

## AI 大模型应用的春天正在到来

李中浩

(中国城市轨道交通协会专家与学术委员会荣誉委员,原铁道部科技司副司长、  
信息技术中心主任,正高级工程师)



AI 大模型的应用当今很热,各行各业都在普及 AI 知识,寻找应用场景,希望以此提高企业管理效率,改进产品形态,甚至带来社会的变革。但其中也有一哄而起、走过场的情况。因此有必要定义 AI 大模型的内涵,了解应用 AI 大模型的环境,知道应用 AI 大模型智能体(AI Agent)的产生过程,明白算力、算法、数据的相互关联作用,并懂得智能体嵌入工作流程的研发途径。这样在 AI 大模型的应用浪潮中才不会迷失方向、走弯路。

AI 的概念在计算机技术发展的初期就已出现,定义是用计算机编程实现人类的思维。在数字化转型阶段,AI 引入了自学习能力,即通过训练模型自主优化算法,但计算机自学习的方式仍是模拟人类思维的。进入大语言模型(LLM)时代,AI 正在由从动属性迈向具备一定自主认知能力的“智能体”。在这一阶段,数据的角色不仅仅是信息的载体,更成为 AI 学习和决策的“基本组成单元”,算法亦在重塑知识与认知的范式。一个独立于人类,学习能力更强、记忆能力更强、联想推理能力更强的硅基“大脑”出现了,而且随着 Deepseek 大语言模型出现,对算力的需求只需要 OpenAI 的十分之一,推动了 AI 大模型的广泛应用。企业是否需要构建私有算力平台,要从生产关系的视角权衡。若企业需对 AI 的输出负责,且涉及私有数据与核心技术,构建专属私有算力平台将更具合理性与安全性。

AI 大模型的应用,仅仅有个聪明的“大脑”是不够的,对于各种不同的应用场景,还需要开发出不同的智能体,这些智能体要与工作流程结合起来,要连接数字化应用的专业软件,要监测 AI 大模型推理过程。要能够像人类一样有图像、语言等的感知能力,有计划和执行能力。这些功能还可以形成基本的功能插件,并提供工具平台,由用户进行开发,形成完整的 AI 应用。

AI 大模型应用有三大推动主力。一是 AI 大模型及智能体开发平台供应商,他们提供算力平台和服务;二是各类数字化专业软件供应商,他们在原有软件的基础上增加了 AI 功能;三是各行各业的应用者,他们旨在利用 AI 平台和工具,提升产品核心竞争力,增强企业管理效率。企业在构建具有 AI 大模型功能的数字化架构时,要找准定位,综合利用三大主力的力量。对于制造企业核心竞争力的产品开发、运输企业运输组织等企业特有的业务,必须自己下功夫开发智能体。

AI 大模型的应用对数据有严格的要求,除了数字化要求的数据的准确、及时、完整性以外,还要根据 AI 应用平台的要求,对数据合理的分类、分段、矢量化,数据治理是最基本的工作,是最耗费时间、精力和成本的。这是 AI 大模型应用者最重要的工作!不可能在落后的信息化基础上搞数字化,更不可能在落后的数字化基础上去做智能化。没有符合要求的数据就没有 AI 大模型的成功应用。

在数字化转型的环境中,在大数据平台上进行数据的综合应用,才能实现企业生产关系的转型;大数据平台是建立在云边端的信息化架构上的,“城轨云”的标准化体系为轨道交通 AI 大模型应用提供了良好的基础架构支持。

AI 智能体嵌入工作流程是个迭代发展、螺旋上升的过程,一般会有“参考”“辅助”“取代”几个阶段,很难一蹴而就。一些通用的管理领域,如财务、人力资源在较好的数字化的基础上,借助厂商 AI 化的专业软件,走软件定义企业的道路,可以有效地缩短智能化的过程。AI 大模型的应用是企业管理、产品研发的换代工具,必须拥抱 AI 大模型应用带来的变革,主动探索,赢得先机。也可以理解为这是数字化转型的深化应用,没有数字化的基础,AI 大模型在企业的应用是无根之木。研发、制造、运营、维护等不同类型企业其独有的 AI 应用场景和企业内部财务、人力资源、采购、办公等通用的业务也各有特点,AI 大模型的应用要分域施策。

