,"风乌"团队与气象研究机构达成共识,共同探索推动风乌气象大模型在巴基斯坦、东南亚等国家的日常预报和台风等极端天气预报方面的应用落地。

正如欧洲中期天气预报中心副主任弗洛里安所说: "人工智能方法 可以解决气象领域非常多的挑战,并且通过风乌气象大模型已经看 到了很好的证明,我们非常期待探索更有精度、时效的气象预报系 统。"

世界日新月异,"风乌"不但能把人工智能方法应用到更广泛的气象、环境、天文、地质等地球科学领域研究中,AI还可以助力"碳中和"、防灾减灾、能源安全等重大需求。这一切,皆因人工智能时代的来临,未来不是梦! (罗浩)

model to 0.09 degrees of latitude and longitude (9 km by 9 km), corresponding to a ground surface area of around 81 square kilometers, which is seven times larger than the accurate forecasting range of the first-generation "Fengwu."

"Today, the fully upgraded 'Fengwu GHR' is equivalent to a 4K high-definition large model, which will help achieve more refined and efficient weather forecasting," said Dr. Ouyang Wanli, a leading scientist at the Shanghai Artificial Intelligence Laboratory.

"The 'Fengwu GHR' has gradually developed into a weather and ocean forecast system composed of multiple models, including short-term, medium-term, and multi-year atmospheric and ocean comprehensive forecast systems," said Bai when introducing the large model at the 2024 Global Developer Conference.

Exploring the Boundaries of Al Weather Forecasting Capabilities

Professor Niklas Boers from the Technical University of Munich introduced that the climate forecast version of Fengwu, jointly developed by the two parties, has been completed. It uses AI methods to predict ocean climate. The prediction effect of this model exceeds that of existing ocean models and further improves human capabilities to predict sub-surface ocean heatwayes, El Niño and other climate events.

In August 2023, during the annual meeting of the United Nations Economic and Social Commission for Asia and the Pacific/World Meteorological Organization



2024年全球开发者先锋大会上,白磊博士介绍气象海洋预报大模型。上海人工智能实验室供图。

At the 2024 Global Developer Conference, Bai Lei introduces the weather and ocean forecast large model. (Provided by Shanghai Artificial Intelligence Laboratory)

(WMO) Typhoon Committee, the Fengwu large meteorological model team introduced the application of the large model, which attracted the attention of meteorological departments from countries such as Cambodia and Vietnam. At the same time, the Fengwu team reached a consensus with meteorological research institutions to jointly explore the application of Fengwu in daily forecasting and the forecasting of typhoons and other extreme weather conditions in Pakistan and Southeast Asian nations.

"Artificial intelligence methods can solve many challenges in the field of meteorology, and we have seen good proof through the Fengwu large meteorological model. We

are looking forward to exploring more accurate and timely weather forecasting systems," said Florian Pappenberger, deputy director-general of the European Centre for Medium-Range Weather Forecasts.

The world is changing rapidly. Fengwu can apply AI methods to a wider range of research in earth science fields such as meteorology, environment, astronomy and geology. AI can also help with major needs such as the pursuit of "carbon neutrality", disaster reduction and energy security. With the advent of the AI era, the future is no longer a dream! (Luo Hao)







2023年12月, TAHAKOM 管理团队听取商汤科技做 AI 技术合作本地化介绍。商汤科技供图。

In December 2023, members of Tahakom's management team listen to SenseTime's briefing on the localization of AI technology. (Provided by SenseTime)

在广袤无垠的阿拉伯沙漠中,沙特首都利雅得宛如一颗耀眼的明珠,璀璨夺目,在阿拉伯语中利雅得意为"花园"。自 2019 年起,一年一度的"利雅得狂欢季" (Riyadh Season) 成为了世界瞩目的盛事,吸引着无数游客前来体验"沙漠花园"的狂欢盛宴。

在利雅得狂欢季中,除了可以亲身感受沙漠国度的热情与神秘外,游客们还可以享受到由人工智能技术带来的科技文化盛宴。AR 导览、AR 景观以及多样化的娱乐功能通过手机 APP 带来身临其境的

Amid the vast expanse of the Arabian Desert, Saudi Arabia's capital Riyadh stands as a dazzling gem with its brilliance illuminating the sands. In Arabic, Riyadh means "garden." Since 2019, the annual "Riyadh Season" has transformed the city into a global spectacle, drawing visitors from far and wide to revel in the vibrant festivities that transform the desert into a flourishing garden of entertainment.

Beyond immersing themselves in the warmth and mystique of the desert kingdom, visitors to the Riyadh Season can also indulge in a feast of technology and culture powered by artificial intelligence. Augmented reality (AR) navigation, AR landscapes

体验,让人们沉浸在科技感满满的智慧世界中。这些都来自中国企业商汤集团有限公司(以下简称"商汤科技")与沙特文旅企业 Sela 共同打造推出的智慧文旅产品。

Sela 商业解决方案高级副总裁 Loai Kamakhi 表示: "我们希望以最富有成效的合作和伙伴关系服务广大游客,创造意义非凡的文旅活动体验。通过与商汤科技的合作,我们提供全方位的人工智能娱乐解决方案,在利雅得狂欢季期间为全世界的游客提供有趣和难忘的体验。"

曾几何时,电影院、酒吧等娱乐场所在沙特难觅踪迹。"充满活力的社会,繁荣发展的经济和充满抱负的国家。"这是沙特王储兼首相穆罕默德·本·萨勒曼 2016 年在作为改革开放蓝图的《沙特阿拉伯王国 2030 愿景》中,为沙特设定的三个远景目标。

自此,沙特文化产业改革开始加速。与此同时,中国的文化产业"走出去"步伐不断加快,尤其是 2013 年提出的"一带一路"倡议,为中国与共建国家的文化交流提供了契机。

作为全球化的人工智能软件公司,商汤科技 2018 年首次踏足"沙漠花园"利雅得,开启了人工智能研发之旅。商汤科技与沙特技术与安全综合控制公司 TAHAKOM 展开合作,共同致力于建设沙特首个 AI 超算中心。这座于 2023 年建成的 AI 超算中心是无数工程师们挥洒汗水结出的智慧结晶。

距利雅得东南方向 20 公里处, TAHAKOM 新建的数据中心如同一

and a diverse array of entertainment features accessible through a mobile app provide an immersive experience, transporting visitors into a world brimming with smart technology. These groundbreaking innovations are the result of a collaborative effort between Chinese enterprise SenseTime Group Limited (SenseTime) and Saudi cultural tourism company Sela.

"Our goal is to serve visitors with the most productive collaborations and partnerships, creating truly exceptional cultural tourism experiences," said Loai Kamakhi, senior vice president of business solutions at Sela. "Through our partnership with SenseTime, we are delivering comprehensive AI-powered entertainment solutions, offering visitors from around the globe engaging and unforgettable experiences during the Riyadh Season."

Once upon a time, cinemas, bars and other entertainment venues were scarce in Saudi Arabia. In 2016, Saudi Crown Prince and Prime Minister Mohammed bin Salman laid out three ambitious goals for the country in "Vision 2030," a blueprint for reform and opening up: "a vibrant society, a thriving economy and an ambitious nation."

Since then, cultural reform in Saudi Arabia has accelerated. Simultaneously, China's cultural industry has expanded its global reach, particularly with the Belt and Road Initiative proposed in 2013, which has provided opportunities for cultural exchanges between China and partner countries.

In 2018, SenseTime, a globalized AI software company, embarked on its AI development journey in Riyadh. Partnering with Tahakom, a Saudi company, SenseTime set out to establish the kingdom's first AI supercomputing center. This

座巍峨的城堡拔地而起。商汤科技与 TAHAKOM 的工程师们齐心协力,并肩作战,即便在新冠疫情肆虐的艰难困境中也坚守岗位,最终在 2023 年如愿建成了沙特首个 AI 超算中心,为沙特带来了超过 5000 TFLOPS 的超算平台。

项目落成, TAHAKOM 方项目负责人瓦法·法赫德 (Wafa Fahd A Aldamegh) 对双方取得的合作成果非常满意,他表示: "AI 超算中心项目不仅帮助 TAHAKOM 在 AI 算力基础设施建设上走在了沙特市场的前列,也为沙特人工智能创新人才培养提供了有力支撑,为当地 AI 产业应用发展创新注入了新动能。"

沙漠中的人工智能研发之路并未止步于此。AI 超算中心的落成极大加强了 TAHAKOM 的自主研发能力以及针对各种场景应用的开发效率。这份智慧之光在沙漠中愈发闪亮耀眼,熠熠生辉。2022年,依托 AI 超算中心,商汤科技与 TAHAKOM 又共同打造出适用于沙特城市可持续发展的智慧城市 AI 平台,这一平台如同一颗冉冉升起的新星照亮了这座沙漠城市的智慧发展之路。

商汤科技项目总监王万里介绍:"智慧城市 AI 平台蕴含丰富的视频、图像和报警数据,通过人工智能技术对数据进行深度分析,为城市管理和决策者提供了极具价值的数据支持。这个平台不仅能够实时监测城市安全状况、预警风险,更为城市的管理效率与安全保障注入了新的动力。"

智慧城市 AI 平台的建设离不开商汤科技与 TAHAKOM 公司的通力合作与默契配合,他们共同将发展沙漠中的智慧城市梦想变为

brainchild of countless engineers' dedication and perseverance was completed in 2023.

Twenty kilometers southeast of Riyadh, Tahakom's newly built data center stands tall like a formidable fortress. Undeterred by the global COVID-19 pandemic, SenseTime and Tahakom engineers worked side by side, relentlessly pursuing their goal. In 2023, their unwavering efforts culminated in the successful establishment of Saudi Arabia's first AI supercomputing center, bringing over 5,000 TFLOPS of supercomputing power to the kingdom.

Thrilled with the fruits of their collaboration, Wafa Fahd A Aldamegh, project manager at Tahakom, said, "The AI supercomputing center project has not only placed Tahakom at the forefront of AI computing infrastructure development in the Saudi market, but has also provided strong support for the cultivation of AI innovation talent in Saudi Arabia, injecting new impetus into the innovative development of AI industry applications in the region."

The journey of AI development in the desert did not stop there. The establishment of the AI supercomputing center has significantly enhanced Tahakom's independent R&D capabilities and development efficiency for various application scenarios. This light of AI is shining brightly in the desert. In 2022, leveraging the AI supercomputing center, SenseTime and Tahakom created a smart city AI platform specifically tailored for sustainable urban development in Saudi Arabia. This platform, like a rising star, is illuminating the path of smart urban development.

Wang Wanli, SenseTime's project director, said, "The smart city AI platform contains a wealth of video, image and alarm data. By deeply analyzing this data using AI



2023 年 12 月, 商汤科技与 TAHAKOM 签署全面战略合作意向书。商汤科技供图。

In December 2023, SenseTime and Tahakom sign a letter of intent for comprehensive strategic cooperation. (Provided by SenseTime)

现实。王万里感慨道: "来到利雅得,我们感受到的不仅仅是炎热的气候,更让我们感受深切的是当地人民对我们的这份不期而遇的热情,让我们的工程师在异国他乡也感受到了家的温暖。正是这份不离不弃的支持和帮助,我们得以顺利完成一个个具有挑战性的项目。"

这段充满智慧与创新的合作之旅还延伸至其他领域。商汤科技不仅在数字旅游、城市规划治理等方面展现了强大的影响力,更在

technology, it provides valuable support for urban management and decision-makers. This platform can not only monitor urban security conditions in real time and warn of potential risks, but also inject new impetus into raising urban management efficiency and ensuring security."

The construction of the smart city AI platform would not have been possible without the close collaboration and common understanding between SenseTime and Tahakom. Together, they have transformed the dream of a smart city in the desert into reality. "Coming to Riyadh, we felt not only the scorching heat but



商汤科技为 2023 年利雅得狂欢季打造的 AI+AR 数字化、3D 可视化的智慧管理平台。商汤科技供图。

SenseTime offers a smart management platform featuring AI+AR digitization and 3D visualization for Riyadh Season 2023. (Provided by SenseTime)

教育和环保领域发挥了巨大作用。

2022年起,商汤科技和沙特数据与人工智能管理局(SDAIA)合作, 在沙特积极推动人工智能基础教育。通过开展人工智能教育项目, 为全国师生提供全面、前沿的人工智能课程,助力培养新一代的 智慧人才。正如沙特谚语所说:"教育是光明的开启者。"这项 教育计划已经取得了令人欣慰的成果,培训了大量教师和学生, 让更多人受益于科技带来的进步与提升。

此外,商汤科技还与红海国际集团 (Red Sea Global) 携手合作,在环境保护和可持续发展领域探索新路径。他们共同利用人工智能技术,为红海环境和动植物生态提供保护和发展的新思路,悉心呵护宝贵的自然资源。正如沙特的另一句谚语: "保护自然,就是保护我们的未来。"

近年来,商汤科技的足迹继续延伸。2019年底,商汤科技创始 人汤晓鸥与阿布扎比经济发展部主席赛义夫 (Saif Mohamed Al Hajeri) 达成战略合作协议,共同致力于加速阿联酋等地区的人工 智能发展。这项战略合作将涵盖隐私保护、智慧园区、航空及公 共安全等多个领域,为未来的城市发展注入新的活力。

作为未来的智慧之源,人工智能具有巨大的潜力和优势。正如商 汤国际业务总裁黄继功所说:"未来,我们将继续利用 AI+AR 技术, 在更多、更广泛的活动与场景中满足人们的需求,协助推动沙特 阿拉伯地区'2030 愿景'的实现。" (张璐曦) also the unexpected warmth of the local people, which made our engineers feel at home in a foreign land. It was with this unwavering support and assistance that we were able to successfully complete one challenging project after another," Wang reflected.

This journey of collaboration, brimming with intelligence and innovation, has extended to other domains. SenseTime has not only demonstrated its strong influence in digital tourism and urban planning and governance, but has also played a significant role in education and environmental protection.

Since 2022, SenseTime has partnered with the Saudi Data & AI Authority (SDAIA) to actively promote AI basic education in Saudi Arabia. By implementing AI education projects, they provide comprehensive and cutting-edge AI courses to teachers and students nationwide, helping to cultivate a new generation of AI talent. As the Saudi adage goes, education is the key to enlightenment. This education initiative has already achieved encouraging results, training a large number of teachers and students and enabling more people to benefit from the progress and advancement of technology.

