

Xiaoyu WANG Ph. D.



Manufacturing × AI Expert | Intelligent Manufacturing • Digital Transformation • Industrial AI

"Embedding AI into the business value chain" — building business agility, helping enterprises respond to uncertainty with confidence

📍 Shanghai, China | 📞 +86 136 3656 7737 | ✉ xywang@xywang.org
| 🌐 <http://xywang.org>

PROFILE

Twenty years on the front line of manufacturing, with one through-line: embedding AI into the business value chain to create real business value. What sets me apart are two "fusions":

- **Technology × business:** I understand both AI and the business, and my core strength is architecture design — modelling the business and the AI in the same systems language, grounded in cybernetics and complex-systems theory, so that "where and how AI creates value" becomes a **designable, engineerable** question rather than a matter of luck
- **Industry × academia:** twenty years of hands-on practice with a deep feel for manufacturers' real pain points and organisational realities, combined with continuous study of complexity science, cognitive science, AI and applied mathematics — using first-principles understanding to guide how industry uses AI

The methodology is distilled in my monograph *Industrial Digital Transformation: Systematic Methods and Agile Practices* (China Machine Press, 2025), which answers one core question: how to make AI create business value.

CORE STRENGTHS

- **Fluent in both AI technology and business insight:** I have personally built industrial AI (operations-research optimisation, intelligent control, machine learning, AI agents) and I know the business of a manufacturer's two value chains — **R&D** (design systems, modelling & simulation, intelligent products) and **operations** (process, equipment, quality, planning & scheduling, supply chain) — so I start from the real business bottleneck and put AI where it creates the most value
- **Cross-domain innovation grounded in complex systems:** reading a business through structure and causal feedback, pursuing global optima rather than point fixes; transferring solutions across industries — lithium-battery coating control migrated to reverse-osmosis membrane manufacturing, battery scheduling algorithms re-engineered for automotive parts
- **Solid engineering delivery:** twenty years across hardware (mechanical, electrical, control) and software (algorithms, data, LLMs); "delivery is king" — solutions must run, ship, and stay stable in production, carried from algorithm prototype to mass production

EDUCATION (1997 – 2007)

2004 – 2007	Xi'an Jiaotong University (China "Double First-Class" A)	Ph.D. • Power Electronics & Electric Drive
2001 – 2004	Xi'an Jiaotong University	M.Sc. • Control Theory & Control Engineering
1997 – 2001	Xi'an Jiaotong University	Dual B.Sc. • Electrical Engineering + Business Administration

EXPERIENCE (2007 – PRESENT)

- First decade — complex intelligent equipment R&D (GE Global Research, Envision Energy): led development and mass production of complex industrial equipment, building the CPS paradigm at device level — intelligent equipment, intelligent control, software-defined hardware
- Second decade — intelligent manufacturing, operations & business digital transformation (Sany Heavy Industry, ATL as Chief Engineer of Intelligent Manufacturing, founding Huiyan Intelligence): migrated the device-level CPS paradigm to factories and operations, designing AI-embedded data pipelines from the customer-value perspective, so the business responds to demand swings, supply disruptions and equipment anomalies quickly, precisely, and optimally

Shanghai Huiyan Intelligent Technology — Founder 2024.01 – present

- Consultant in industrial digitalisation and AI, focusing on engineering deployment of AI agents and operations-research optimisation in manufacturing and supply chains.
- Ningbo Huaxiang (NBHX, top-100 Chinese auto-parts group) — Chief Digitalisation Expert Advisor, covering both value chains:
 - Intelligent planning & scheduling: designed and deployed an injection-moulding scheduling system fusing LLMs with classical operations research — humans prepare rules and data, AI builds and solves the optimisation model (CPLEX) and generates visual reports, humans review and release
 - R&D digitalisation (three-layer AI+R&D programme: efficiency → design assistance → simulation intelligence): deployed AI extraction of customer SOR requirements and intelligent BOM processing; architected a simulation capability centre (expert rule trees + AI diagnosis) and AIGC-assisted styling design
 - IoT & intelligent injection moulding: process-parameter monitoring, machine-condition monitoring and data acquisition, cycle-time optimisation — "precise regulation guided by data"
 - Feymer Technology (listed water-treatment chemicals company, 40+ countries) — Chief Digitalisation Advisor: built an Advanced Process Control (APC) layer above DCS — closed-loop polymerisation lines with significant cost and capacity gains; mechanism model + MPC temperature auto-cruise, published at IEEE ICAIM 2025
 - Also serving Yonggang Group (steel) and Crystal Optech (advanced optics); AI Faculty at Hundun Academy (2025 -), teaching "How Traditional Manufacturing Creates Value with AI"