AI 大模型应用的浪潮已经到来,需要躬身入局,学习应用 AI 大模型的能力,通过 AI 的应用整治数据,优化流程,打造战略性、高价值的应用场景。同时要脚踏实地,夯实数字化转型的基础,遵循数字化建设的基本规律,一步一个脚印扎实推进。AI 大模型应用的春天正在到来。

(下转第 255 页)

- Smart Rail Transit, 2022, 59(6): 86.
- [13] 闵晶晶. 城市轨道交通安防集成平台与智慧安检结合建设方案研究[J]. 智能建筑与智慧城市, 2022(9): 169.
- MIN Jingjing. Research on construction scheme of security integration platform and intelligent security check of urban rail transit [J]. Intelligent Building & Smart City, 2022(9): 169.
- [14] 陆海亭, 付保明, 张宁, 等. 城市轨道交通车站智慧运营管理模式研究[J]. 现代城市轨道交通, 2023(5): 18.
- LU Haiting, FU Baoming, ZHANG Ning, et al. Research on intelligent operation and management mode of urban rail transit stations[J]. Modern Urban Transit, 2023(5): 18.
- [15] 赵书毅, 姬燕男, 杨林, 等. 市域(郊)铁路与其他轨道交通融合模式及选择决策方法研究[J]. 都市快轨交通, 2022, 35(4): 106.
- ZHAO Shuyi, JI Yannan, YANG Lin, et al. Integration mode and selection decision-making method of suburban railway and other rail transit [J]. Urban Rapid Rail Transit, 2022, 35(4): 106.
- [16] 吴蒙, 孟毅美, 荣文笋. 基于安全等级的铁路与城市轨道交通安检互认研究[J]. 大连交通大学学报, 2022, 43(1): 8.
- WU Meng, MENG Yimei, RONG Wenyu. Security check mutual recognition between railway and urban rail transit based on safety level [J]. Journal of Dalian Jiaotong University, 2022, 43(1): 8.
- [17] 陈晓红, 徐敏婕, 陈武华. 考虑成本、等待时间和安全水平的分类安检模式研究[J]. 运筹与管理, 2021, 30(7): 35.
- CHEN Xiaohong, XU Minjie, CHEN Wuhua. Research on classified security inspection mode considering cost, waiting time and security level [J]. Operations Research and Management Science, 2021, 30(7): 35.
- [18] 张宁. 基于安检互认下的京张高铁清河站设计[J]. 铁道勘察, 2022, 48(1): 105.
- ZHANG Ning. Design of Qinghe Station of Beijing Zhangjiakou High-speed Railway based on mutual recognition of security inspection [J]. Railway Investigation and Surveying, 2022, 48(1): 105.
- [19] 丁小兵, 史淦, 洪晨, 等. 地铁安检客流智能引导及组织优化方法研究[J]. 交通运输系统工程与信息, 2023, 23(1): 123.
- DING Xiaobing, SHI Gan, HONG Chen, et al. Intelligent guidance and organization optimization of subway security inspection passenger flow [J]. Journal of Transportation Systems Engineering and Information Technology, 2023, 23(1): 123.
- [20] 赵华伟, 魏子越, 张炳森, 等. 排队论在地铁自动售检票系统中的应用[J]. 铁路通信信号工程技术, 2022, 19(1): 78.
- ZHAO Huawei, WEI Ziyue, ZHANG Bingsen, et al. Application of queuing theory in automatic fare collection system for subway [J]. Railway Signalling & Communication Engineering, 2022, 19(1): 78.
- 收稿日期:2023-09-23 修回日期:2023-11-17 出版日期:2025-06-10  
Received:2023-09-23 Revised:2023-11-17 Published:2025-06-10
- 通信作者:付保明,工程师,baomingfu@126.com
- ©《城市轨道交通研究》杂志社,开放获取 CC BY-NC-ND 协议  
© Urban Mass Transit Magazine Press. This is an open access article under the CC BY-NC-ND license

## Commentary

### Springtime of AI Foundation Model Applications Approaching

LI Zhonghao

(Honorary Member of China Association of Metros Expert and Academic Committee, Former Deputy Director of the Department of Science and Technology, Ministry of Railways, Director of the Information Technology Center, Professor-level Senior Engineer)

The application of AI foundation models is currently a hot topic. Industries of all trades are promoting AI knowledge, seeking application scenarios, and hoping to leverage these technologies to enhance enterprise management efficiency, improve product forms, and even drive societal transformation. However, instances of blind adoption and superficial efforts also exist. It is therefore essential to define the connotation of AI foundation models, understand the environments in which they are applied, grasp the process by which AI foundation model agents are generated, comprehend the interplay among computing power, algorithms, and data, and become familiar with the development pathways for integrating AI agents into workflows. Only in this way can organizations avoid losing direction or taking detours amid the surge of AI foundation model applications.