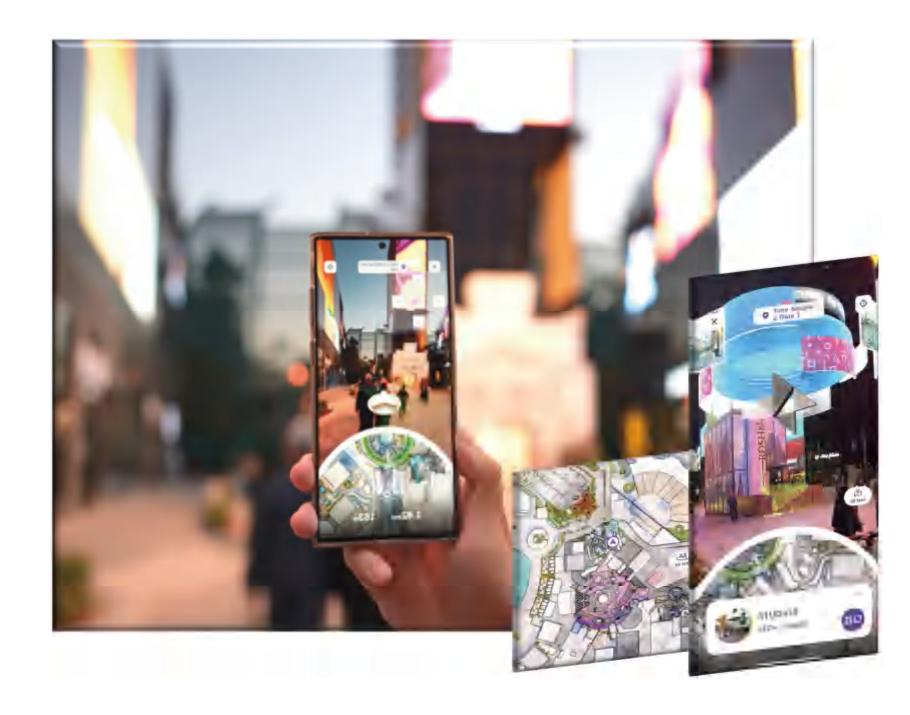
SenseTime has also collaborated with Red Sea Global to explore new paths in environmental protection and sustainable development. Together, they utilize AI technology to provide new ideas for the protection and development of the Red Sea's environment and flora and fauna, carefully conserving precious natural resources. As another Saudi proverb goes, protecting nature is protecting our future.

In recent years, SenseTime's presence in the Saudi Arabian region has continued to

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expand. At the end of 2019, SenseTime's founder, Tang Xiao'ou, reached a strategic cooperation agreement with the Chairman of Abu Dhabi Department of Economic Development Saif Mohamed Al Hajeri to jointly accelerate the development of AI in the United Arab Emirates and other regions. This strategic cooperation will cover various fields, including privacy protection, smart parks, aviation, and public safety, injecting new vitality into future urban development.

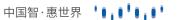
As a source of future intelligence, AI holds immense potential and advantages. "In the future, we will continue to utilize AI+AR technology to meet people's needs in more activities and scenarios, assisting in the realization of Saudi Arabia's 'Vision 2030,'" said Huang Jigong, president of international business at SenseTime. (Zhang Luxi)



商汤科技为 2023 年利雅得狂欢季推出的 AR 融合式导航产品。商汤科技供图。

SenseTime launches an AR navigation product for Riyadh Season 2023. (Provided by SenseTime)







2024年5月9日,小麦种子加速育成研究设施。中巴农业实验室供图。

The photo taken on May 9, 2024 shows a wheat seed accelerated breeding research facility. (Provided by the China-Pakistan Joint Lab for AI and Smart Agriculture)

初夏时节,各式"新科技"纷纷亮相,硬核"新农人"们在巴基斯坦的田间地头如何"大显身手"?

在旁遮普省的麦田里,无人机正在空中巡视,智能管控系统代替人工"照顾"农作物,农民直接在手机上"一键式"精准进行施肥灌溉等操作……风吹麦浪夏收忙,得益于中巴合作的"利用计算机视觉实现气候智能农业的高通量作物监测"项目(以下简称"高通量作物监测项目")在此试点应用,今年的旁遮普省农田麦收科技感十足。

In early summer, a flurry of groundbreaking technologies made their mark on the agricultural front of Pakistan. How are tech-savvy farmers in Pakistan wielding such innovations in their fields?

Across the wheat fields of Punjab province, drones are patrolling the skies, an intelligent control system is replacing manual labor to tend the crops, and farmers are using their smartphones to precisely apply fertilizers, irrigation and other operations with just a few taps. In this summer harvest season, the wheat fields of

"星"眼观测苗情让农业生产有"智"

旁遮普省是巴基斯坦的农业主产区,其粮食年产量占全巴年粮食总产量的约76%,在此开展高通量作物监测项目的试点应用,具有得天独厚的优势。

在旁遮普省,已有600名农民加入到高通量作物监测项目的试点应用中。种植小麦、甘蔗等农作物30多年的当地农民穆罕默德·马利克正是其中一员。几年前,他的儿子大学毕业后,也加入到父亲的农业事业。然而,传统农耕面临最大的困难是不可预测的自然气候和病虫害影响,这导致粮食产量和收入的双重不稳定。

"我们通过搭载视觉识别设备的无人机巡飞等方式,实现对作物监测、栽培管理、病虫害分析和农事生产的智能化管理,包括长势判定、作物健康监测、作物需水量分析、施肥、施药等。"中国-巴基斯坦人工智能智慧农业实验室(以下简称"中巴农业实验室")中方负责人吴军博士介绍。

马利克对此抱有疑虑: "这项技术对农民来说太复杂了,我对它的有效性和实用性也存疑。"项目团队人员及时解惑: "我们可以制作以当地方言编写的植被健康地图文字指南、视听材料,发送到你儿子的智能手机应用程序上。"

"农作物的状态,对水和肥料的确切需求被量化,更精准了。这避免了我们过去浇水过多或不足的情况,能帮助我们精准灌溉和施肥,降低投入成本。"学会使用这些技术后的马利克说,"现在我们全家都盼望这项创新技术,能为农业带来更多可预测性和稳定性,帮助提高作物产量。"

Punjab province are brimming with technological advancements, thanks to the pilot application of the China-Pakistan cooperation project "Using Computer Vision to Achieve Climate-Smart Agriculture and High-Throughput Crop Monitoring" (referred to as the "High-Throughput Crop Monitoring Project").

"Eyes in the Sky" Monitoring Crops, Powering Smart Agriculture

Punjab province is Pakistan's main agricultural producer, accounting for about 76% of the country's total annual grain production. The pilot application of the High-Throughput Crop Monitoring Project here holds a unique advantage.

In Punjab province, 600 farmers have already joined the pilot project. Muhammad Malik, a local farmer who has been growing wheat and sugarcane for over 30 years, is one of them. A few years ago, his son joined his father's agricultural endeavors after graduating from college. However, the biggest challenge facing traditional farming is the unpredictable impacts of climate, pests and diseases, which lead to instability in both grain yields and income.

"We use drones equipped with visual recognition devices to achieve intelligent management of crop growth, cultivation management, pest and disease analysis, and agricultural production. The functions include assessing crop growth, monitoring crop health, analyzing water needs, and managing fertilization and pesticide application," explained Dr. Wu Jun, the Chinese head of the China-Pakistan Joint Lab for AI and Smart Agriculture.

Malik expressed his doubts, "This technology seems too complex for farmers. I also question its effectiveness and practicality." The project team promptly addressed his concerns, "We can create vegetation health map guides, written in the local dialect, as well as audiovisual materials and send them to your son's

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2024年5月11日,中国-巴基斯坦人工智能智慧农业实验室举办农业论坛。中巴农业实验室供图。

On May 11, 2024, the China-Pakistan Joint Lab for AI and Smart Agriculture holds an agricultural forum. (Provided by the China-Pakistan Joint Lab for AI and Smart Agriculture)

当 AI 技术在巴基斯坦遇见农业

什么样的"机缘"让中国的人工智能技术与巴基斯坦的农业发生"碰撞"?会发生怎样奇妙的反应?

巴基斯坦是世界十大小麦、水稻生产国之一,农业约占其国内生产总值的18.9%,吸纳了全国44.2%的劳动力。尽管农业种植基础优渥,巴基斯坦却是最易受气候变化负面影响的国家之一,也是面临严重 突发性饥饿人口最多的十个国家之一。

smartphone app."

"The state of crops and their precise needs for water and fertilizer are quantified more accurately. This avoids the past issues of over-watering or under-watering and helps us with precise irrigation and fertilization, reducing input costs," Malik said after learning to use the technology. "Now, my whole family looks forward to this innovative technology bringing more predictability and stability to agriculture, helping to increase crop yields."



2024年2月1日,项目组人员向农民讲解项目应用的相关技术。中巴农业实验室供图。

On February 1, 2024, project team members explain the project's technologies to the farmers. (Provided by the China-Pakistan Joint Lab for AI and Smart Agriculture)

2022年,巴基斯坦国立科技大学与广州软件应用技术研究院联合成立了中国-巴基斯坦智能系统实验室。吴军博士回忆道: "2023年第四届中国-南亚合作论坛在昆明召开期间,巴基斯坦费萨拉巴德农业大学的农业系主任找到我,希望与我们开展合作,用中国先进的人工智能技术,帮助当地农业发展。"

巴方有农业资源和需求,中方有人工智能技术和应用经验,双方一拍即合。2023年底,由巴基斯坦费萨拉巴德农业大学、广州软件应用技术研究院、广东中科凯泽科技有限公司共同启动高通量作物监

When Al Technology Meets Agriculture in Pakistan

What kind of opportunity led to the convergence of Chinese AI expertise and Pakistani agricultural needs? What unexpected synergies might arise from this interaction?

Pakistan is one of the top ten producers of wheat and rice globally, with agriculture accounting for about 18.9% of its GDP and engaging 44.2% of the workforce. Despite having a strong agricultural foundation, Pakistan is one of the

测项目,基于项目成立的中巴农业实验室已于 2024 年 5 月 11 日正式挂牌。

"授人以渔"助力农业发展

如今,中巴农业实验室已有9名博士及多名硕士、工程师投入到高 通量作物监测项目开发中。巴方还派出几名博士后常驻广州,学习 人工智能领域的技术。

"我来自一个农民家庭,非常了解巴基斯坦农民今天所面临的问题, 严重的热浪和水资源短缺成为我们面临的主要挑战。我加入这个团 队,为农民提供实时数据,帮助他们优化种植决策,确保社区粮食 安全。"中巴农业实验室巴方科研人员萨奇布·阿里说。

"巴基斯坦目前迫切需要依靠先进技术驱动的农业实践。该项目对 巴基斯坦来说是一个机遇,它提供了科学的实际解决方案,农民也 都很感兴趣,这为当地农业带来实质性的改变。"费萨拉巴德农业 大学农业与粮食安全研究中心主任苏丹·哈比布拉·汗博士说。

"将人工智能技术带到巴基斯坦,并应用到农业领域,切实能帮助当地农民解决饥饿问题才是最重要的,也是我们最想实现的目标。" 吴军博士说。世界银行和亚洲灾害防治中心为高通量作物监测项目提供基金支持,强调了这种创新解决方案在应对气候挑战和增强农业可持续能力方面的重要性。

未来,中巴农业实验室计划两年内在巴基斯坦全境推广这项技术,实现粮食安全与促进可持续农业发展。后续,还将推广到其他发展中国家,培养"AI+"应用于农业领域的专业人才,推动智慧农业发展和农民增产增收,助力更多国家消除饥饿、增进民生福祉。(刘婉秋)

countries most negatively impacted by climate change and ranks among the top ten countries in terms of population facing severe sudden hunger.

As early as 2022, the National University of Sciences and Technology of Pakistan and the Guangzhou Institute of Software jointly established the China-Pakistan Joint Lab for AI and Smart Agriculture. "During the fourth China-South Asia Cooperation Forum held in Kunming in 2023, the head of the department of agriculture from University of Agriculture, Faisalabad approached me, seeking to collaborate and use China's advanced AI technology to help develop local agriculture," Wu recalled.

Pakistan has agricultural resources and needs, while China has AI technology and application expertise, leading to a perfect match. By the end of 2023, the High-Throughput Crop Monitoring Project was jointly launched by University of Agriculture, Faisalabad; the Guangzhou Institute of Software; and Guangzhou CAS Cogniser. The China-Pakistan Joint Lab for AI and Smart Agriculture, established based on this project, was inaugurated on May 11, 2024.

"Teaching How to Fish" to Ensure Agricultural Development

Today, the China-Pakistan Joint Lab for AI and Smart Agriculture has nine doctorate holders and several masters and engineers engaging in the development of the High-Throughput Crop Monitoring Project. Pakistan has also sent several postdoctoral researchers to Guangzhou to learn AI technology.

"I come from a farming family and am very aware of the problems Pakistani farmers face today. Severe heat waves and water shortages are our main challenges. I joined this team to provide farmers with real-time data, helping them optimize planting decisions and ensure community food security," said Sachib Ali, a Pakistani researcher at the China-Pakistan Joint Lab for AI and



2024年5月8日,当地农民和中巴农业实验室部分成员合影。中巴农业实验室供图。

On May 8, 2024, local farmers and members of the China-Pakistan Joint Lab for AI and Smart Agriculture pose for a group photo. (Provided by the China-Pakistan Joint Lab for AI and Smart Agriculture)

Smart Agriculture.

"Pakistan urgently needs to adopt advanced technology-driven agricultural practices. This project represents a promising opportunity for Pakistan, offering scientifically sound and practical solutions that resonate with farmers and have the potential to transform local agriculture," said Dr. Sultan Habibullah Khan, director of the Agricultural and Food Security Research Center at the University of Agriculture, Faisalabad.

"Bringing AI technology to Pakistan and applying it to agriculture to genuinely help local farmers solve hunger issues is the most important goal we want to achieve," said Wu. The World Bank and the Asian Disaster Preparedness Center provide funding support for the High-Throughput Crop Monitoring Project, highlighting the importance of this innovative solution in addressing climate challenges and enhancing agricultural sustainability.

In the future, the China-Pakistan Joint Lab for AI and Smart Agriculture plans to promote this technology across Pakistan within two years to realize food security, enabling farmers to hold their "rice bowls" firmly in their own hands. Subsequently, it will also be promoted to other developing countries, cultivating professionals in the application of "AI+" in agriculture, advancing smart agriculture, increasing farmers' productivity and income, and helping more countries eliminate hunger and improve people's livelihoods. (Liu Wanqiu)

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2023年8月20日,科大讯飞赛会服务人员在田径比赛出发点为中国运动健儿加油助威。科大讯飞供图。

On August 20, 2023, the service staff of iFLYTEK for the event cheer for Chinese athletes at the starting point of the track and field competition. (Provided by iFLYTEK)

2023年8月,在匈牙利的心脏,多瑙河的明珠——布达佩斯,一场世界级的体育盛事正如火如荼地进行。第19届世界田径锦标赛,不仅汇聚了全球的目光,更成为科技与人文交流的桥梁。在这里,科大讯飞,一家来自中国的企业,以其先进的人工智能技术,悄然改写了国际赛事的沟通方式。

In August 2023, a world-class sports event was in full swing in Budapest, the capital of Hungary and dubbed "the pearl of the Danube." The 19th World Athletics Championships captured global attention and served as a bridge for technological and cultural exchanges. Here, iFLYTEK, a Chinese company, quietly revolutionized communication at international events with its cutting-edge AI technology.

