

JARVIS AI Twin

JARVIS 数字孪生平台

AI Digital Twin Platform for Built Asset Operation & Lifecycle Management
面向建筑资产全生命周期智能运维的 AI 数字孪生平台

Jarvis Intelligent Knowledge Base · Six Practical AI Functions · Full Lifecycle Building Asset Management · Standard Asset Deliverables, All Operations Managed via Central AI Assistant

Jarvis Knowledge+ 知识库 · 六大 AI 实用功能 · 建筑全周期资产管理 · 标准化资产交付资料, AI 智能助手统一管控全部业务

See every asset. Predict every risk. Manage in real time.

全面掌握所有设备状态, 提前预判设备故障风险, 随时随地可视化管控建筑资产。

Executive summary

执行摘要

Large public buildings, industrial facilities and municipal infrastructure have long been troubled by cumbersome manual operation, hidden danger omission, high energy consumption and backward management methods. Traditional paper-based recording, manual patrol and passive maintenance can no longer adapt to modern large-scale asset management needs.

JARVIS AI Twin is an intelligent full-lifecycle digital twin platform for public and corporate facility assets. It deeply integrates BIM 3D models, 360° panoramic images, real-time IoT monitoring data and AI intelligent analysis, building a unified, fully visualized digital asset database. All building facilities, sensor data and inspection records are automatically archived into one traceable digital file, realizing unified data management for the whole project.

Equipped with six core AI capabilities including intelligent object recognition, AI anomaly detection, predictive maintenance, RAG intelligent Q&A engine, 360° eagle-eye panoramic inspection and professional ESG energy efficiency evaluation, the platform completely breaks the limitations of traditional management. It helps projects achieve intelligent risk early warning, unmanned patrol inspection, scientific maintenance arrangement and refined energy-saving management, realizing full-digital, efficient and low-cost lifecycle management for building and municipal assets.

长期以来, 大型公共建筑、产业园区与市政基础设施, 普遍面临运维工作繁杂、安全隐患难以排查、能耗居高不下、管理方式老旧落后等痛点。传统依靠人工巡检、纸质台账记录、坏了再修的被动管理模式, 已经无法满足现代化大型资产的管理标准。

贾维斯 AI 数字孪生平台是面向政企大型资产、市政设施、建筑基建打造的全生命周期智能数字化管理平台。平台深度融合 BIM 三维建筑模型、360°全景影像、物联网实时传感数据与 AI 智能分析技术, 搭建全覆盖、数据统一、智能可视的数字化底座。所有建筑设备、传感数据、巡检记录全部自动汇总至同一数字档案, 实现项目数据统一归集、全程可查、全程可追溯。

平台搭载六大核心 AI 能力: 智能物件识别、AI 异常隐患检测、设备预测性维护、RAG 智能问答知识库、360°鹰眼全景巡检、专业 ESG 能耗评估体系。彻底打破传统人工管理的短板, 实现隐患智能预警、无人化远程巡检、科学化维保排期、精细化节能管控, 帮助各类建筑与市政资产实现全流程数字化、智能化、降本增效的全生命周期管理。

Deployment reference. JARVIS AI Twin has been proven in large-scale government and enterprise park deployments, seamlessly connecting massive volumes of IoT sensors and building management system (BMS) data to deliver efficient space utilisation, intelligent energy optimisation, real-time environmental monitoring and full-lifecycle asset management — with stable performance and mature technology.

部署实绩. JARVIS AI Twin 已在大型政府与企业园区项目中获得实证, 可无缝对接海量物联网传感器与楼宇管理系统 (BMS) 数据, 实现高效空间利用、智能能耗优化、实时环境监测与全生命周期资产管理——性能稳定、技术成熟。

Large, multi-system building portfolios face three recurring structural problems that manual processes are no longer able to resolve at scale.