The concept of AI emerged at the early stages of computer technology development, originally defined as programming computers that simulate human thought. During the era of digital transformation, AI acquired self-learning capabilities, in the sense of optimizing algorithms autonomously through training models, which is still a process mimicking human cognition. With the advent of large language models (LLMs), AI is evolving from a passive tool to an 'agent' with a degree of autonomous cognitive ability. At

this stage, data has transcended its role as a mere information carrier and has become a 'fundamental building block' of AI learning and decision-making. Algorithms are simultaneously reshaping the paradigms of knowledge and cognition. A silicon-based 'brain'—independent of humans, with superior learning, memory, and associative reasoning capabilities—has emerged. Furthermore, with the development of the Deepseek LLM, computing power requirements have dropped to one-tenth of OpenAI models, accelerating the widespread adoption of AI foundation models.

For application of AI foundation models, having a smart 'brain' alone is insufficient. Different application scenarios require the development of corresponding AI agents. These AI agents must integrate with business workflows, connect with professional digital software, and monitor the reasoning process of the AI foundation models. They should possess sensory abilities similar to humans, such as vision and language, as well as planning and execution capabilities. These functions can be modularized into functional plugins and made available on tool platforms for user-driven development, ultimately forming complete AI applications.

Three main driving forces are behind the application of AI foundation models: first, the platform providers of AI foundation models and agents, who offer computing infrastructure and services; secondly, the suppliers of various professional digital software, who enhance their products with AI functionalities; thirdly, the end users across industries, who aim to leverage AI platforms and tools to boost product competitiveness and enterprise management efficiency. When constructing a digital architecture with AI foundation model functionalities, enterprises must identify their position and make comprehensive use of all three driving forces. For business operations unique to a specific industry—such as product development in manufacturing or transportation organization in logistics—enterprises must invest their own effort in developing proprietary AI agents.

The application of AI foundation models imposes strict requirements on data. Beyond the usual digital standards of accuracy, timeliness, and completeness, data must also be properly categorized, segmented, and vectorized according to the needs of AI application platform. Data governance is the most fundamental and labor-intensive task, consuming significant time, effort, and cost. This is the most critical task for any AI foundation model implementer! One cannot build digital solutions on a backward information infrastructure, and intelligent solutions cannot be realized on a poor digital foundation. Without compliant data, there can be no successful application of large AI models.

In a digital transformation context, only by applying data comprehensively on a big data platform can an enterprise transform its production relationships. Such platforms are built on a cloud-edge-terminal information architecture, and standardized systems like the 'urban rail cloud' provide solid infrastructure support for AI foundation model applications in rail transit.

Embedding AI agents into workflows is an iterative and progressive process, typically evolving through phases of 'reference', 'assistance', and eventually 'replacement', while instant success is rare. In general-purpose management areas such as finance and human resources—where digitalization is already advanced—enterprises can leverage AI-enhanced professional software from vendors to follow the path of software-defined enterprises, thus accelerating the journey toward intelligence.

The application of AI foundation models represents a generational shift in enterprise management and product development tools. Enterprises must embrace the transformative potential of AI applications, actively explore their use, and strive to gain advantage. This can also be viewed as a deepening of digital transformation. Without a foundation in digitalization, AI applications in enterprises are like a tree without roots. Different types of enterprises—such as those focused on research and development, manufacturing, operations, or maintenance—have unique AI application scenarios, while internal departments like finance, HR, procurement, and administration also have distinct needs. The application of AI foundation models must follow domain-specific strategies.

The wave of AI foundation model applications is already upon us. It is time to take initiative, build competence in applying AI foundation models, use AI to clean and structure data, optimize workflows, and create strategic, high-value application scenarios. At the same time, it is crucial to stay grounded, strengthen the digital transformation foundation, follow the fundamental principles of digital development, and proceed steadily, step by step. The springtime of AI foundation model applications is indeed approaching.

**Translated by ZHANG Liman**