初遇: 与布达佩斯的首次握手

时间回到 2022 年初秋的一个夜晚,科大讯飞收到了来自匈牙利驻上海总领事的一条信息,透露了布达佩斯将举办 2023 年世界田径锦标赛,赛事主办方正寻求科技企业合作,在比赛期间提供智能化语言服务支持的消息。这样一场世界级的体育赛事,对于承接企业而言,既是一个展现本国科技力量的舞台,也是证明自身技术实力的绝佳机会。

科大讯飞应下挑战,成为世界田径锦标赛供应商,为赛事提供听见 同传和虚拟人软件系统,以及翻译机、录音笔、词典笔等硬件产品, 借助科技的力量,打造没有语言障碍的世锦赛。

破冰: 无障碍沟通的桥梁

来自也门的男子 800 米选手阿勒雅里在布达佩斯田径世锦赛上创造了他的个人最好成绩,还比以往海外参赛交到了更多新朋友。他说,这都要归功于一款中国品牌自主研发的翻译"神器"。

"我用这个机器已经和说法语、葡萄牙语、匈牙利语的运动员聊过天了,因为我的英语一般,我以前从来没在国际比赛中和这么多人交流

First Encounter: A Handshake with Budapest

On an early autumn night in 2022, iFLYTEK received a message from the Consul General of Hungary in Shanghai, revealing that Budapest would host the 2023 World Athletics Championships. The organizers were seeking a tech partner to provide intelligent language services during the event. This world-class sports event was both a stage to showcase the technological prowess of a company and a golden opportunity to prove its technological strength.

Naturally, iFLYTEK accepted the challenge and became a supplier for the World Athletics Championships, providing real-time translation software, virtual human systems, and hardware products like translators, recording pens and dictionary pens. Leveraging technology, they helped remove language barriers during the event.

Breaking the Ice: The Bridge for Seamless Communication

Yemeni runner Al-Yaari set a personal best in the 800 meters at the World Athletics Championships in Budapest and made more new friends than ever before at international events. He attributed this to a "magic" Chinese-made translation device.

"I've used this device to chat with athletes who speak French, Portuguese and Hungarian. My English is average, and I've never communicated with so many people at international competitions before," said Al-Yaari. This made his championship

中国智·惠世界 【』』【』【』【』

过。"阿勒雅里说,这让他的这次世锦赛在成绩之外更显意义非凡。

阿勒雅里口中的中国机器,正是作为布达佩斯田径世锦赛官方赛事供应商——中国企业科大讯飞提供的一款智能翻译机,支持 60 种语言的实时文字和语音翻译。

在组委会为媒体工作间设置的设备技术支持区域,每天都有来自各国和地区的记者前来询问。赛场内外,也常能看到各个国家和地区的运动员、教练员和工作人员举着翻译机交流。许多人都认同:这些来自中国的科技产品,方便了运动员、教练员和记者们的海外生活,也拉近了地球村"村民"彼此间的距离。

"匈牙利语和阿拉伯语间的互译非常准确,我几乎离不开它了。" 阿勒雅里说,从注册到入住,从训练到比赛,他都使用它和匈牙利 的志愿者沟通。小小的翻译机成为了他与世界沟通的桥梁。

携手: 共建国际化开放合作平台

"各位嘉宾、朋友们,晚上好!"搭载讯飞智作 AIGC 内容创作平台的 2023 年世界田径锦标赛吉祥物 Youhuu,出现在新闻发布中心的屏幕上,正热情地用中文向大家问好。

experience even more meaningful beyond his achievements.

The device he referred to was an intelligent translator provided by iFLYTEK, an official supplier of the event, supporting real-time text and voice translation in 60 languages.

In the media work area set up by the organizing committee, journalists from various countries and regions came daily to inquire about the devices. Both inside and outside the stadium, athletes, coaches and staffers from different countries and regions were often seen using the translators. Many agreed that these Chinese products facilitated overseas life and brought the "villagers" of the global village closer together.

"Its translation between Hungarian and Arabic is very accurate. I almost can't do without it," said Al-Yaari. From registration to check-in, from training to competition, he used it to communicate with Hungarian volunteers. The small translator became a bridge between him and others.

Hand in Hand: Building an Internationalized Open Platform

"Good evening, guests and friends!" said Youhuu, the mascot of the 2023 World Athletics Championships, appearing on the screen in the press center, enthusiastically greeting everyone in Chinese.



2023年8月24日,布达佩斯人工智能联合开放平台成立发布会现场。科大讯飞供图。

The photo taken on August 24, 2023 shows the launch of the Budapest Joint AI Open Platform. (Provided by iFLYTEK)

此刻,在场嘉宾闻声都将目光投向这只身着运动服、神态俏皮的土 著匈牙利绵羊。

Youhuu 通过布达佩斯人工智能联合开放平台系统集成的多语种技术,流利地讲着多国语言,在发布会上展现多语种播报能力,用活泼生动的方式向世界传递体育精神。

Guests turned their attention to this indigenous Hungarian sheep in sportswear, which spoke multiple languages fluently through the Budapest AI Joint Open Platform, demonstrating multi-language broadcasting abilities at the press conference and conveying the spirit of sports in a lively manner.

This scene occurred at the launch of the Budapest AI Joint Open Platform.

During the event, iFLYTEK took the lead in the construction of a global multi-

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记者正在使用讯飞翻译机进行交流。科大讯飞供图。

 $A\ reporter\ uses\ the\ iFLYTEK\ translator\ to\ communicate\ with\ a\ Hungarian.\ (Provided\ by\ iFLYTEK)$

这一幕发生在布达佩斯人工智能联合开放平台发布会现场。

田径世锦赛期间,科大讯飞还牵头构建全球多语种技术生态,发布了布达佩斯人工智能联合开放平台。

"我们从全球范围内寻找技术合作伙伴,成功引入 115 项具有区域 语种和母语优势的技术,应用于本次赛事。"科大讯飞 AI 工程院院 长龙明康在现场表示,布达佩斯人工智能联合开放平台"在 2023 年 language technology ecosystem, launching the Budapest AI Joint Open Platform.

"We sought technological partners worldwide and successfully introduced 115 technologies with regional language and native language advantages for this event," said Long Mingkang, dean of the iFLYTEK AI Academy, during the event. The platform "will open over 100 multi-language capabilities by the end of 2023," inviting global partners to jointly promote AI technology innovation and application. It has already attracted the attention and participation of 378,000 overseas developers.



也门选手阿勒雅里在本次世锦赛办理注册手续时留影。受访者供图。

Al-Yaari from Yemen poses for a photo during the registration for the 2023 World Athletics Championships. (Provided by the interviewee)

底开放超过 100 种多语种能力",并邀请全球合作伙伴共同推进人工智能技术的创新与应用,已吸引 37.8 万海外开发者的关注和参与。

受邀来自 Speechmatics 公司的高级销售总监 Damir 先生表示,可以在 世锦赛这样一个享誉国际的重大赛事中提供技术服务很有价值,"科 大讯飞提供了这样一个技术合作平台,我们感到很高兴"。

每一次重大的国际运动赛事都是全球语言与文化的一次大融合,在国际大型运动会上率先使用先进科技,并陆续在城市治理、产业发展、百姓生活等领域全面推广,已经成为先进技术普及的重要脉络。人工智能时代,以科大讯飞为代表的中国企业以实际应用推动技术的不断进步,助力跨语言交流更高效、无障碍。(胡梦婷)

Damir, a senior sales director from Speechmatics, said providing technical services at such a prestigious international event was valuable. "We are very pleased that iFLYTEK provided such a technical cooperation platform," he said.

Every major international sports event is a grand gathering of languages and cultures. Pioneering the use of advanced technologies in large-scale international sports events and gradually adopting it in urban governance, industrial development and people's lives has become an important trend in the popularization of advanced technologies. In the AI era, Chinese companies like iFLYTEK are driving continuous technological progress through practical applications, making crosslanguage communication more efficient and barrier-free. (Hu Mengting)

SKA 推动国际科技合作 远望宇宙奥秘

Listening to the Universe: SKA Boosts
International Sci-Tech Collaboration

"平方公里阵列"射电望远镜项目(SKA)无导项目 MeerKAT 射电望远镜与其观测到时银河系中心时巨大射电频段气池示意图(台成照片)。新华在照片。 This is a composite photo showing the MeerKAT radio telescope, a precursor project of the SKA, and the huge radio frequency bubbles it observed in the center of the Milky Way galaxy. (Provided by Xinhua News Agency)



2018年2月6日, "平方公里阵列"射电望远镜项目(SKA)首台天线样机在河北石家庄正式启动。新华社照片。

The photo taken on February 6, 2018 shows the first antenna prototype of the SKA project, launched that day in Shijiazhuang, Hebei Province. (Provided by Xinhua News Agency)

一片雪花落在地上产生的能量, 比来自宇宙背景的电磁能量都要强。

如今,在南非和澳大利亚人烟稀少、广袤无垠的无线电宁静区,一项国际大科学工程——"平方公里阵列"射电望远镜(Square Kilometre Array, SKA)正在紧锣密鼓建设中。建成后,SKA 将接收来自数十亿光年外的电波并将其转化为图像,成为倾听微弱宇宙"声音"

The energy generated by a single snowflake falling to the ground is greater than the electromagnetic energy from the cosmic microwave background.

Today, in the vast and radio-quiet regions of South Africa and Australia, a major international project in science - the Square Kilometre Array (SKA) radio telescope - is under rapid construction. Upon completion, the SKA will receive radio waves

最灵敏的耳朵,让天文学家得以洞察大爆炸后的第一代恒星和星系的形成与演化、宇宙磁场的作用、重力的本质,甚至地外生命。

携手探索 填补空白

SKA 是由全球多国合资建造和运行的世界最大规模综合孔径射电望远镜,因接收总面积约"1平方公里"而得名,台址分别位于南非及南部非洲 8 国、澳大利亚西部的无线电宁静区域。

作为国际大科学工程, SKA 肩负着人类认识宇宙和基本物理规律的一些重大科学探索任务,包括第一代天体如何形成、星系形成与演化、暗能量性质、宇宙磁场、引力本质、生命分子与地外文明等,在填补人类宇宙基本认知空白方面发挥着重要作用。

早在 1993 年,包括中国在内的 10 国共同发起了建造 SKA 的倡议。 截至 2024 年 6 月,SKA 参加国包括正式成员南非、澳大利亚、英国、 中国、意大利、荷兰、瑞士、西班牙、葡萄牙和加拿大,以及观察 员印度、法国、德国、瑞典、日本和韩国。

作为 SKA 创始成员国之一,中国通过广泛的国际合作深度参与 SKA 关键技术研发、核心设备研制和科学问题研究,与国际同行携手合作,共同为探索宇宙奥秘发挥积极力量。在科技部国家遥感中心 (SKA 中国办公室) 的指导下,中国科学院上海天文台、中国科学院国家 天文台、中国电科网络通信研究院、鹏城实验室、广州大学等机构 的科学家积极参与 SKA 的活动,持续为 SKA 建设作出贡献。

中国科学院国家天文台研究员、中国科学院院士武向平说,SKA汇集了人类在天文学、无线电、信息、通讯、计算机、机械制造等诸多领域的最新科技成果。未来10年,中国SKA科学团队将围绕宇宙再电离探测、脉冲星搜寻、测时和引力理论检验等10个科学方向开展研究和攻关,在秉承国际合作开展大科学研究的前提下,确立清晰的科学目标和发展路线图。

from billions of light-years away and convert them into images, becoming the most sensitive ear to listen to the faint "voices" of the universe. This will enable astronomers to gain insights into the formation and evolution of the first stars and galaxies after the Big Bang, the role of cosmic magnetic fields, the nature of gravity, and even extraterrestrial life.

Joint Exploration to Fill in the Blanks

The SKA will be the world's largest radio telescope in terms of overall aperture, a global collaboration project constructed and operated by multiple countries. Its name derives from its total collecting area of approximately one square kilometer, with stations located in the radio-quiet regions of South Africa, eight other southern African nations, and western Australia.

As a major international scientific endeavor, SKA shoulders the responsibility of undertaking groundbreaking scientific explorations to enhance humanity's understanding of the cosmos and fundamental physical laws. These explorations encompass the formation of the first celestial bodies, the evolution of galaxies, the nature of dark energy, cosmic magnetism, the essence of gravity, life-bearing molecules, and the search for extraterrestrial civilizations. SKA plays a pivotal role in filling the gaps in our fundamental understanding of the universe.

As early as 1993, a total of 10 countries, including China, jointly initiated the construction of SKA. As of June 2024, SKA participants had full members encompassing South Africa, Australia, the United Kingdom, China, Italy, the Netherlands, Switzerland, Spain, Portugal and Canada, as well as observers comprising India, France, Germany, Sweden, Japan and the Republic of Korea.

As one of the founding member countries of SKA, China has actively participated in the development of key SKA technologies, as well as the research and development of core equipment and scientific research through extensive international cooperation. In collaboration with international peers, it has played an active role in exploring the mysteries of the universe. Guided by the National Remote Sensing Center of China under the Ministry of Science and Technology (or the SKA China Office), scientists from the Shanghai Astronomical Observatory of the Chinese Academy of Sciences,

南非科学院院士、南非斯泰伦博斯大学物理系天体物理分部主任马寅哲表示,中国具有500米口径球面射电望远镜"中国天眼"(FAST)项目设计及实验经验,而南非在SKA 先导项目 MeerKAT 射电望远镜建设中体现出中小口径阵列式射电望远镜建设能力,中南两国在不同领域各具特色,各有所长。

汇聚融合 开放共享

SKA 不仅是一个射电望远镜阵列,更是一个先进的数据密集型科学计算平台。像所有大项目一样,SKA 也面临着来自各方面的挑战,其中一个巨大的挑战是如何处理 SKA 运行产生的巨量数据。在建成使用后,SKA 每年数据量将超过 1EB(1EB 相当于超过 10 亿 GB),使其成像、校准和数据处理面临巨大挑战。

平方公里阵列天文台 (SKAO) 总干事菲利普·戴蒙德表示, "一个巨大的挑战是如何处理所有数据, 我们将产生比任何其他科学项目更多的数据。因此, 我们必须开发技术、算法和软件来处理所有数据并产生科学。"

在科技部的支持和指导下,鹏城实验室与广州大学王锋教授团队优势互补联合组建科研团队,在 SKA 科学数据处理系统 (SDP) 建设中取得了重要进展。依托"鹏城云脑"大装置,联合科研团队利用人工智能技术,正在开发面向特定望远镜相关领域的大数据处理分析支撑软件包、大数据服务平台和 PB 级大数据汇聚融合、开放共享与高效处理中的关键技术。

仰望星空 步履不停

目前,坐落于南非的 SKA 的先导项目——MeerKAT 每秒生产约 4GB 的数据。虽然数据量仅为 SKA 的十分之一,但仍然十分巨大。科研团队通过与南非 SKA 团队开展紧密合作,针对 MeerKAT 中的海量

the National Astronomical Observatories of the Chinese Academy of Sciences, the 54th Research Institute of China Electronics Technology Group Corporation, the Pengcheng Laboratory, and Guangzhou University have actively participated in SKA activities and continued to make contributions to SKA construction.