大型多系统大型建筑群资产集群长期存在三类结构性难题，依靠人工运维已经无法实现规模化管控。

Pain Point 痛点	What It Means in Practice 它在实践中的意义
Asset Scale Outpaces Manual Inspection 资产规模远超人工巡检极限	Municipal portfolios often span dozens of sites and thousands of assets. Conducting gap-free inspections of every corridor, roof, and plant room on a fixed cycle simply exceeds the physical limits of any facilities team. 市政资产组合往往涵盖数十个场址与数以千计的资产。要求设施团队按固定周期对每一条走廊、每一处天台与机房进行无遗漏巡检，已超出人工能力的物理极限。
Hazards Remain Invisible Until Failure 隐患在故障前难以察觉	Defects such as cracks, rust, and leaks often develop silently between scheduled visits. By the time they are reported, minor issues have usually escalated into tangible safety risks. 裂缝、锈蚀、渗漏等缺陷往往在两次例行巡检之间悄然发生。待隐患被上报时，通常已从轻微缺陷演变为实质性的安全风险。
Maintenance is Reactive, Not Predictive 维修模式被动，缺乏预测性	Equipment is typically serviced after failure rather than through proactive prevention. This reactive approach causes unplanned downtime and emergency call-outs, often disrupting services precisely when facility demand peaks. 设备往往在故障后才获维修，而非防患于未然。这种被动响应不仅导致计划外停机与紧急调派，更常在设施使用需求最高峰时引发服务中断。
Energy & Resource Waste Goes Unmeasured 能源与资源浪费难以量化	Without continuous monitoring, inefficiencies like overloaded equipment and climate control in unoccupied spaces quietly accumulate costs and carbon emissions—issues that a single routine inspection cannot detect. 在缺乏持续监测的情况下，设备超负荷运行、无人空间仍开启照明与空调等低效行为，会在不知不觉中累积高昂的成本与碳排放，而这绝非单次巡检所能发现。
Facility Data Lives in Disconnected Systems 设施数据分散，形成信息孤岛	BIM models, IoT readings, BMS logs, and paper records are often siloed in disconnected systems. This prevents managers from accessing a unified view of an asset's identity, location, and real-time performance. BIM 模型、物联网读数、BMS 日志与纸本巡检记录往往分散于互不相通的系统中。管理者无法在同一视图中，全面掌握资产的属性、位置及实时运行状况。

The Prerequisite: AI Must "See" the Asset, Not Just Read a Data Point 破局关键：AI 须“看懂”资产，而非仅读取数据

A generic dashboard can only plot a sensor reading against a threshold. It cannot provide the full asset context: which specific chiller on the third floor generated the reading, what its maintenance history looks like, or whether the anomaly matches a fault pattern seen elsewhere in the portfolio.

普通的仪表盘仅能将传感器读数与阈值进行比对，却无法提供完整的资产背景：该读数源自哪栋大楼三楼的哪台冷水机组？其历史维修记录如何？该异常是否与资产组合内其他地点的故障模式相符？

We anchor every sensor reading, panoramic image, and inspection finding to its exact position on the BIM model. Consequently, an anomaly is never just an isolated number—it becomes a specific, locatable, and traceable asset condition.

我们将每一项传感器数据、每一张全景影像与每一次巡检发现，都精准锚定于 BIM 模型上的对应位置。因此，任何异常都不再是一个孤立的数字，而是具体、可定位、可追溯的资产状况。

JARVIS AI Twin integrates BIM building models, 360° panoramic images, IoT sensor data streams and artificial intelligence analysis into one unified digital twin platform, supporting the operation of six core AI capabilities. Instead of replacing the existing business systems of the team, it connects and docks with established IoT networks and building management systems. It enables staff to view, query and process the status of all building assets on one single platform, realizing centralized and unified management of all operational data.

JARVIS AI Twin 将 BIM 建筑模型、360°全景影像、物联网传感器数据流与人工智能分析技术融为一体，所有数据与功能统一集成在同一套数字孪生平台中，搭载并运行六大核心 AI 能力。产品不会替代各部门现有在用系统，而是适配对接已成型的物联网网络与楼宇管理体系，让工作人员可以在同一个平台上，集中查看、查询、处理所有建筑资产的运行状态，实现各类运维数据的一体化统一管理。