ATL (Amperex Technology Ltd., world-leading lithium battery maker) — Chief Engineer, Intelligent Manufacturing

2021.01 – 2024.01

Group digital-transformation blueprint, technology innovation and organisational enablement; built and led the industrial AI algorithm team. Signature work:

- Process digitalisation (multi-factor yield improvement): led overall planning and business architecture; introduced semiconductor-industry yield management (YMS) and failure-analysis (FA) methods, modelling cross-process couplings to upgrade quality from batch-level SPC to cell-level "dynamic process control — take care of every single cell"
- Energy optimisation: 30% energy saving in the coating process; roughly 800 GWh saved cumulatively
- Automatic closed-loop coating control: cracked the industry-wide coating-uniformity problem (borrowing from the structurally similar paper-making industry), replacing artisan shim adjustment with an MPC continuous closed loop — stable micron-level thickness control
- Planning digitalisation: three-tier master/daily/micro planning around IBM CPLEX for 1M+ cells/day — scheduling cut from one week to hours ($\approx 90\%$ efficiency gain), live in production; sustained a >50% delivery surge in 2022

Sany Heavy Industry — Director, Industrial Software Institute / Data Scientist

2019.04 – 2020.03

Founded and led the institute; the digitalisation practice I led helped Sany's piling-machinery plant become the World Economic Forum's first "Lighthouse Factory" in global heavy industry (2020).

- Smart-factory central control centre: microservice platform integrating lines/AGV/MES/SAP, flexible line control for mass customisation, factory digital twin; APS (CPLEX / OptaPlanner)

Santa Fe Institute (USA) / Aalborg University (Denmark) — Visiting Scholar

2018.03 – 2019.03

- Studied the fusion of complexity science, AI and industrial problems at the world's leading complexity-science centre — complex-systems theory became the foundation of my transformation methodology

Envision Energy (world-leading smart wind-turbine company) — Deputy Director, Electrical R&D Centre

2009.12 – 2017.11

Led R&D of converters, turbines and substation products.

- Converter product from 0 to 1: in-house 1.5–4 MW converters to mass production — 3,000+ units, cumulative output value over RMB 2 billion
- A world-class weak-grid problem: redesigned adaptive turbine control — distributed wind on long 10 kV feeders went from 20% curtailment to full output, 500-hour acceptance with zero faults; built a high-fidelity simulation & model-consistency assessment system — dozens of turbine models LVRT-certified by China EPRI on numerical simulation, helping change industry certification practice
- Intelligent turbines & next-gen control platform: dual-mode control raising AEP 0.5–2%; deep-learning online fault diagnosis; merged main/converter/pitch control for integrated turbine design optimisation

GE Global Research — Lead Research Engineer

2007.07 – 2009.12

- Control algorithms and software for GE's first industrial centralised PV inverter (US assignment); 10 MW high-speed drive control for GE Oil & Gas

INDUSTRY IMPACT

Monograph: *Industrial Digital Transformation: Systematic Methods and Agile Practices*, China Machine Press, 2025 (ISBN 9787111772514) — core ideas: the virtual-physical interplay of intelligent data flow $\rightleftharpoons$ business value flow, the digital space driving operations via an OODA loop (observe → orient → decide → act); cybernetic circular causality for business dynamics; fusing industrial mechanism models with large AI models for interpretability and generalisation

Standards: voting expert, IEC TC8/SC8A — international standards on power-system stability, power quality and renewable grid integration; State Grid standard on virtual-synchronous-generator wind turbines

Papers & patents: 7 US/Chinese invention patents (145 citations); 20+ papers (incl. SCI, 74 citations); 2025 IEEE paper on industrial AI agents — Google Scholar

Talks & teaching: AI Faculty, Hundun Academy (2025–), 1,300+ paying attendees per course (Hundun: 5M registered users; clients incl. Siemens, Mercedes-Benz, Bayer, P&G); long-running public lecture series on complexity science and industrial digital transformation (2019–, lecture list)

TECHNICAL RANGE (PHYSICAL WORLD → INTELLIGENT DECISIONS)

Equipment & hardware (power electronics, embedded & edge) → Data & connectivity (industrial IoT, time-series DBs, ETL & data modelling) → Algorithm spectrum (mechanism modelling & simulation $\rightleftharpoons$ grey-box modelling $\rightleftharpoons$ operations research $\rightleftharpoons$ statistics, causal inference & ML) → Software engineering (backend, web frontend, visualisation) → AI-native stack (knowledge bases & RAG, agent orchestration, context engineering, AI-assisted development)

Languages: fluent spoken and written Chinese and English