Wu Xiangping, a researcher at the National Astronomical Observatories and an academician of the Chinese Academy of Sciences, said SKA brings together the latest scientific and technological achievements in fields such as astronomy, radio, information, communication, computer, and mechanical manufacturing. In the next 10 years, China's SKA science team will carry out research and make breakthroughs in 10 scientific directions such as cosmic reionization detection, pulsar search, timing, and testing of gravitational theory. By conducting large-scale scientific research while carrying out international cooperation, clear scientific goals and the development road map will be established.

Professor Yin-Zhe Ma, a member of the Academy of Sciences of South Africa and director of the astrophysics division of the Department of Physics at Stellenbosch University, South Africa, said that China has experience in the design and experimentation of the Five-hundred-meter Aperture Spherical radio Telescope (FAST), dubbed the "China Sky Eye" project, while South Africa has demonstrated its ability to construct small and medium-sized array radio telescopes in the construction of the MeerKAT radio telescope in the SKA precursor project. China and South Africa have their own characteristics and strengths in different fields.

Gathering, Merging and Open Sharing of Data

SKA is not only a radio telescope array, but also an advanced data-intensive scientific computing platform. Like all large projects, SKA also faces challenges from all sides. One of the biggest challenges is how to process the massive amount of data. After being built and used, SKA will generate more than 1 EB, or 1 billion GB, of data per year, posing a huge challenge to its imaging, calibration, and data processing.

"One of the biggest challenges is how to process all the data," said Philip Diamond,



2021 年 7 月 1 日"鹏城云脑 II" 以顶尖性能再获 IO500 排行榜冠军的新闻中公布的照片。鹏城实验室供图。

The photo released on July 1, 2021 shows the site of "Pengcheng Cloud Brain II" after it topped the IO500 list again with top performance. (Provided by the Pengcheng Laboratory)

数据近实时处理工作进行合作研发,已取得大量阶段性成果。

"我们希望借助中国在人工智能领域积累的经验及技术,解决困扰 SKA数据处理与未来科学研究的关键问题,为未来各国科学家利用 分析 SKA 科学数据取得科学成果提供基础支撑。"王锋说,未来将 继续与 SKA 各国参与团队保持紧密合作,为 SKA 的建设和科学研究 director general of the Square Kilometre Array Observatory (SKAO). "We will generate more data than any other scientific project, so we need to develop the technology, algorithms and software to process all the data and produce science."

With the support and guidance of the Ministry of Science and Technology, the Pengcheng Laboratory and the team of Professor Wang Feng at Guangzhou University have formed a research team to complement each other's advantages in the construction

'▮▮▮'▮▮' 中国智·惠世界





广州大学王锋(左二)教授团队与罗德斯大学(Rhodes University)射电天文技术中心的 SKA 研究主席 Oleg Smirnov(左三)探讨 SKA 数据处理相关问题。广州大学王锋教授团队供图。

The team of Professor Wang Feng (2nd from left) at Guangzhou University and Oleg Smirnov (3rd from left), SKA research chairman of the radio astronomy technology center of Rhodes University, discuss SKA data processing issues. (Provided by Professor Wang's team)

贡献力量,为探索宇宙奥秘、推动人类文明进步做出更大的贡献。

SKA 建成后将成为地球上最大、最先进的科学设施之一,也将成为利用中国人工智能技术进行科学探索,推动人类科技进步与繁荣的典范。仰望星空,步履不停。在不远的将来,SKA 将为国际天文界持续探索宇宙带来更多新视角,为引领人类突破认知新领域作出更大贡献。(董道勇)

of the SKA Science Data Processors (SDP) system. Relying on the "Pengcheng Cloud Brain" large-scale device, the joint research team is using AI technology to develop big data processing and analysis support software packages, big data service platforms, and key technologies for PB-level big data gathering, merging, open sharing and efficient processing.

Looking Up at the Stars Ceaselessly

At present, MeerKAT, a precursor project of SKA located in South Africa, produces about 4 GB of data per second. Although the data volume is only one-tenth of that for SKA, it is still huge. Through close cooperation with the South African SKA team, the Chinese research team has carried out collaborative research on the near-real-time processing of massive data and has achieved a large number of early results.

"We hope to use China's experience and technology accumulated in the field of AI to solve the key problems that plague SKA data processing and future scientific research, and provide basic support for scientists from all over the world to use and analyze SKA scientific data to achieve scientific results," Wang said, adding that in the future, his team will continue to maintain close cooperation with SKA participating teams from all countries, contribute to the construction and scientific research of

SKA, and make greater contributions to exploring the mysteries of the universe and promoting the progress and prosperity of human civilization.

After its completion, SKA will become one of the largest and most advanced scientific facilities on Earth, and it will also become a model for using Chinese AI technology to conduct scientific exploration and promote human scientific and technological progress and prosperity. We should never stop our steps in exploring the mysteries of the universe. In the near future, the SKA will bring more new perspectives to the international astronomical community's continuous exploration of the universe and make greater contributions to leading humans to break through new areas of cognition. (Dong Daoyong)

智能巡检,远赴巴西的"风机叶片医生"

Intelligent Inspection: "Wind Turbine Blade Doctors" Journey to Brazil

'▮▮▮╹ 中国智·惠世界





正在工作中的扩博智能无人机。扩博智能供图。 The photo shows a Clobotics intelligent drone at work. (Provided by Clobotics)

在巴西东北部,海浪拍岸,海风吹拂,一排排"大风车"和连绵漫长的海岸线勾画出一片海岸风情。在巴西这片广袤的土地上,风电场集中于东北部和东南部,风能潜力惊人。

在风能转换为电能的过程中,风机叶片是必不可少的重要部件,但 长期运行易导致设备的磨损和老化,需要定期巡检维修,避免安全 事故发生。总部位于中国上海的扩博智能从 2020 年开始与巴西本地 运维商阿斯风能 (ArthWind) 合作,将智能化巡检风机叶片技术带 到巴西高原。 Along the northeastern coast of Brazil, waves crash against the shore and sea breezes blow, creating a picturesque coastline dotted with towering wind turbines. On the vast land of Brazil, wind farms are concentrated in the northeast and southeast, boasting incredible wind power potential.

In the process of converting wind into electricity, wind turbine blades are essential components. However, long-term operations can easily lead to wear and aging of the blades, requiring regular inspection and maintenance to avoid accidents. Chinese AI company Clobotics, headquartered in Shanghai, has been cooperating with

守护工人安全 点亮智能作业

传统风机巡检主要依靠人工开展,工作人员非常辛苦。尤其在干湿两季分明的巴西,湿季多雨,干季又面临烈日的炙烤,巡检人员的每一次作业都是对身心的巨大考验。"风机内部温度经常达40度以上,巡检人员上去后,身上就跟水淋一样,衣服上全是汗,一拧就出水。"扩博智能硬件产品负责人说。

"天呐,终于有人来解决这个问题了!"阿斯风能公司从事巡检作业的老员工何塞在听到与扩博智能合作的消息后这样感叹,"能为'大风车'服务是一件很有趣的工作,但背着一根安全带爬上数十米的高塔进行作业,也非常危险,能和扩博智能合作真是太好了!"

席尔瓦是何塞的同事和好友,负责技术培训方面的工作,她同样对 扩博智能的到来感到兴奋,也为自己的好友不再冒着高风险工作而 感到开心。"不只是何塞,任何人只要看过人工巡检作业现场,都 会有相同的感受。很多巡检人员以讲笑话的方式描述第一次巡检是 多么害怕,甚至腿软发抖,这份工作确实需要极大的勇气。"她说。

针对传统巡检的痛点问题,扩博智能给出了一份智能运维解决方案,这跟非全自动无人机巡检相比也具有显著优势。"传统非全自动无人机飞手要提前一天校准,作业前还要试飞,试飞过程中要多次以

ArthWind, a Brazilian operation and maintenance provider, since 2020 to bring intelligent wind turbine blade inspection technology to the Brazilian plateau.

Protecting Worker Safety, Promoting Intelligent Operations

Traditional wind turbine inspections are primarily conducted manually, placing a significant burden on workers. This is especially challenging in Brazil's distinct wet and dry seasons. In both the rainy wet season and the scorching dry season, each inspection is a physical and mental test for the workers. "The temperature inside the wind turbines often exceeds 40 degrees Celsius," explained a Clobotics hardware product manager. "After working inside, inspection workers come out drenched in sweat, and water will come out if you twist their clothes."

"Thank goodness! Someone is finally addressing this issue!" Jose, a veteran inspector at ArthWind, exclaimed upon hearing about the collaboration with Clobotics. "Servicing these giant turbines is fascinating, but climbing dozens of meters up the tower with a safety harness is also extremely dangerous. I'm thrilled to know about the cooperation with Clobotics."

Silva, Jose's colleague and friend, is responsible for technical training. She shared Jose's excitement about Clobotics' arrival and was overjoyed that her friend no longer had to face such high risks. "Not just Jose, anyone who has witnessed manual inspection firsthand would feel the same way," she said. "Many inspectors have

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不同路线飞行来保证照片采集的清晰度和完整性,这都是时间成本。" 扩博智能硬件产品负责人说,"而且特别考验飞手的熟练程度,作 业过程中要紧盯屏幕,实时手动调整飞行器。"

扩博智能在现场数据采集与后台处理这两方面都拥有尖端技术,自动 巡检系统可实现无人机自主飞行,其基于计算机视觉、机器学习等技术,通过数据获取、图像识别、云端大数据处理和分析等路径,形成 了精准的专家级风电行业智能运维解决方案,这也是为什么扩博智能 在众多竞争对手中赢得了与阿斯风能的合作。阿斯风能首席执行官阿曼多表示,相信双方强强联合将实现风机运维领域的新突破。

巡检"王牌三件套",助力"风起巴西"

在为巴西提供技术支持的过程中,扩博智能陆续派出了自主研发的叶片数智化巡检"王牌三件套"。包括扩博博云风机叶片智能化巡检系统、巡检机器人 KIWI 和扩博无人机风机叶片电阻测试解决方案。

扩博博云风机叶片智能化巡检系统包括无人机自动巡检系统 IBIS 和叶片数字化管理平台 IRIS 两部分。无人机自动巡检系统 IBIS 能够自动捕捉风机位置并规划巡检路径,可实现无人机的 100% 自主飞行,每台风机只需要 15-25 分钟就能完成智能巡检,并在巡检完成后提

jokingly recounted their fear and even trembling legs during their first inspection. It's a job that demands immense courage."

Recognizing the drawbacks of traditional inspection methods, Clobotics has developed an intelligent maintenance solution that offers significant advantages over semi-autonomous drone inspections. "With traditional semi-autonomous drone inspections, drone pilots need to perform calibration a day in advance and conduct test flights before actual operations. During test flights, they must fly multiple routes to ensure the clarity and completeness of photo capture, which is both time-consuming and demanding for pilot expertise," said a Clobotics hardware product manager. "Furthermore, pilots must closely monitor the screen and manually adjust the drone's flight path throughout the inspection process."

Clobotics' expertise in both on-site data collection and back-end processing empowers its autonomous inspection system to enable drone self-flight. Leveraging computer vision, machine learning and other cutting-edge technologies, the system integrates data acquisition, image recognition, cloud-based big data processing and analysis to deliver a comprehensive, expert-level wind power industry intelligent maintenance solution. This is why Clobotics stood out among numerous competitors and secured a partnership with ArthWind. Armando Costa Rego, CEO of ArthWind, expressed his confidence that their collaboration will lead to groundbreaking advancements in wind turbine operation and maintenance.



KIWI 机器人正在风机叶片内部执行内检。扩博智能供图。
The photo shows a KIWI robot performing an internal inspection inside the blades of a wind turbine. (Provided by Clobotics)

供清晰完整的图像资料,准确定位缺陷图形和尺寸。叶片数字化管理平台 IRIS 则将无人机自动巡检采集到的图像数据进行智能识别,并提供包括原始数据图像、分类缺陷等级、巡检维修建议的综合检测报告。

KIWI 机器人在风机叶片内检中发挥重要作用,其生成图像质量更高,探测深度更可达超过 2/3 的叶片长,可以轻松触达人工巡检无法到达的位置,而且进入单只叶片所耗费的时间也大大减少。KIWI 的存在使何塞等巡检人员不再需要自己进入叶片内部进行内检,大大提

"Ace Trio" for Wind Turbine Blade Inspection Serving Brazil

In its efforts to provide comprehensive technical support to Brazil, Clobotics has deployed its self-developed "Ace Trio" of blade inspection solutions. This trio comprises the "Clobotics Boyun Wind Turbine Blade Intelligent Inspection System", the KIWI inspection robot, and the Clobotics Drone Wind Turbine Blade Resistance Testing Solution.

The "Clobotics Boyun Wind Turbine Blade Intelligent Inspection System" has two

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高了巡检作业的安全性。

扩博无人机风机叶片电阻测试解决方案采用了接闪器测量方式。在 雷路电阻测试的过程中,巡检风机只需一次停机且对停机角度没有 特殊要求,在30分钟内,便可完成对三只叶片各个接闪器阻值精度 高达毫欧姆 (mΩ)级别的测量。

扩博智能"王牌三件套"在巴西大受欢迎,受到好评的不仅是扩博智能的技术,还有派驻工作人员的坚守和责任。为确保合作顺利进行,扩博智能硬件产品负责人兼工程师柯亮常驻巴西。有时闲暇,他会去海岸旁边散步,望着绵延的海岸线与转动的"大风车",感受着袭来的海风,他表示,一点也不后悔为了技术合作而背井离乡,"当你想到巴西现在这么多的风电叶片巡检,都离不开扩博的技术,说实话还是感到很骄傲的。"

除了巴西,目前,扩博智能已与丹麦、美国、加拿大、越南、缅甸、泰国、希腊、罗马尼亚、葡萄牙、意大利等地不同规模的风电场达成合作,共覆盖 29 个国家及地区,全球累计巡检 80,000+台次。秉承着"国内磨剑,国外亮剑"的理念,扩博智能将把"风电+AI"带到地球上更多"有风的地方"。(翟淑睿)

parts: the drone-based inspection system IBIS and the blade digital management platform IRIS. The drone-based IBIS can automatically capture the position of the wind turbine and plan the inspection path, which can realize 100% autonomous flight of the drone, and only 15 to 25 minutes will be needed to complete the intelligent inspection of each wind turbine. The system can also provide clear and complete image data after the inspection, and accurately identify the pattern and size of any possible defect. IRIS, a digital management platform, intelligently identifies the image data collected by the drones' automatic inspection, and provides a comprehensive inspection report including the original data and images, defect level, as well as inspection and maintenance recommendations.

The KIWI robots play an important role in the internal inspection of wind turbine blades. They can generate images of higher quality and reach a detection depth of more than two-thirds of the blade length, making it easy to reach locations that cannot be reached by manual inspections and greatly reducing the time to enter a single blade. The existence of KIWI makes it no longer necessary for inspectors such as Jose to enter the blade for internal inspection, which greatly ensures the safety of inspection workers.