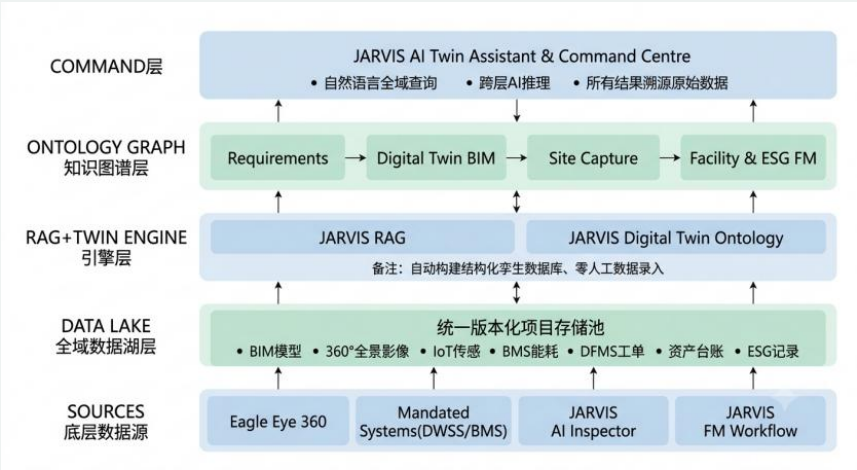
AI Capability 能力	What It Does 功能说明
Automatic Equipment Recognition 设备自动识别	Automatically distinguish walls, air conditioners, water pumps, pipelines and other facilities via on-site photos & 3D scanning files. 上传现场实拍照片、三维扫描文件，系统自动识别墙体、空调、水泵、管线等所有建筑设施。
Equipment Fault Warning 设备故障预警	Auto detect hidden risks including cracks, rust, water leakage and equipment overheating to avoid sudden breakdowns. 自动识别墙体开裂、锈蚀、漏水、设备高温等隐患，提前预警，避免设备突然停机。
Predictive Maintenance 预测性运维	Calculate equipment failure probability based on running data, help you arrange maintenance in advance to reduce breakdown loss. 依靠设备运行数据测算故障发生概率，辅助提前安排保养，减少停机损失。
Conversational AI (RAG) 检索增强对话人工智能	Ask asset, maintenance and inspection information in daily language, no need to check piles of files manually. 用日常口语提问，一键查询设备、维修、巡检全部资料，不用人工翻阅大量台账图纸。
Eagle Eye 360 贾维斯鹰眼 360°全景远程巡检	Complete full building patrol online through panoramic images, cut down frequent outdoor on-site visits. 依托全景影像线上完成整栋建筑巡检，大幅减少外勤现场巡查次数。

89%
Inspection Man-Hour Reduction
巡检人工工时节省 89%

600+
IoT sensors per building
单栋建筑 IoT 传感器

2,000+
BMS data points integrated
BMS 数据点接入

6
Core AI capabilities
核心 AI 能力



JARVIS AI Twin organises all ingested data into a structured knowledge graph that links physical assets, spatial locations, IoT sensor readings, inspection records and maintenance history within a single ontology. Data is ingested automatically through RAG pipelines and knowledge graph construction, without manual data entry.

JARVIS AI Twin 将所有接入数据组织为结构化知识图谱，在统一本体框架内关联物理资产、空间位置、IoT 传感器读数、巡检记录及维保历史。数据通过 RAG 流程与知识图谱自动构建方式接入，无需人工录入。

Layered Entity Structure

分层实体三线对照表

Layer 层级	Core content 核心内容	Fed by 数据来源
Asset 资产层	Building, floor, room, equipment, component — each with a unique digital identity and location. 建筑物、楼层、房间、设备、构件——各自拥有唯一数字身份与位置信息。	BIM model ingestion, intelligent object recognition BIM 模型摄取、智能物件识别
Visual 影像层	360° panoramic captures, photos, scan point clouds, linked to the exact position on the 3D model. 360°全景影像、照片、扫描点云，均链接至三维模型上的精确位置。	Eagle Eye panoramic system, periodic capture rounds 鹰眼全景系统、定期拍摄轮次
Sensor 传感层	IoT readings — temperature, vibration, water, air quality, energy meters — and BMS points, streamed continuously. 物联网读数——温度、震动、水浸、空气质素、能源电表——以及 BMS 数据点，持续实时接入。	IoT sensor network, BMS integration 物联网传感器网络、楼宇管理系统整合
Condition 状况层	Detected anomalies, severity, confidence score, maintenance history, predicted failure window. 已侦测异常、严重程度、置信度评分、维修历史、预测故障时间窗。	AI anomaly detection, predictive maintenance engine 人工智能异常检测、预测性维护引擎
Governance 治理层	Work orders, officer decisions, ESG metrics, audit trail, access log. 工作单、人员决定、ESG 指标、审计追踪、访问日志。	Work order engine, ESG benchmarking, platform audit log 工作单引擎、ESG 基准评估系统、平台审计日志

JARVIS AI Twin embeds a defined set of business rules that govern how AI outputs are generated, flagged and routed. These rules are configurable per project but follow a consistent baseline logic.

