

ABU HUZAIFAH BIDIN

Industrial AI Engineer | Experienced Process Engineer

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PROFESSIONAL SUMMARY

Senior Engineer pivoting to AI with 13+ years of domain expertise at PETRONAS. Bridging the gap between heavy industry and modern AI by deploying **Liquid Neural Network (LNN)** and **Large Language Models (LLMs)** for operational control. Winner of the 2025 PETRONAS Innovation Garage Hackathon. Architect of the 'MEGAT' AI Assistant (RAG) and 'ORACLE' Anomaly Detection System.

TECHNICAL SKILLS

AI & ML	Transformers (Training from scratch), PyTorch, TensorFlow, PINNs, LNNs, LLMs (Ollama, RAG), Computer Vision, LSTM.
Cloud & DevOps	AWS, Azure VM, Vercel, Linux Bash Scripting, Docker, Ollama (Local Deployment), GCP, Git/GitHub (CI/CD).
Data & Web	Python (Pandas, Scikit-learn), SQL, React.js, Tailwind CSS, Streamlit, Firebase, MongoDB, Supabase, SciPy (Optimization).
Industrial	Aspen HYSYS, PETROSIM, SPIRAL Network/Plan (LP), HAZID/HAZOP.

EXPERIENCE

Universiti Teknologi PETRONAS

Postgraduate Researcher (AI in O&G)

Remote / Perak

May 2025 - Present

- Developing novel **Hybrid Energy Based-LNNs architectures** for industrial furnace control, focusing on thermodynamic constraints and dynamic excess oxygen optimization.
- Implementing "Energy-Based Models" to reduce fuel consumption and carbon emissions in non-linear control systems.

PETRONAS (Petroleum Nasional Berhad)

Senior Supply and Manufacturing Executive

Melaka, Malaysia

Oct 2024 - Present

- Value Chain Steering:** Orchestrated strategic optimization between Refining assets and the Trading arm, capturing **more than 3 million USD** in realized enterprise value through agile crude selection and product manufacturing steering.
- Network Linear Programming (LP):** Architected complex multi-site LP models using **Spiral Plan & Network** for 5-Year Strategic Planning (KPBI). Harmonized constraints across multiple refinery networks to optimize long-term asset utilization and margin targets.

Senior Process Engineer (Project Armaya)

Oct 2023 - Oct 2024

- Deployed as Resident Engineer at Chevron Lummus Global (USA) to steer Design Feasibility Studies for the joint PETRONAS-PERTAMINA hydroprocessing complex.
- Led process simulation and sensitivity analysis using **Aspen HYSYS**, generating synthetic data used to validate plant design parameters under stochastic conditions.
- Optimized heat and material balances, utilizing data analytics to identify bottlenecks and improve thermodynamic efficiency.

Senior Operation Engineer

Nov 2019 - Oct 2023

- **MEGAT (AI Assistant):** Architected and deployed a RAG-based virtual assistant integrating Power BI with Python/LLMs. Automated complex operational reporting, reducing man-hours by 90% and enabling natural language querying of plant data.
- **ORACLE (Anomaly Detection):** Developed a time-series anomaly detection system using **LSTM AutoEncoders**. Successfully identified process deviations in real-time, securing a Top 10 finish in the Group-wide Analytics Hackathon.
- Engineered predictive maintenance algorithms for reactor temperature control, resulting in **RM 10M+ in cost avoidance** through early fault detection.

Process Governance Executive

Jan 2016 - Oct 2019

- Full-stack development of the **Safety Critical Bypass Web Application**. Digitalized manual safety workflows into a centralized database, winning the **Gold Award at ICQCC Japan**.
- Engineered a crisis solution by deploying the plant's first-ever Portable Boiler during critical failure, averting a 48-hour shutdown.

KEY PROJECTS

Furnace Commander | Python, LNNs, Industrial Control

2025

- **Recognition:** Presented at UTM Conference & Winner of UTP Research Poster Competition.
- Built a revolutionary AI-powered furnace control system leveraging **Liquid Neural Networks (LNN)**. Designed for edge deployment with real-time adaptation to highly dynamic operational conditions.

Aliran Tunai | Vision LLM, WhatsApp API, React

2025

- **Recognition: 1st Place Winner**, PETRONAS Innovation Garage (PING) Hackathon.
- Engineered a **WhatsApp-based financial bot** utilizing **Vision LLMs** to automatically parse receipts and record transactions from user uploads.
- Leveraged the Meta API to deliver a frictionless bookkeeping interface for SMEs, validating the business model's commercial viability through a winning pitch.

MEGAT AI Assistant | LLMs, Power BI, RAG Architecture

2023

- **Recognition: Innovation Award Winner**, PETRONAS RMT Innovation Week.
- Architected a neuro-symbolic virtual assistant leveraging the **Microsoft Power Platform (Power BI, Power Automate, Power Apps)**. Integrated Python and LLMs to deliver a fully automated reporting engine, streamlining complex operational workflows.

HONORS & AWARDS

- **1st Place Winner**, PETRONAS Innovation Garage Hackathon. 2025
- **Gold Award**, ICQCC Tokyo (International Convention on Quality Control Circles). 2019
- **Top 3 Finalist**, CA AI Ideathon (GenAI Track) - Developed LLM Virtual Assistant. 2023
- **Innovation Award**, PETRONAS RMT Innovation Week. 2022

EDUCATION

Universiti Teknologi PETRONAS

Perak, Malaysia

- M.Sc. in Information Technology (AI Research) Ongoing
- B.Eng. in Chemical Engineering 2012