The Clobotics Drone Wind Turbine Blade Resistance Testing Solution employs a flashpoint measurement method, enabling a single shutdown of the wind turbine during the entire lightning path resistance test without any specific requirements

for the shutdown angle. Within 30 minutes, it can accurately measure the resistance values of each flashpoint on all three blades with a precision of milliohms.

The trio of Clobotics solutions has garnered widespread acclaim in Brazil. This success can be attributed not only to the innovative technology but also to the dedication and responsibility of Clobotics' on-site personnel. To ensure the smooth progress of the collaboration, Clobotics' hardware product manager and engineer Ke Liang has been stationed in Brazil for a long time. During his occasional moments of leisure, he often strolls along the coastline, gazing at the expansive shoreline and the towering "windmills" while feeling the refreshing sea breeze. He said he has no regrets about leaving his homeland for technical collaboration. "When you realize

that so many wind turbine blade inspections in Brazil rely on Clobotics' technology, it's a real source of pride."

Beyond Brazil, Clobotics has established partnerships with wind farms of varying sizes and locations in Denmark, the United States, Canada, Vietnam, Myanmar, Thailand, Greece, Romania, Portugal and Italy. Its services now span 29 countries and regions, with over 80,000 wind turbine inspections conducted worldwide. By "sharpening the blade at home before using it abroad," Clobotics is committed to benefiting more corners of the globe with its expertise in AI and the wind power sector. (Zhai Shurui)

智慧仓储方案出海 "小机器"解决"大问题" Smart Warehouse Solutions Go Global and Solve Big Problems MEGVII 町视 0040

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基里亚科斯和尼古拉斯在旷视科技苏州工厂内接受硬件培训。旷世科技供图。 Kyriakos and Nikolas receive hardware training at Megvii's Suzhou factory. (Provided by Megvii)

"我们终于见面了。"在经过了一次转机,长达十几个小时的飞行后,2023年2月,来自希腊 VOYATZOGLOU 公司的自动化负责人基里亚科斯 (Kyriakos Bertsos) 和机械工程师尼古拉斯 (Nikolas Nomikos) 落地上海,终于见到了旷视科技的"网友们"。在此之前,双方已经通过邮件和视频会议保持了半年多的联系。沟通的方向,

"We finally met." After a long flight of over 10 hours with a transfer of planes in February 2023, Kyriakos Bertsos, head of automation at the Greek company VOYATZOGLOU, and mechanical engineer Nikolas Nomikos landed in Shanghai and finally met with their "online friends" from Chinese AI company Megvii. Prior to this, the two parties had been in contact for more than half a year through emails and video conferences. The topic of discussion was the application of intelligent systems

是智能化系统在仓储物流领域的应用。

中国人工智能企业旷视科技与 VOYATZOGLOU 的合作在这次见面后加速, 开始根据客户需求提供人工智能仓储机器人系统解决方案。如今, 在欧洲的首个应用项目已落地罗马尼亚, 高效率、高柔性的冷库存储系统有效降低了罗马尼亚企业 Doly Com 的仓储投资和运营成本, 确保产品质量与安全的同时, 也有助于工人得以更体面地工作。

AI 技术与物流仓储"双向奔赴"

作为希腊最大的仓储自动化集成商,VOYATZOGLOU 深切感受到近年仓储物流行业劳动力短缺带来的巨大机遇,主动寻找可以提供质量好、稳定性高且足够智能的自动化系统供应商,以帮助客户应对人工不足带来的挑战。

十余年聚焦物联网场景的旷视科技,持续探索人工智能技术在物流搬运领域的应用,已经形成 Matrix8 Storage (存)/Hybrid Handling (搬)/Hybrid Picking (拣)三大标准化子系统解决方案,可供集成商和终端客户单独或者组合使用。近年来,旷视科技开始拓展海外市场,把目光投向一直以来依靠人工的传统制造业和物流业。

in warehousing and logistics.

The cooperation between Megvii and VOYATZOGLOU accelerated after this meeting, and they began to provide AI warehouse robot system solutions based on the actual needs of clients. Today, the first application project in Europe has landed in Romania, and the high-efficiency and high-flexibility cold storage system has effectively reduced the warehousing investment and operating costs of the Romanian company Doly Com. While ensuring product quality and safety, it also allows workers to work more decently.

Al Technology Contributing to Smart Logistics and Warehousing

As the largest warehousing automation integrator in Greece, VOYATZOGLOU has deeply felt the huge opportunities brought about by the labor shortage in the warehousing and logistics industry in recent years. They have actively sought automation system suppliers who can provide high-quality, stable and intelligent systems to help clients deal with the challenges brought about by the shortage of labor.

Megvii, which has focused on the Internet of Things scenarios for more than 10 years, has continuously explored the application of AI technology in logistics handling. It has formed three standardized subsystem solutions: Matrix8 Storage,

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正是在这样的背景下, AI 技术的应用与物流仓储的需求一拍即合, 中希两家企业开启了"双向奔赴"的合作之旅。

在中国,基里亚科斯和尼古拉斯来到旷视科技在上海的办公室和落地项目,又到旷视科技苏州工厂进行了为期一周的软硬件技术培训。 双方对彼此在实施交付、售后服务上的能力也有了充分的信任。

接下来,中希两家企业多次在希腊、德国等地合作参与大型展会,双方管理层进行了深入交流,技术团队也开始了紧密的合作开发。 终于,共同研发的人工智能仓储机器人系统解决方案在 2024 年迎来了第一个客户——罗马尼亚企业 Doly Com。

"协力同心"在罗马尼亚落地首个项目

Doly Com 是罗马尼亚最大的肉类屠宰和加工企业,随着市场需求的增加和业务扩展,Doly Com 面临着传统仓储管理系统效率低下、工人在低温下的工作环境恶劣、人员不足等挑战。

旷视科技与 VOYATZOGLOU 的合作成果恰好可以应对这些难题。 在项目咨询前期,双方就针对肉类生产企业的冷链存储场景进行了 定制化设计。接下来是良好的合作施工: VOYATZOGLOU 调动本土 工程资源,帮助旷视科技进行土建、货架的搭建,以及协助进行提 Hybrid Handling, and Hybrid Picking, which can be used by integrators and end clients alone or in combination. In recent years, Megvii has begun to expand its overseas market, focusing on traditional manufacturing and logistics industries that have always relied on manual labor.

It was against this background that the application of AI technology and the needs of logistics and warehousing hit it off, and the two companies embarked on a cooperative journey of mutual benefit.

In China, Kyriakos and Nikolas visited Megvii's Shanghai office and project site, and then spent a week undergoing software and hardware training at Megvii's Suzhou factory. The two parties also gained full confidence in each other's capabilities in terms of project delivery and after-sales services.

Next, the two companies collaborated on large-scale exhibitions in Greece, Germany and other places, where their management teams had in-depth exchanges and their technical teams began to closely cooperate on development. Finally, the jointly developed AI warehouse robot system solution got its first client in 2024: Romanian company Doly Com.

Working Closely Together for the First Project in Romania

Doly Com is the largest slaughterhouse and meat processing enterprise in Romania.



2024年3月旷视科技与 VOYATZOGLOU 团队在德国展会现场。旷视科技供图。

Megvii and the VOYATZOGLOU team attend an exhibition in Germany in March 2024. (Provided by Megvii)

升系统、输送系统、网络及IT系统、机器人系统的安装。最终,人工智能机器人系统顺利融入了Doly Com 的生产及仓储流程。

在新系统应用前, Doly Com 将货物以地堆的方式存储,仓库内部的垂直空间没有被利用。新系统采用了以托盘四向车机器人为核心的仓储人工智能机器人解决方案,依托具备灵活性和延展性的机器人,

With the increase in market demand and its business expansion, Doly Com was facing challenges such as the low efficiency of traditional warehouse management systems, the harsh working environment for workers in low-temperature conditions, and a shortage of personnel.

The cooperation results of Megvii and VOYATZOGLOU were tailor-made to address these challenges. In the early stages of project consultation, the two parties conducted

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Doly Com、VOYATZOGLOU、旷视科技三方人员在项目现场合影。旷世科技供图。

Representatives of Doly Com, VOYATZOGLOU and Megvii pose for a group photo at the project site. (Provided by Megvii)

可以将仓库整个三维空间"填满"。"与客户的传统仓库相比,存储密度可以提升3倍以上。"旷视科技机器人业务负责人徐庆才说。

不仅如此,通过人工智能软件的管理和调度,可以对货物的存储方式和区域、出库顺序、搬运效率整体进行优化提升。基里亚科斯介绍说,系统可以根据常规肉类和清真肉类的特性,将不同的产品存储到不同的区域,还可以根据产品的保质期自动选择需要优先出库的货物,并对临近保质期的库存进行监控和预警。夜间,系统会自动将第二天需要出库的货物提前运送到出库口,节省搬运时间。

"对于冷库这种单位面积运营成本高的场景,存储空间的充分利用给企业带来的收益更高。"基里亚科斯说。

customized designs for the cold chain storage scenarios of the meat enterprise. Next came a good cooperative construction: VOYATZOGLOU mobilized local engineering resources to assist Megvii in construction, shelf erection and the installation of lifting, conveying, network, IT and robot systems. Finally, the AI robot system was successfully integrated into Doly Com's production and warehousing processes.

Before the new system was applied, Doly Com stored goods on the ground, and the vertical space inside the warehouse was not utilized. The new system adopts a warehouse AI robot solution based on four-way pallet robots. Relying on robots with flexibility and extensibility, the entire three-dimensional space of the warehouse can be filled. "Compared to the traditional warehouse, the storage density can be

以人为本促"人人得以体面工作"

在应用人工智能机器人系统之前, Doly Com 库内所有的操作都需要工作人员穿着棉衣在极端的冷冻环境下完成,长期在冷库内作业的人员容易受寒甚至患病,严重的可能造成后遗症状,对工作人员的身心健康很不友好。

而在自动化仓库中,货物的入库、存储、搬运、出库全部由托盘四向车机器人完成,运营人员可以在中控室的控制平台上实时监控库存和机器人的运行状态。因此,操作工人无需再进入-25°C的仓库,便可对仓库进行管理。

"人工智能和机器人系统,将工作人员从低温的冷冻库中隔离出来, 后续需要人工的操作都可在温度相对较高的冷藏环境下进行,大大 改善了工人的工作环境。"旷视科技产品市场经理秦亚群说,未来, 该技术可复制推广至医药、电子商务和冷链物流等行业,尤其在需 要高效仓储和快速分拣的场景中,将具有广泛应用前景,可以增进 工人福祉,促进企业盈利。(李唐宁) increased by more than three times," said Xu Qingcai, head of Megvii's robotics business.

In addition, through the management and scheduling with AI software, the storage method and areas of goods, outbound sequence, and overall handling efficiency can be optimized and improved. Kyriakos introduced that the system can store different products in different areas based on whether it is conventional meat or halal meat, and can also automatically select the goods that need to be sent out first according to the expiration dates, and monitor the goods close to expiration dates and issue early warning. Every night, the system will automatically transport the goods that need to be sent out the next day to the outbound exit in advance, thus saving handling time.

"For scenarios like cold storage where the operating cost per unit area is high, the full utilization of storage space brings even greater benefits to an enterprise," said Kyriakos.

People-Centered Approach Allowing for "Decent Work of Everyone"

Before the application of the AI robot system, all operations in Doly Com's



旷视 Matrix8 Handling 系统的 AMR+ 四向车机器人。 旷视科技供图。

The photo shows the Megvii Matrix8 Handling system's AMR+ four-way robots. (Provided by Megvii)

warehouse required employees to wear cotton coats and work in extreme freezing environments. Employees who work in cold storage for a long time are prone to catching a cold or even getting sick. In severe cases, it may cause sequelae, which can be detrimental to the physical and mental health of employees.

In an automated warehouse, the entry, storage, handling and exit of goods are all completed by four-way pallet robots. The operators can monitor the inventory and the operating status of the robots in real time on the control platform in the central control room. Therefore, operation workers no longer need to work in the warehouse of minus 25 degrees Celsius.

"AI technology and the robot system free workers from the low-temperature cold storage facilities, and subsequent manual operations can be performed in a relatively high-temperature refrigerated environment, which greatly improves the working environment," said Qin Yaqun, product marketing manager of Megvii, adding that in the future, this technology can be replicated and promoted to industries such as pharmaceuticals, e-commerce, and cold chain logistics. It will have broad application prospects, especially in scenarios that require efficient warehousing and fast sorting, and can enhance workers' well-being and promote enterprise profitability. (Li

中德联手打造无人驾驶 单轨吊机车守护矿区安澜

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Al-Powered Underground Monorail
Vehicles Keep Miners Safe

井下作业的无人驾驶单轨吊机车。工大高科供图。

The photo shows a driverless monorail vehicle working underground. (Provided by Hefei Gocom Information Technology Co., Ltd.)

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700 多米幽深的矿井下,无人驾驶单轨吊机车往复行驶,昼夜不息……如今这已经成为安徽淮北矿业集团袁店一井智能煤矿的常态。在这里,中国的 AI 技术与德国的机车喜结良缘,成为矿区安澜的守护者。

为响应联合国可持续发展目标,近年来井下高危环境逐步实现无人 化作业,提升矿工安全感、幸福感已经成为中国众多工矿企业、科 技企业加大投入、努力攻关的目标。"AI+"已然成为引领中国矿山 安全生产、科技发展的前沿和热点。

作为中国矿山井下无人驾驶领域开展国际合作的联合攻关项目,装载着合肥工大高科信息科技股份有限公司(以下简称"工大高科") 自主研制无人驾驶系统的德国沙尔夫单轨吊机车,采用 AI 视频识别、精确定位、雷达等技术,实现了点到点的自动安全运输,解决了井下单轨吊运输效率低、调度等待时间长、事故频发的行业痛点,成为中德企业携手创新,合作共赢的又一个例证。

力推矿山智能化,中德企业携手创新

在煤矿生产中,运输是重要环节。袁店一井煤矿自 2011 年就引进了全球市场占有率很高的德国 SMT 沙尔夫集团公司 (SMT Scharf GmbH) 的单轨吊机车。

Deep in a mine shaft over 700 meters underground, driverless monorail vehicles run back and forth around the clock. This has now become the norm at the Yuandian No. 1 Mine, an intelligent coal mine of Huaibei Mining Group in Anhui. Here, Chinese AI technology has seamlessly integrated with German locomotives, becoming the guardians of safety in mines.

In response to the United Nations Sustainable Development Goals, unmanned operations in high-risk underground environments have gradually become a reality in recent years, enhancing miners' sense of safety and happiness. This has become a goal for many industrial and mining enterprises, as well as technology companies in China, which are investing heavily in this regard. "AI+" has already become a frontier and hotspot for the safe production and technological development of Chinese mines.