JARVIS AI Twin 内嵌成套标准化业务规则，管控人工智能输出结果的生成、异常标记与消息分发流程。各类规则支持分项目自定义配置，同时共用一套统一的基础逻辑。

Rule 管理规则	Logic Applied 逻辑说明
No auto-approval 禁止 AI 自动办结单据	AI flags anomalies and defects for human review; AI does not automatically approve or close work orders or NCRs. AI 仅标记异常、缺陷，交由人工审核；系统不会自动审批或是办结运维工单、不合格项报告（NCR）。 AI only marks equipment faults and hidden risks; all maintenance orders need manual confirmation before execution to avoid management loopholes. AI 仅标记设备故障与隐患，所有维修整改单据必须人工确认后才能执行，避免管理漏洞。
Full traceability 全程可溯源	Every equipment alert, query result and AI analysis report can find its original source data file. 每一条设备告警、查询结果、AI 分析报表，都能找到对应的原始数据源文件。
Scheduling confirmation 维保排期人工确认	The system's early maintenance suggestions must be confirmed by facility management staff before arranging work. 系统给出的提前保养建议，需要设施管理人员确认后，再安排维修工作。
Role-based access 分级人员访问权限	Different posts can only view asset, maintenance and cost data within their scope to ensure data security. 不同岗位员工仅能查看职责范围内的资产、维修、成本数据，保障企业数据安全。
Warranty Fault Responsibility Linkage 质保期故障责任绑定	Faults found within equipment warranty period will be automatically bound to corresponding construction or equipment suppliers for quick rectification follow-up. 设备质保维修期内发现的故障，系统自动绑定对应施工 / 设备供应商，方便跟进整改追责。
Flexible AI Model Switch 自由切换大模型	The underlying large language model is configurable and can be switched between DeepSeek, Qwen, GPT-4o and Gemini without changing the platform's business logic layer. 底层大语言模型支持自定义配置，可在 DeepSeek、通义千问 (Qwen)、GPT- 4o、Gemini 之间切换，不用改动整套平台运维流程。

For all commercial parks, hospitals, shopping malls and infrastructure projects, JARVIS AI Twin can generate complete standardized asset files to support daily asset sorting, internal compliance management and long-term building operation.

针对产业园区、医院、商业楼宇、基建等各类项目，贾维斯 AI 数字孪生平台可生成成套标准化资产文件，支撑企业日常资产盘点、内部合规管理与建筑长期运营。

5.1 Common Questions · 常见咨询问题

- ▶ Which chillers are showing an anomaly this week?
- ▶ Show me every crack finding on Block C in the last quarter.
- ▶ What is the predicted failure window for the rooftop AHU?
- ▶ Draft a work order for the leak detected on Level 5.
- ▶ How does this month's energy use compare with the ESG benchmark?
- ▶ Show me a 360° view of the plant room before I schedule a visit.

Every answer cites the asset, location and record it came from, and can be opened alongside the panoramic image or BIM view. Answers are drawn from the twin's own data — not from open-web recall.

- ▶ 本周哪些冷水机组出现异常？
- ▶ 显示 C 座上一季度的所有裂缝发现事项。
- ▶ 天台空调机组的预测故障时间窗为何？
- ▶ 为五楼所侦测到的渗漏问题草拟一份工作单。
- ▶ 本月能源使用与 ESG 基准相比表现如何？
- ▶ 在安排视察前，让我先查看机房的 360°影像。

每一个回答均引用其所据的资产、位置与记录，并可与全景影像或 BIM 视图并排开启查阅。回答取自数字孪生自身数据，而非来自开放网络的记忆。

Deliverable 交付成果	Contents 内容	Used By 使用者
As-built Digital Twin Model 竣工数字孪生模型 竣工三维数字模型 Completed 3D Digital Model	1:1 3D building model fully matching actual finished site 1:1 三维建筑模型，完全匹配现场完工实景	Facilities management team 设施管理团队 Property & Maintenance Team 物业、设施运维团队
Full General Asset List 完整资产总台账	Full records of all building structures, pipelines & electromechanical equipment 记录建筑全部墙体、管线、机电设备完整信息	Asset Management Supervisor 资产运营负责人
Fault & Rectification Archive 故障与整改记录档案	Store all fault photos and full rectification history 留存所有隐患实拍照片、问题从发现到整改完成全流程记录	Maintenance team 运维团队
Historical Maintenance Orders 历史维修工单档案	Full maintenance records with equipment warranty tracking 完整留存全部维修记录，同步追踪质保期设备问题	Facilities management 设施管理部门
Full Traceable Data Archive 全链路可追溯数据档案	Every record supports source data retrieval for internal asset sorting 设备运行、巡检、维修每条记录均可调取原始数据，满足企业内部盘点需求	Corporate Asset Management Team 企业资产经营管理部

From design, handover to long-term facility operation 从项目设计、竣工移交到长期设施运维

JARVIS AI Twin supports the built asset across seven stages, from design through handover and into long-term facilities management.

