

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 <i>Postgraduate Researcher (AI in O&G)</i>	Remote / Perak <i>May 2025 - Present</i>
<ul style="list-style-type: none">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 (Petroliam Nasional Berhad) <i>Senior Supply and Manufacturing Executive</i>	Melaka, Malaysia <i>Oct 2024 - Present</i>
<ul style="list-style-type: none">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.	
<i>Senior Process Engineer (Project Armaya)</i>	<i>Oct 2023 - Oct 2024</i>
<ul style="list-style-type: none">Deployed as Resident Engineer at Chevron Lumus 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**. Digitized 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