As an international cooperation project in the field of underground driverless transportation in Chinese mines, monorail vehicles of German company SMT Scharf GmbH, equipped with the driverless system independently developed by Hefei Gocom Information Technology Co., Ltd. (Hefei Gocom), use AI video recognition, precise positioning, radar and other technologies to achieve point-to-point automatic safe transportation. This addresses common industry problems such as low transportation efficiency, long waiting times and frequent accidents in underground monorail transport, exemplifying the joint innovation and win-win cooperation between Chinese and German enterprises.

单轨吊机车具有爬坡能力强、载重大、巷道断面空间利用率高、平 巷和斜巷连续不转载运输等特点,在过去十多年中,已逐步成为中 国矿井下复杂环境辅助运输系统的主要运载工具。

然而,随着人工智能技术的快速发展,仍在依赖人工作业、缺乏智能系统的单轨吊机车,除了面临安全问题外,还存在调度等待时间长、行车异常、人工操作失误等状况,限制了井下运输效率的提高,越来越不能满足中国建设无人、安全矿山的现实需要,进行自动驾驶技术及装备升级改造已迫在眉睫。

在煤矿企业迫切的需求下,德国沙尔夫与中国工大高科于 2023 年 5 月达成战略合作协议,开启中国人工智能技术与德国先进单轨吊机 车深度融合的双向奔赴之旅。

好事多磨,办法总比困难多

项目正式实施后,德国沙尔夫的工程师要求设备加装完全独立于原装装备,如必须额外配置第二发电机、车速采集必须单独另配、通信接口电气隔离等。

对于德方十分审慎的态度,工大高科的总经理程运安明确表态说:"第一次合作,建立信任需要个过程。我们可以多做一些工作,释放最

Chinese and German Enterprises Pursuing Innovation for Smart Mines

In coal production, transportation is a crucial link. Since 2011, the Yuandian No. 1 Mine has introduced monorail vehicles from SMT Scharf, which holds a high market share globally.

These monorail vehicles boast strong climbing ability, large load capacity and high utilization of tunnel space, and can transport continuously in both flat and inclined tunnels without reloading. Over the past decade, they have gradually become the main equipment for auxiliary transportation in complex underground environments in Chinese mines.

However, with the rapid development of AI technology, monorail vehicles that still rely on manual operation and lack intelligent systems face safety issues, long scheduling wait times, abnormal operation, and human operation errors, thus limiting the improvement of underground transport efficiency. Such vehicles no longer meet China's real needs for building unmanned safe mines, making it urgent to upgrade and transform to driverless technology and equipment.

Driven by the urgent needs of coal mining enterprises, SMT Scharf and Hefei Gocom signed a strategic cooperation agreement in May 2023, embarking on a journey to deeply integrate Chinese AI technology with advanced German monorail

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大的诚意,办法总比困难多。最重要的是这么有意义的项目一定要做好。"

此后,从设备选型、安全标准合规,到风险评估、安全防护,工大高科的技术人员与德方工程师进行了为期2个月的测试试验和对比验证,历经数十次方案交流,用实际效果,逐步打消了德方的顾虑,使得项目开始向实质性的方向迈进。

2023年8月,双方技术人员就项目所用机车的改造工作进行技术对接,在通信接口类型选择的问题上又出现了分歧。

沙尔夫机车的对外通信接口由名为 C2W 的通信模块组成, 在经过实地测试后发现, C2W 的无线信号接收距离有限, 致使机车在行车过程中, C2W 与车载通信控制器的通讯会存在不连续情况, 这在无人驾驶机车控制中是不能接受的。

工大高科的技术工程师邢星说: "我们给德方的建议是,希望他们能更改机车对外的通信接口为 CAN (C2C) 总线接口,一方面 CAN 通信是目前主流的车辆控制接口方式,另一方面,由于 CAN 通信本身是有线的,全双工,稳定可靠,传输速率高,对无人驾驶这种场景来说非常适宜"。

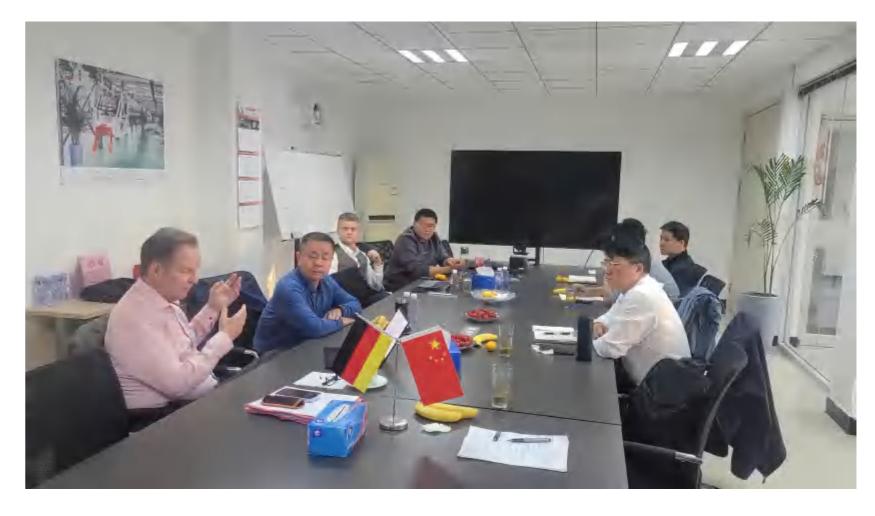
rehicles.

Striving for Solutions and Overcoming Challenges

After the project was officially implemented, SMT Scharf's engineers requested that the equipment be completely independent of the original equipment, such as requiring an additional generator, a separate speed collection device, and electrical isolation for communication interfaces.

Hefei Gocom general manager Cheng Yun'an responded clearly to the cautious attitude of the German side, "In our first cooperation, building trust takes time. We can do more work to show our utmost sincerity. Solutions always outnumber challenges. The most important thing is to ensure the success of this meaningful project."

After that, from equipment selection and compliance with safety standards to risk assessment and safety protection, the technical personnel of Hefei Gocom and the engineers from the German side conducted two months of testing and comparative verification and held dozens of exchanges on the project. They gradually dispelled the German side's concerns with actual results, moving the project toward a substantive direction.



中德双方于沙尔夫中国公司进行技术实施方案讨论。工大高科供图。

Chinese and German teams discuss technical details at SMT Scharf's China subsidiary. (Provided by Hefei Gocom)

对于这样的建议,德国工程师起初是排斥的。正所谓"不打不相识", 当双方吃住都安排在了项目现场,围绕现场问题不断沟通与试验后, 最终德方同意更改为效果更好的 CAN (C2C) 总线接口。

此时,沙尔夫的总经理豪格·鲁尔斯提出了新的问题:硬件更改通信接口后,产品需要重新进行煤安测试认证(产品在井下应用的必备资质条件),时间可能需要半年甚至更久。

工大高科经过认真考虑,决定双管齐下,一方面做好配合沙尔夫公

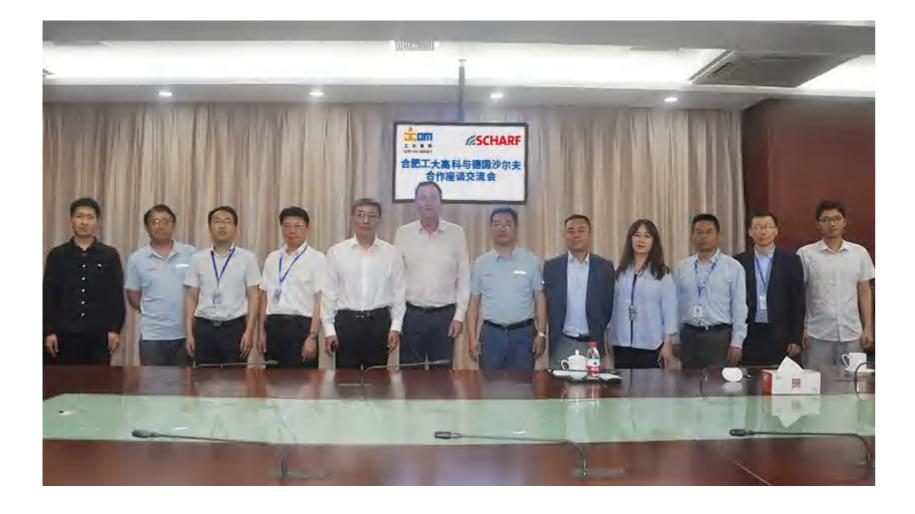
In August 2023, technical personnel from both sides discussed technical details for the upgrading of the underground vehicles. Disagreement arose over the choice of the communication interface type.

The external communication interface of SMT Scharf vehicles consists of a communication module called C2W. After field testing, it was found that the wireless signal reception distance of C2W was limited, causing intermittent communication between C2W and the onboard communication controller during vehicle operation, which is unacceptable in unmanned vehicle control.

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2023年5月,工大高科与德国沙尔夫达成合作。工大高科供图。

The photo shows Hefei Gocom and SMT Scharf reach cooperation in May 2023. (Provided by Hefei Gocom)

司进行通信接口更改工作中的技术对接,包括协助德方进行设备煤 安测试认证工作;另一方面,按原计划时间表,工大高科的技术人员专门在单轨吊车上加装了一套无线通信装置,解决 C2W 接收信号 不足导致的无线通信不稳定情况,作为过渡方案先完成整体系统功能测试。

合作共赢,商机无限

单轨吊机车无人驾驶系统投入使用后,淮北矿业袁店一井煤矿单轨

Hefei Gocom's engineer Xing Xing said, "Our suggestion to the German side is to change the external communication interface to a CAN (C2C) bus interface. On one hand, CAN communication is currently the mainstream vehicle control interface method. On the other hand, because CAN communication is wired, full-duplex, stable and reliable and allows for high transmission speed, it is very suitable for driverless scenarios."

Initially, the German engineers rejected this suggestion. However, as the teams lived and worked on site, after continuous communication and experiments, the German

吊"工匠大师"郝明警高兴地说:"以前开单轨吊的时候,我们要三班倒,并下作业粉尘很大,特别是夏天闷热得很,每天都是一身汗一身泥。现在不用下井,在地面远程遥控就行了,人休车不休,效率还提高了。"

单轨吊机车在实现无人驾驶后,每车每天能减少6人下井,如果淮 北矿业全部300多台单轨吊机车均实现无人驾驶,一年减少的下井 人次可高达数十万。

在显著的社会和经济效益下,单轨吊机车无人驾驶系统很快获得了 国内外市场的认可。2024年4月,沙尔夫再次携手工大高科,在淮 南张集煤矿实现井下机车无人驾驶。

淮南张集煤矿项目现场是封闭的通信网络,脱机运行。为了解决沙尔夫机车车载通信模块脱网情况下开机需要 NTP 授时,且不影响控车的问题,工大高科的专家们尝试了不少方法,经过反复论证、测试,中方专家通过对车载通信控制器软件进行功能改造,最终解决了这个难题。

豪格·鲁尔斯感慨地说: "我们要合作就找运输领域最强的厂商, 事实证明,我们这次又找对了。"

中德项目合作的案例经过行业发酵,一些国内外的单轨吊机车生产 企业都慕名来合肥与工大高科进行相关项目技术的交流。

side finally agreed to switch to the more effective CAN (C2C) bus interface.

At this point, Scharf Mining Machinery (Beijing) general manager Holger Rusch raised a new issue: Hardware changes to the communication interface would require the product to undergo new coal safety certification (a necessary qualification for underground applications), which could take six months or even longer.

After careful consideration, Hefei Gocom decided to adopt a dual approach. On one hand, they would cooperate with Scharf in the technical docking for the communication interface change, including assisting the German side with coal safety certification. On the other hand, following the original timetable, Hefei Gocom's technical team installed a wireless communication device on the monorail vehicle to address the issue of C2W's insufficient signal reception, as an interim solution to complete the overall system function testing.

Win-Win Cooperation, Endless Opportunities

After the driverless monorail system was put into use, Hao Mingjing, a "master craftsman" of the Yuandian No. 1 Mine, said happily, "In the past, when we operated the monorail vehicles, we had to work in three shifts, and the underground environment was very dusty, especially in the summer when it was sweltering. Every day we were covered in sweat and dirt. Now, we don't have to go underground; we can control it remotely from the surface. The machines keep running while we rest, and the efficiency has improved."

With the new monorail system, each vehicle can reduce the number of underground

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捷克公司芬瑞特来访工大高科寻求合作。工大高科供图。 Czech company Ferrit visits Hefei Gocom to seek cooperation. (Provided by Hefei Gocom)

实现单轨吊车无人化后,由单轨吊车、地轨机车、无轨胶轮车、放矿机、 吊梁机等智能化运输装备之间通过群体协同,在井下高速无线通信 平台的支持下,可实现矿井井下"装-运-卸"一体化作业,实现矿 井运输作业的数字化向智能化、无人化方式转变。

人工智能与矿山产业复杂工业场景的融合,将引领我们向着更加美好、智慧、可持续的未来工业迈进。(邵莉)

workers needed per day by six. If all 300-plus monorail vehicles in Huaibei Mining achieve driverless operation, the annual reduction in underground workers could reach hundreds of thousands.

With significant social and economic benefits, the driverless monorail system quickly gained recognition in both domestic and international markets. In April 2024, SMT Scharf and Hefei Gocom once again joined hands to achieve driverless operations of underground vehicles at the Zhangji coal mine in Huainan.

The Zhangji coal mine project site operates in a closed communication network that is offline. To address the issue of the Scharf vehicle's onboard communication module requiring NTP time synchronization once turned on and to avoid affecting vehicle control, Hefei Gocom experts tried various methods. After repeated verification and testing, Chinese experts modified the functions of the onboard communication controller software, ultimately solving the problem.

Holger Rusch commented, "When we seek cooperation, we choose the strongest manufacturers in the transportation field. This collaboration has once again proven that we made the right choice."

The case of Sino-German cooperation has spread through the industry, attracting many monorail vehicle manufacturing companies from home and abroad to Hefei for

technological exchanges with Hefei Gocom.

After achieving driverless monorail transportation, an integrated operation of "loading, transporting and unloading" can be realized in the mine, transforming the digitalization of underground transportation operations into an intelligent, unmanned mode. This will be supported by intelligent transportation equipment such as monorail vehicles, ground rail vehicles, trackless rubber-tired vehicles, ore loaders, and beam cranes, coordinated through a high-speed wireless communication platform in the mine.