JARVIS AI Twin 为建筑资产提供全周期支撑，完整覆盖七大阶段，从方案设计、工程交付，一直延伸至长期设施运维管理。

Stage 阶段	What Happens 执行内容
1. Design Data Integration 设计数据接入	BIM models and design records are ingested into the digital twin ontology. 将 BIM 模型与各类设计档案录入、接入数字孪生知识本体。
2. Construction Monitoring 施工阶段监督	DWSS inspection records and site imagery are linked to the corresponding asset entities. 数码工程监管系统(DWSS)巡检记录及现场影像与相应资产实体关联。
3. As-built Model Creation 竣工模型搭建	The completed construction record is consolidated into an As-built digital twin. 竣工记录整合为 As-built 竣工数字孪生模型。
4.Commissioning&Sensor Onboarding 系统调试与传感器接入部署	IoT sensors and BMS data points are connected and validated. 完成物联网传感器、楼宇管理系统采集点位的接入与有效性校验。
5. Handover & DLP Tracking 工程交付与缺陷责任期追踪	Defects identified during the Defects Liability Period are logged and tracked to closure. 登记缺陷责任期（DLP）排查出的全部问题，全程跟踪直至缺陷闭环整改。。
6. Operational Monitoring 常态化运营监测	JARVIS Eagle Eye 360 inspection, anomaly detection and predictive maintenance operate continuously. 鹰眼 360° 远程巡检、设备异常检测、预测性运维功能全天候持续运行。
7. Long-term Facilities Management 长期设施运维管控	Asset, maintenance and ESG records are maintained as a single auditable digital record for the life of the asset. 在建筑资产整个服役周期内，统一留存资产档案、运维台账、ESG 指标档案，形成一套可供审计核查的完整数字卷宗。

Advantages: The core advantage of the platform's standardized asset data files is proactive risk prevention. It effectively reduces hidden safety hazards, avoids preventable equipment failures, and solves disputes related to inspection records, time and responsible personnel. This visual management platform will not increase work pressure. It centrally aggregates all data, freeing staff from tedious manual inspection and manual account checking work.

优势: 平台标准化资产数据资料的核心优势是**提前预防、主动防控风险**。可以有效减少各类隐蔽的安全隐患，规避原本可以提前预判的设备故障，彻底解决巡检记录、巡检时间、巡检责任人相关的工作争议。这套可视化管理后台不会增加团队工作负担，反而可以集中汇总全部数据，让工作人员告别繁琐的人工核查、手动对账工作。

Formats. Dashboards are accessed via web and mobile; registers and reports are exportable as Excel and PDF; the full record is available via a RESTful API with role-based access control for departments that wish to hold it in their own systems.

格式:仪表板可通过网页及移动端访问；登记册与报告可导出为 Excel 及 PDF 格式；如部门拟将完整记录保存于自身系统，亦可通过具备基于角色访问控制的 RESTful API 提取。

7.1 Core Value

核心价值

- Integrate scattered BIM, sensor, inspection and maintenance data into one unified digital asset archive for easy internal asset sorting.
 - Discover hidden structural and equipment risks in advance to avoid costly large-scale repairs.
 - Automatically generate energy consumption & asset statistical reports with traceable source data, cut manual sorting workload.
 - Compatible with your existing management systems without full replacement; open technical framework free from single supplier binding.
- 打整合分散的 BIM 图纸、传感器、巡检、维修数据，生成一套统一数字资产档案，方便企业内部盘点；
 - 提前发现建筑结构、设备隐藏隐患，避免后期高额大修费用；
 - 自动生成带原始数据支撑的能耗、资产统计报表，省去人工整理台账的工作量；
 - 完美兼容企业现有各类管理系统，无需全部替换；底层技术开放，不会被单一供应商绑定。

7.2 Application Scope

适用领域

- Data centres
 - Hospitals
 - Public campuses
 - Commercial buildings
 - Rail transit
 - Urban municipal lifeline infrastructure
- 数据中心
 - 医院建筑
 - 公共校园
 - 商业楼宇
 - 轨道交通工程
 - 城市市政生命线基础设施

7.3 Deployment Scenarios

落地部署场景

JARVIS AI Twin can be deployed from the design stage of a new asset, introduced at construction handover to establish an As-built digital twin, or applied to an existing operational asset to consolidate historical records and enable predictive maintenance going forward.

JARVIS AI Twin 可在新建资产设计阶段即部署，也可在施工交付节点引入以建立 As-built 竣工数字孪生，或应用于既有运营资产，整合历史记录并支持未来预测性运维。

1	2	3	4	5	6	7
Set up	Ingest	Detect	Review	Act	Report	Carry forward
设置	摄取	侦测	复核	处理	报告	承接

Figures are illustrative of platform scale across deployments; actual configuration varies by project and site. This document is for information only and does not constitute an offer.
上述数据反映平台整体部署规模，实际配置因项目及现场情况而异。本文件仅供参考，不构成要约。