Phan Minh Dang Khoa

Principal Engineer — Automation, AI & Industrial Systems | Milwaukee Tool (TTI Group)

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36+	7+	2,400+	6	Global
SYSTEMS	YEARS	COMMITS	DOMAINS	MANUFACTURING

SUMMARY

Principal Engineer with 7+ years of experience bridging industrial automation, IoT, data platforms, and AI in manufacturing environments. Proven track record delivering end-to-end solutions from embedded devices and test systems to cloud platforms and intelligent business applications. Experienced leading cross-functional teams and driving digital transformation initiatives at global scale.

TECHNICAL SKILLS

Languages	Python, TypeScript, JavaScript, C/C++, C#, PHP, SQL, VBA	**Frontend**	React 18, Vue.js, Next.js, Material-UI, Vite, Tailwind CSS, LVGL
Backend	Flask-RESTX, FastAPI, Express.js, Laravel, Prisma	**AI / ML**	Azure AI Foundry, Claude, RAG, pgvector, Document Intelligence, AI Search, Mem0
IoT / Embedded	ESP32, MQTT (EMQX), BLE, I2C/SPI/UART, CAN Bus, Modbus, FreeRTOS, OTA	**Industrial**	NI LabVIEW, PLCs (Siemens, Mitsubishi), SCADA, HMI, DAQ
Database	PostgreSQL, MongoDB, Redis, Neo4j, ClickHouse, InfluxDB, SQLite	**Data Platform**	Azure Data Lake, Databricks, Spark, Kafka, MQTT, ETL Pipelines
DevOps	Docker Compose, Azure AD SSO, CI/CD, Git, Nginx, Linux	**Hardware**	PLC (Siemens, Mitsubishi), Servo, NI DAQ, Sensors, Arduino, STM32, Test Fixtures

EXPERIENCE

Principal Engineer
2026 — Present

Milwaukee Tool (TTI Group)

Own the technical vision and architecture for 36+ production systems spanning AI, IoT, web platforms, industrial automation, and data engineering. Integrated AI-powered assistants using Azure AI Foundry and document intelligence to support knowledge retrieval, document generation, and engineering workflows. Drive the full IoT data pipeline from sensor to cloud across global manufacturing operations.

Senior Software Engineer & Team Leader
2024 — 2026

Milwaukee Tool (TTI Group)

Led a multidisciplinary team of engineers and technicians delivering factory-scale automation, IoT, and software projects. Built and deployed a vendor management platform used across multiple engineering teams, reducing RFQ processing time and improving project visibility. Delivered 8+ ESP32 IoT firmware systems and real-time Grafana floor monitoring providing visibility for environmental monitoring points across the facility.

Software Engineer
2021 — 2023

Milwaukee Tool (TTI Group)

Built the first digital systems for the test lab — lab dashboards, data query services, Python desktop tools. Every tool born from real pain points observed on the factory floor.

FabLab Specialist
2020 — 2021

Eastern International University

Managed university fabrication lab (3D printing, CNC, laser cutting). Mentored students on IoT and embedded systems.

Technician
2019 — 2020

Tetra Pak

Operated world-class packaging lines — PLC, SCADA, HMI systems. Learned what a fully automated, deeply integrated factory looks like.

KEY HIGHLIGHTS

- Built a **35+ module platform** that unified lab operations, equipment tracking, vendor management, IoT monitoring, and AI intelligence into one system
- Integrated **AI-powered assistants** using Azure AI Foundry and document intelligence to support knowledge retrieval, document generation, BOM extraction, and engineering workflows
- Led **cross-functional teams** delivering AI, IoT, software, and industrial automation projects from concept through production deployment
- Built **8+ ESP32 firmware** systems with OTA updates, auto-calibration, and real-time field device & environment monitoring
- Created **10+ LabVIEW** test applications covering airflow, force, vibration, sound, and life-cycle testing
- Developed and published **custom plugins** for third-party platforms (Grafana, etc.) — extending systems when off-the-shelf features fall short

SELECTED PROJECTS

Smart Lab Platform — AI + Web Platform
`35+ modules · 500+ commits · 30+ pages`
Unified 35+ module platform managing the entire lab and factory operation — from equipment tracking, fixture management, and testing schedules to vendor purchasing, IoT device monitoring, and AI-powered intelligence. AI-powered assistants support knowledge retrieval, document generation, BOM extraction, and predictive maintenance workflows. Reduced development effort for standard business modules from several days to a few hours through reusable architecture and AI-assisted development workflows.

Vendor Management — Enterprise Platform
`759 commits · 1,481 files`
Spun out from Smart Lab to handle factory-wide vendor operations. Used by engineering and sourcing teams to manage vendor onboarding, RFQs, project tracking, and delivery schedules across multiple product development programs. Real-time notifications keep all stakeholders aligned without email chains. Integrated with corporate Azure AD for single sign-on across the organization.

ESP32 IoT Firmware Suite — IoT / Embedded
`8+ firmware systems · 200+ devices deployed`
Fleet of industrial IoT edge gateways deployed across 200+ devices supporting environmental monitoring and equipment telemetry. Each device monitors conditions (temperature, humidity, pressure, dust levels) and sends data to the central platform via MQTT. Remote firmware updates eliminate the need for physical access. Fault detection and auto-calibration reduce false alarms and manual intervention.

LabVIEW Test & Life Test Controller — Industrial Automation
`10+ applications · Multi-type testing`
Designed and deployed automated test systems supporting reliability, airflow, force, vibration, acoustic, and lifecycle testing. Integrated NI DAQ, PLCs, MQTT, and centralized data platforms for real-time monitoring and long-term analytics. Custom MQTT library bridges legacy LabVIEW infrastructure to the modern IoT platform.

Grafana Floor Panel + T-HMI Sensors — Visualization + IoT
`Published on GitHub · Open Source`
Interactive factory floor map that shows real-time environmental data from wireless sensors across the building. Facility team monitors temperature, humidity, and differential pressure zones at a glance. Open-sourced the Grafana plugin — used by the community for similar floor-plan visualization needs.

Engineering Toolbox — Productivity Suite
`10+ tools · Desktop & CLI`
Collection of internal tools that solve daily engineering pain points: high-speed video analysis for product testing, life-test data viewer with encrypted cloud storage, 3D printer fleet discovery, CCTV health monitoring, and DevOps migration utilities. Each tool was built because an engineer asked for it.

EDUCATION

Bachelor of Engineering in Automation & Control Engineering — Eastern International University (EIU)

PORTFOLIO & LINKS

Website: pmdk.xyz — Full portfolio with project details and AI journey narrative
GitHub: github.com/khoapmd — Open-source Grafana plugins, IoT firmware, and engineering tools
LinkedIn: linkedin.com/in/khoapmd