The integration of AI and complex industrial scenarios in the mining industry will lead us toward a smarter and more sustainable future in industrial development. (Shao Li)

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心脏影像AI,点亮生命的希望

uMRomega

Al-Powered Cardiac Imaging, a Beacon of Hope for a Healthier Future

OMEGA

hoto shows the 75cm 3.0T magnetic resonance imaging with ultra-large aperture of United Imaging Intelligence. (Provided by Xinhua News Agency)



联影智能心脏磁共振智能分析系统产品概览。联影智能供图。

 $The \ photo \ shows \ an \ overview \ of \ United \ Imaging \ Intelligence's \ CMR \ intelligent \ analysis \ system. \ (Provided \ by \ United \ Imaging \ Intelligence)$

春日的一个上午,英国帝国理工学院生物工程系心血管影像实验室的窗外,温暖的阳光洒在树叶上。透过实验室宽大的玻璃窗,可以清晰地看到映照在实验台电脑屏幕上的心脏 MR 影像。帝国理工学院先进技术研究院联席院长、帝国理工学院医学院教授大卫·菲尔曼 (David Firmin) 正仔细地查看最新的影像数据。

这些数据经过了来自上海联影智能医疗科技有限公司(以下简称"联影智能")的心脏磁共振(CMR)智能分析系统的重建和计算。该系统运用最新的人工智能技术,可实现心肌病、先天性心脏病、心脏瓣膜病等多种心脏病的"一栈式"评估,显著提升了医生对心血管病的诊断效率及精准度。

On a spring morning, outside the window of the cardiovascular imaging laboratory in the Department of Bioengineering at Imperial College London, the warm sunshine bathed the leaves of the trees. Through the large windows of the laboratory, one could clearly see the cardiac magnetic resonance images on the computer screen on a table. David Firmin, co-director of the Advanced Technology Research Institute of Imperial College London and professor of medicine at Imperial College London, was carefully examining the latest imaging data.

The data was reconstructed and calculated using the cardiac magnetic resonance (CMR) intelligent analysis system from the Shanghai-based United Imaging Intelligence. The system uses the latest AI technology to assess cardiomyopathy,

诊断效率的提升要归功于一项由菲尔曼教授与北京安贞医院影像科主任徐磊携手联影智能共同攻关的重大项目——基于人工智能的心血管病多模态影像诊断体系研究。

携手突破技术难关

回忆起当初与安贞医院及联影智能的结缘,菲尔曼教授对两国合作的重要性和紧迫性深有感触。中英两国心血管疾病的诊断和治疗需求巨大,当前磁共振检查在心血管病的诊断、治疗和预后评估中发挥着越来越重要的作用,而两国在心脏 MR 智能后处理和心血管病多模态影像智能辅助诊断方面都存在技术瓶颈。携手合作共同运用人工智能深度挖掘 MR 数据迫在眉睫。

作为项目的核心技术开发方之一以及产品的提供方,联影智能在影像扫描技术和人工智能技术上有着深厚的积累。然而,在项目初期,他们仍遇到了许多挑战——最为突出的是心脏MR的精准量化分析。但幸运的是,帝国理工学院的技术团队在这个领域有着丰富的经验,两国专家定期线上交流,取长补短,共同推动项目顺利进行。

大医精诚,仁爱天下。医学技术进步的最终目的是服务于患者。徐磊表示:"我们不仅要在技术上取得突破,更要通过合作,探索构建更加完善的心血管多模态影像智能诊疗体系,为全球患者带来更多福音。"

congenital heart disease, heart valve disease and other heart diseases through a single imaging session, significantly improving the efficiency and accuracy of doctors' diagnosis of cardiovascular diseases.

The improvement in diagnostic efficiency was attributed to a major project jointly undertaken by Professor Firmin, Xu Lei, director of the medical imaging department at Beijing Anzhen Hospital, and United Imaging Intelligence: the research on a multimodal imaging diagnosis system for cardiovascular diseases based on AI technology.

Breaking Through Technological Barriers Together

Recalling the initial connection with Beijing Anzhen Hospital and United Imaging Intelligence, Professor Firmin was deeply impressed by the importance and urgency of cooperation between the two countries. The demand for diagnosis and treatment of cardiovascular diseases is huge in both China and the UK. Magnetic resonance imaging plays an increasingly pivotal role in the diagnosis, treatment and prognosis evaluation of cardiovascular diseases. However, both countries face technological bottlenecks in intelligent CMR post-processing and multimodal image-based intelligent auxiliary diagnosis of cardiovascular diseases. It is imperative to work together to use AI to deeply analyze MR data.

As one of the core technological developers and product providers of the project, United Imaging Intelligence has sufficient expertise in imaging and AI technologies.

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目前,该项目的成果已成功落地,不仅补齐了中国在心脏 MR 上的技术短板,还被应用到英美等国多家医院的临床科研中。中国提供的先进技术,极大地提升了帝国理工学院在心脏影像研究上的效率和准确性,助推了英国在心血管疾病领域的进一步发展。

项目的成功不仅在中英两国产生了积极影响,也为全球医疗健康产业带来了新的希望。两国项目团队共同培养了许多博士生,为未来全球生物医学工程的发展储备了充足的人才力量。2023年,菲尔曼教授团队骨干杨光教授带领团队来到北京,同徐磊及博士生团队举办研讨会等技术交流活动。在中英导师的共同指导下,多名博士生在人工智能和心血管病多模态影像诊断领域取得了突破性进展。近几年,团队也在国际知名学术期刊上发表了多篇高水平的学术文章,将项目的科研成果同全球共享。

开创医疗人工智能新纪元

安贞医院、联影智能和帝国理工学院这种紧密的"技术研发一功能整合一临床应用"的全链条合作,有效地将医疗人工智能技术创新与临床需求紧密结合,不仅补齐了心脏 MR 上的技术短板,还加深了中英两国在健康医疗领域的互信与合作,共同促进了全球医疗健康产业的进步。

未来,随着人工智能技术的不断进步,心脏影像技术将迎来更多创新和应用。项目团队将继续深化合作,攻克更多技术难关,为全球

However, in the early stages of the project, they still faced many challenges, the most prominent of which was the precise quantitative analysis of CMR. Fortunately, the technological team at Imperial College London had rich experience in this field. Experts from both countries regularly exchanged online, learned from each other's strengths and jointly promoted the smooth progress of the project.

Great doctors embody both mastery and compassion, extending their benevolence to all. The ultimate purpose of medical technological progress is to serve patients. Xu Lei said, "We not only need to achieve breakthroughs in technology, but also through cooperation, explore the construction of a more complete cardiovascular multimodal image-based intelligent diagnosis and treatment system to bring more benefits to global patients."

The results of the project have now been successfully implemented. They have helped address China's technological weaknesses in CMR, and have also been applied to the clinical research of many hospitals in the UK, the US and other countries. The advanced technologies from China have greatly improved the efficiency and accuracy of Imperial College London's research on cardiac imaging, and promoted the further development of cardiovascular diseases treatment in the UK.

The success of the project has not only had a positive influence in China and the UK, but also brought new hope to the global medical and health industry. The project teams of both countries have nurtured many doctoral students, providing a sufficient reserve of human resources for the future development of global biomedical engineering. In 2023, Professor Yang Guang, a core member of Professor



项目组培养的部分中英两国博士生。项目组供图。

The photo shows some of the doctoral students from China and the UK who have been trained under the project. (Provided by project team)

心血管疾病的诊断和治疗提供更为先进的技术支持。

联影智能联席 CEO 周翔说: "我们的理想是把医疗人工智能带给每一个公民,做到人工智能的普惠普及。我们希望能够借助人工智能的力量,实现全生命周期的健康管理,这将会是人工智能未来发展的广阔天地。"

亦如菲尔曼教授所言: "科学无国界,合作让我们更强大。希望我们的努力,能为全球心血管疾病患者带来更多希望。"(董小涵、刘春涛)

Firmin's team, led a delegation to Beijing to hold technological exchanges such as seminars with Xu Lei and his team of doctoral students. Under the joint guidance of Chinese and British mentors, several doctoral students have made breakthroughs in the field of AI and multimodal image-based diagnosis of cardiovascular diseases. In recent years, the team published many top-level academic articles in internationally renowned academic journals to share the research findings from the project with the world.

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2024年6月,北京安贞医院医学影像科主任徐磊演示项目合作成果。联影智能供图。

 $In \ \textit{June 2024}, \textit{Xu Lei, director of the medical imaging department at Beijing Anzhen \ Hospital, demonstrates \ the \ cooperation \ outcomes \ of \ the \ project.} \ (Provided \ by \ United \ Imaging \ Intelligence)$

Ushering in a New Era of Medical Al

The close full-chain cooperation from technology research and development and functional integration to clinical application between Beijing Anzhen Hospital, United Imaging Intelligence and Imperial College London effectively combines medical AI technological innovation with clinical needs. Not only has it bridged the technological gap in CMR, but it has also deepened the mutual trust and cooperation between China and the UK in the field of health and medical care, and jointly promoted the progress of the global medical and health industry.

In the future, with the continuous advancement of AI technology, cardiac imaging technology will witness more innovations and applications. The project teams will

continue to deepen cooperation, overcome more technological difficulties, and provide more advanced technological support for the diagnosis and treatment of cardiovascular diseases worldwide.

Zhou Xiang, co-CEO of United Imaging Intelligence, said, "Our ideal is to bring medical AI to every citizen and achieve the popularization of AI. We hope to use the power of AI to achieve health management throughout the full life cycle. This will open up vast frontiers for the future development of AI."

"Science knows no borders, and collaboration empowers us. We hope our endeavors will bring renewed hope to cardiovascular patients worldwide," said Firmin. (Dong Xiaohan, Liu Chuntao)



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在系统指挥调度下,物流机器人正在运送实验试剂。晶泰科技供图。

Under the command of the system, a logistics robot is transporting experimental reagents. (Provided by XtalPi)

一粒药片,从靶点验证、药物发现再到临床试验,往往要经历重重 关卡,面临诸多挑战、巨额成本和极高风险。根据塔夫茨大学药物 发展研究中心 (Tufts Center for the Study of Drug Development) 的统计 数据,目前一个新药的研发成本约为 26 亿美元,平均耗时 14 年。 而 AI 等前沿技术的发展,大大推动了创新药物研发进程,不仅起到 了降本增效的作用,更实现了从 0 到 1 的突破。随着 AI 和量子物理、 机器人实验等前沿技术的融合,越来越多的例证为新药研发打开了 可能性之门。 The journey of a single drug tablet, from target validation and drug discovery to clinical trials, is often fraught with obstacles, challenges, immense costs and high risks. According to statistics from the Tufts Center for the Study of Drug Development, the average cost of developing a new drug is around 2.6 billion dollars, taking an average of 14 years. However, the advancement of cutting-edge technologies like AI has significantly accelerated the drug development process, not only reducing costs and increasing efficiency but also enabling breakthroughs from the ground up. As AI converges with other cutting-edge technologies like quantum physics and robotic

瞄准精度与效率,AI+ 量子物理的攻坚克难之路

以 AI+ 量子物理为底层技术, 晶泰科技最先攻克了药物研发中难度 较大的晶型预测提速增效问题, 展现了中国"智"药的实力。

2016年,美国辉瑞公司组织了一场全球晶型预测盲测比赛,来自全球顶尖的生物科技机构和技术公司同台竞技。晶泰科技自主研发的 AI+量子物理算法以 100% 的预测率夺冠,获得了辉瑞十年战略合作伙伴关系和多项国际订单。辉瑞首席科学家杰奥夫·伍德 (Geoff Wood) 说,这次合作改变了辉瑞分子筛选的工作方式,且这一突破将有望改善行业生态。

时间来到 2022 年,在参与辉瑞 PAXLOVID 药物研发过程中,晶泰科技仅用 6 周时间便准确预测了优势晶型,缩短了在传统人工研发模式下 6 个月的药物研发期,加速了药物上市进程。"过去,这一过程耗费太多时间,但有了中国 AI+ 机器人平台的技术支持,我们几乎可以在每个小分子项目上完成测试。"位于康涅狄格州格罗顿市的辉瑞材料科学全球主管布鲁诺·汉考克(Bruno Hancock)如是说。

在晶泰科技的 AI 机器人实验室里,数百台机器人自动化实验室工作站,如同一支训练有素的军队,在调度系统的指挥下工作:试管旋开、粉末称重、精准加料、液体移液、磁力搅拌……实验试剂和耗材被物流机器人准确配送。此外,更多看不见的工作也在有序进行——机器人不仅是执行者,也是记录者,大量标准化的基础数据持续投喂给 AI 算法,帮助科研人员设计实验,优化实验步骤。

"精度和效率是第一位的,必须经得起科学的检验"。在实验室里, 200 多种 AI+量子物理算法模型如同 200 多位探索者,在新药发现的 experimentation, an increasing number of examples are opening up new possibilities for drug development.

Pursuing Precision and Efficiency: The Challenging Path of Al+Quantum Physics

Leveraging AI+quantum physics as its core technology, XtalPi has taken the lead in conquering the challenging problem of accelerating and improving crystal form prediction in drug development, showcasing the power of China's smart drugs.

In 2016, Pfizer, a U.S. company, organized a global crystal form prediction blind test competition, bringing together top biotechnology institutions and technology companies from around the world to compete. XtalPi's self-developed AI+quantum physics algorithm emerged victorious with a 100% correct prediction rate, securing a 10-year strategic partnership with Pfizer and multiple international orders. Pfizer's chief scientist Geoff Wood said that this collaboration has transformed the way Pfizer conducts molecular screening and this breakthrough holds promise for improving the industry landscape.

Fast forward to 2022, in its involvement in the development of Pfizer's PAXLOVID drug, XtalPi accurately predicted the preferred crystal form in just six weeks, significantly shortening the six-month drug development period under traditional manual research methods and accelerating the drug's time to market. "This process used to take too long, but with the support of China's AI+robotics platform technology, we can now test almost every small molecule project," said Bruno Hancock, global head of materials science at Pfizer, based in Groton, Connecticut.

Within XtalPi's AI robotics laboratory, hundreds of robotic automation workstations stand in formation, resembling a well-disciplined army operating under the command of a central system. They perform a symphony of tasks: unscrewing test tubes,

征程上,以 2-5 倍于传统人力模式的速度,通过了默克、辉瑞、强生等医药巨头们的验收,持续为生物医药研究中的瓶颈问题提供着自动化解决方案。

数智平台,与世界比肩

在晶泰科技与美国药企礼来(Eli Lilly)的 AI 小分子新药发现合作项目中, 其数智化平台全程把控数据质量, 将交付的药物候选分子成药性质提升至预定基准之上。

平台首先运用 AI 模型库,探索哪些药物分子组合能激发出最佳疗效。 之后,平台便开始了"智造"之旅,正如设计图纸转化为现实的过程, 数百台机器人工作站将筛选好的药物分子一一合成。随后,平台进 行一系列测试,包括生物化学测试、细胞测试和药理药代测试等, 以判断候选药物分子的有效性及安全性。测试完成后,平台进一步 优化药物分子的设计,改进并达到预期效果。

礼来中国创新合作中心(LCIP)负责人王嵘评价称,这是一次在 AI 领域规模大、难度高的合作,双方都投入了优秀的专业团队和大量资源,在合作中建立了基于 AI 的化合物设计一合成一验证的模式,产出了高质量的创新分子。礼来相信,在 AI 药物研发领域里,中国企业的实力可以比肩全球顶级公司。

践行社会责任,打造思想交流盛宴

晶泰科技 CEO 马健博士介绍称,波士顿的创新实验室以加深创新交流、促进行业协作为已任,定期举办开放日等交流活动,成为前沿药学思想碰撞与智慧交流的纽带。在首次开放日活动中,实验室邀

weighing powders, precisely adding reagents, transferring liquids, and stirring magnetically. Logistics robots ensure the timely delivery of experimental reagents and consumables. Beyond these visible actions, a multitude of unseen processes are also meticulously orchestrated. The robots not only execute tasks but also serve as meticulous record keepers, continuously feeding vast quantities of standardized data into AI algorithms. This data empowers researchers to design and optimize experimental procedures.

"Precision and efficiency are paramount, and our solutions must withstand the scrutiny of science." Within the confines of the laboratory, over 200 AI+quantum physics algorithm models function as a team of explorers, surpassing traditional human methods by two to five times in their pursuit of new drug discoveries. Their dedication has garnered the approval of pharmaceutical giants like Merck, Pfizer, and Johnson & Johnson, who rely on these robots to provide automated solutions for the bottlenecks that hinder biomedical research.

A Digital Intelligence Platform with Global Competitiveness

In a collaborative AI-powered small-molecule drug discovery project between XtalPi and Eli Lilly, a U.S. pharmaceutical company, XtalPi's digital intelligence platform ensured data quality throughout the process, elevating the drug candidate molecules' therapeutic properties above the predetermined benchmark.

The platform initially utilized an AI model library to identify the most effective drug molecule combinations. Next, the platform embarked on a "smart manufacturing" journey, akin to transforming blueprints into reality. Hundreds of robotic workstations synthesized the selected drug molecules one by one. Subsequently, the platform conducted a series of tests, including biochemical assays, cellular tests, and pharmacological and pharmacokinetic studies, to assess the efficacy and safety of



2023 年 7 月,美国学者在晶泰科技创新实验室参观交流。晶泰科技供图。 In July 2023, American scholars visit XtalPi's innovation lab. (Provided by XtalPi)

请了默克、辉瑞、诺华等知名医药机构的科学家,共同探讨 AI 制药与自动化合成的奥秘。在这里,创新实验室如同一位舵手,积极履行对环境以及对社会的责任。它致力于推动联合国可持续发展目标,特别是促进包容性的可持续工业化和创新目标的实现。

当多层次融合成为产业发展的新趋势,当创新平台成为超越传统的进阶打法,站在未来大医学产业发展前沿,以平台为驱动的跨界融合模式无疑为AI赋能医学产业聚集的发展提供了新的思路。(杨博瑶)

the candidate drug molecules. Upon completion of the tests, the platform further optimized the design of the drug molecules, refining them to achieve the desired effect.

Wang Rong, head of Lilly China Innovation & Partnerships (LCIP), lauded the project as a large-scale and highly challenging collaboration in the AI domain. Both parties committed their top-notch professional teams and substantial resources, establishing an AI-based model for compound design, synthesis and validation processes, and yielding high-quality novel molecules. Eli Lilly has expressed

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在系统的指挥调度下,机器人正在做实验。晶泰科技供图。

Under the system's command, the robot is carrying out an experiment. (Provided by XtalPi)

confidence that Chinese companies' capabilities in AI-powered drug discovery are comparable to those of global leaders.

Fulfilling Social Responsibility, Creating a Feast of Intellectual Exchange

Ma Jian, CEO of XtalPi, said the innovation lab in Boston is committed to

deepening innovation exchange and promoting industry collaboration. It regularly hosts open days and other exchange activities, serving as a bridge for the exchange of cutting-edge pharmaceutical ideas and wisdom. At the first open-day event, the lab invited scientists from renowned pharmaceutical companies such as Merck, Pfizer, and Novartis to jointly explore the mysteries of AI-powered drug discovery and automated synthesis. Here, the innovation lab acts as a helmsman, actively fulfilling its responsibilities to the environment and society.



实验室里的机器人工作站与 AGV 小车相互协作,7×24 小时不停歇。晶泰科技供图。

 ${\it The \ robot \ workstation \ in \ the \ laboratory \ and \ the \ AGV \ trolley \ cooperate \ with \ each \ other \ around \ the \ clock. \ (Provided \ by \ XtalPi)}$

It is dedicated to promoting the United Nations Sustainable Development Goals, particularly the goal of promoting inclusive and sustainable industrialization and innovation.

As multi-level integration becomes a new trend in industrial development, and as innovation platforms become a new approach beyond traditional methods, the

platform-driven cross-industry integration model is standing at the forefront of the development of the future big medical industry and providing new ideas for the development of AI-empowered medical industry clusters. (Yang Boyao)



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保险 AI Agent 语音即时转译和智能总结。稀字科技供图。

The Insurance AI Agent can realize real-time speech translation and intelligent summary. (Provided by MiniMax)

"不论用中文还是英文,他都能明白我在问什么,并准确地回答我。"一次国际商务对接会上,亚洲知名保险企业富卫集团 (FWD Group) 人工智能平台负责人马歇尔的一次体验,促成了上海稀宇科技有限公司(以下简称"稀宇科技")的大模型为保险业务赋能,为金融数据安全护航。

在富卫集团首席未来官霍华德看来, "稀宇科技提供了一个有专业 度也有温度的 AI Agent"。未来, 富卫集团将充分利用金融科技来 提高本土化服务能力, 实现对客户需求的精准识别与快速响应, 提 升服务效率和质量。

国际会议上结下保险与 AI 之缘

随着人工智能技术的发展, 凭借强大计算能力和深度学习能力, 大模型在多个领域展现出了巨大价值。大模型的发展, 关键在应用。

"In either Chinese or English, it could understand what I was asking and answer me accurately." This experience at an international business matchmaking event led Marshall, head of AI platform at FWD Group, a renowned insurance company in Asia, to collaborate with Chinese AI startup MiniMax to bring large models to insurance operations and safeguard financial data security.

"MiniMax offers an AI Agent that is both professional and empathetic," said Howard, chief future officer of FWD Group. In the future, FWD Group will fully leverage fintech to enhance its localized service capabilities, achieve precise identification and rapid response to customer needs, and improve service efficiency and quality.

Bond of Insurance with AI at an International Conference

With the advancement of AI technology, large models have demonstrated immense value in various domains due to their powerful computing and deep learning capabilities. The key to large model development lies in its applications.

2023年底在上海举行的一次国际商务对接会议上,霍华德提出: "在全球化背景下,国际保险行业也面临很大挑战。其中,保险经纪人能力参差不齐的问题尤为突出。"在霍华德看来,保险经纪人是连接保险公司与客户的桥梁,其专业素养和服务质量直接关系到保险业务的顺利开展和客户的满意度。

稀宇科技是一家专注研发通用大模型并致力于大模型技术应用的企业,已为多家中国互联网企业研发面向海外用户的大模型软件,也在积极接触海外各领域的头部企业。在这次商务对接会上,稀宇科技的代表向富卫集团展示了文本模态和语音模态模型的落地案例。马歇尔表示: "如果不告诉我这是大模型生成的声音,我完全会以为在和一个真人对话,真的太像了!"

会上的交流,给富卫集团留下深刻印象,合作的大门就此开启。

云上私有化方案护航金融数据安全

金融机构对数据安全的要求远高于其他行业, 这成为稀宇科技与富卫集

"In the context of globalization, the global insurance industry is also facing significant challenges. Among them, the uneven quality of insurance brokers is particularly prominent," Howard stated at an international business matchmaking conference held in Shanghai at the end of 2023. In his view, insurance brokers are the bridge between insurance companies and customers, and their professionalism and service quality directly affect the success of the insurance business and customer satisfaction.

MiniMax is a company dedicated to the research and development of general large models and the application of large model technology. It has developed large model software for many Chinese internet companies to serve overseas users, and is also actively contacting leading enterprises in various fields overseas. At the matchmaking meeting, MiniMax's representatives demonstrated the real cases of text-based and speech-based models to FWD Group. "If you didn't tell me this was a voice generated by a large model, I would have thought I was talking to a real person. It's really too similar!" Marshall said.

The exchange at the meeting left a deep impression on FWD Group, and the door to cooperation was thus opened.

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团合作初期的第一个挑战。考虑到大模型的技术发展态势以及项目的实际需求,云上部署具有更高的灵活性和可扩展性,能支持企业动态调整计算资源和优化训练策略。同时,金融数据安全的要求也不容突破。

通常,金融机构与其他企业的合作多数是用私有化部署来实现数据安全与智能服务并存。针对此,稀宇科技设计了专门针对金融行业的云上私有化方案,既可随着大模型迭代不断升级合作项目的技术能级,也通过技术手段确保所有敏感数据"只进不出";通过数据加密、访问控制等安全措施,有效防止数据泄露和非法访问的风险。同时,该方案还提供了实时审计功能,对数据操作和流量进行全程监控,确保数据操作的合规性和可追溯性。这些措施构筑起一道坚固的安全防线,为金融数据安全保驾护航。

富卫集团看到了云上私有化方案在推动保险业务智能化升级方面的巨大潜力,合作打造保险 AI Agent 的计划浮出水面。

Private Solution on Cloud Ensuring Financial Data Security

Financial institutions have far stricter data security requirements than other industries, which posed the first challenge for MiniMax when cooperating with FWD Group. Considering the development trend of large model technology and the actual needs of the project, cloud deployment offers greater flexibility and scalability, enabling enterprises to dynamically adjust computing resources and optimize training strategies. At the same time, financial data security requirements must not be compromised.

Typically, cooperation between financial institutions and other companies often adopts private deployment to achieve data security and intelligent services simultaneously. To address this, MiniMax designed a cloud-based private deployment solution specifically for the financial industry. This solution allows for continuous upgrades to the technological capabilities of collaborative projects in line with large model iterations, while also employing technological measures to ensure that all



技术团队针对小语种国家特殊场景需求进行方案讨论。稀字科技供图。

 $The \ technological \ team \ discusses \ solutions \ to \ meet \ the \ specific \ needs \ of \ those \ speaking \ minority \ languages. \ (Provided \ by \ MiniMax)$

懂专业又有温度的保险 AI Agent 将服务全球

作为一家具有全球视野的金融服务提供商,富卫集团计划投入更多资源,以加强在东南亚地区的市场布局,希望充分利用金融科技产品来提高在各国的本土化服务能力,实现对客户需求的精准识别与快速响应,提升服务效率和质量。

2024年1月,富卫集团向稀宇科技提出了新的需求,希望尝试实现 针对东南亚小语种的训练,让保险 AI Agent 除了能向中英文客户提 sensitive data "only enters and never leaves." Through security measures such as data encryption and access control, it can also effectively prevent data leaks and unauthorized access risks. Additionally, the solution provides real-time auditing capabilities, monitoring data operations and traffic throughout the entire process to ensure data operation compliance and traceability. These measures form a robust line of defense to safeguard financial data security.

FWD Group recognized the enormous potential of the cloud-based private deployment solution in driving intelligent upgrades to insurance operations, leading

供服务外,还可以服务于东南亚地区的小语种客户。

响应需求,稀宇科技加速了对自研大模型的迭代:收集文本、语音等多种形式的数据,打造东南亚小语种语料库;通过自然语言处理技术和深度学习算法,对语料库进行预处理和特征提取,确保模型能力适合东南亚小语种。

与此同时,还对保险 AI Agent 进行了本地化改造。例如,针对东南亚地区当地的文化习俗和宗教信仰,保险 AI Agent 在与客户沟通时会避免使用可能引起误解或冒犯的言辞;根据当地的法律法规和行业规范,为客户提供合规的保险服务等。

2024年4月,稀宇科技正式发布亚太地区首个商用的万亿参数、MOE架构的大模型"MiniMax-abab6.5"。依托"MiniMax-abab6.5",向富卫集团提交了第一代保险 AI Agent。

经测试,保险 AI Agent 不仅在"智商"方面达到保险经纪人的基础水平,在"情商"方面也表现出色,可以根据客户需求模拟出各种不同的经纪人形象和性格特征,与用户进行自然而流畅的对话。无论是幽默风趣的聊天伙伴,还是严谨专业的业务顾问,甚至是贴心温暖的心灵交流,都能轻松胜任。

正如霍华德所说,"这是一个有专业度也有温度的 AI Agent"。基于保险 AI Agent 在多个应用场景中展现出了高效、精准、创新的特性,

to the joint development of an Insurance AI Agent.

Professional and Empathetic Insurance Al Agent to Serve Global Clients

As a global financial services provider, FWD Group plans to invest more resources to strengthen its market presence in Southeast Asia, hoping to fully utilize financial technology products to enhance its localized service capabilities in various countries, achieve precise identification and rapid response to customer needs, and improve service efficiency and quality.

In January 2024, FWD Group approached MiniMax with a new requirement, hoping to explore training for Southeast Asian minority languages, allowing the Insurance AI Agent to serve not only Chinese- and English-speaking customers but also customers in Southeast Asia who speak minority languages.

In response to this demand, MiniMax accelerated the iteration of its self-developed large models: collecting data in various forms, including text and speech, to create a Southeast Asian minority language corpus; and utilizing natural language processing techniques and deep learning algorithms to preprocess and extract features from the corpus, ensuring that the models' capabilities are suitable for Southeast Asian minority languages.

At the same time, the Insurance AI Agent underwent localization modifications. For instance, considering local cultural customs and religious beliefs in Southeast Asia, the Insurance AI Agent avoids using language that could be misconstrued or



2024年1月,稀字科技联合创始人带队在新加坡与微软进行技术交流。稀字科技供图。

In January 2024, a team led by the co-founders of MiniMax visits Singapore to conduct technological exchanges with Microsoft. (Provided by MiniMax)

富卫集团与稀宇科技签订了战略合作协议。

目前,保险 AI Agent 已实现包括日语、印尼语、泰语在内的多语种覆盖,富卫集团将陆续投用到相关市场。未来,双方团队将继续紧密合作,根据国别市场的特点不断优化保险 AI Agent。(陈云富)

offensive when communicating with customers; it also provides compliant insurance services to customers in accordance with local laws, regulations and industry norms.

In April 2024, MiniMax launched "MiniMax-abab 6.5," the first commercialized 1-trillion-parameter, MOE-based large model in the Asia-Pacific region. Based on "MiniMax-abab 6.5," the company submitted the first-generation of the Insurance AI

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Agent to FWD Group.

After testing, the Insurance AI Agent not only achieved the basic level of an insurance agent in terms of "IQ" but also performed well in terms of "EQ." It can simulate various broker images and personality features according to customer needs and engage in natural and fluent conversations with users. Whether it is needed to be a humorous and witty chat companion, a rigorous and professional business consultant, or even a warm and caring confidant, the AI Agent can handle all situations with ease.

"This is an AI Agent with both professionalism and warmth," Howard said. Due

to the high efficiency and precise and innovative features demonstrated by the Insurance AI Agent in multiple application scenarios, FWD Group and MiniMax signed a strategic cooperation agreement.

Currently, the Insurance AI Agent has achieved coverage of languages including Japanese, Indonesian and Thai. FWD Group will gradually deploy it to the relevant markets. In the future, the two sides will continue to work closely to further optimize the Insurance AI Agent based on the characteristics of markets. (Chen Yunfu)