Muhammad Haerul, S.Kom

AI Full-Stack Specialist (Engineer, Researcher, and Trainer)

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PROFESSIONAL SUMMARY

AI Full-Stack Specialist with 4+ years of hands-on experience building, researching, and deploying production AI systems, Computer Vision pipelines, and modern web architectures. Graduated with Cum Laude honors (GPA 3.97/4.00) in Computer Science from Hasanuddin University. Experienced in training 2,000+ professionals and students across Indonesia in Generative AI, PyTorch, and Full-Stack Engineering.

WORK EXPERIENCE

Co-Founder (AI & Product Lead) — AksaraHub Nusantara

Jan 2026 – Present

Leading AI and Product development and data analytics for AksaraHub.id — script recognition (OCR), local-language translation, AI-powered educational tools, and digital preservation of Indonesian regional scripts and languages.

Tech: Product Management, AI Development, Data Analytics

AI Trainer — RevoU

Jul 2025 – Present

Mentoring and training hundreds of professionals and students on foundational through AI, prompt and context engineering, and Generative AI applications.

Tech: Prompt Engineering, Context Engineering, AI Applications, Generative AI Applications, AI Agents

AI Engineer — Paper.id

May 2024 – Jun 2025

I was part of the AI Product and Enablement team, focusing on researching, building, and deploying production AI systems — from intelligent document processing (OCR & KYC) to agentic chatbots and semantic search. Projects: 1. Paper OCR LLM: Developed an OCR system to classify and process KYC/KYB documents (ID Card, Tax ID Number, Business Registration Number) using LLMs and FastAPI, achieving 99% OCR accuracy and reducing processing time to 4 seconds per document. 2. Paper AI Agentic Chatbot: Researched and developed an AI chatbot to assist employees with HR-related inquiries using company-specific data, powered by LLMs (OpenAI, Gemini) and Flowise. Deployed the chatbot into the company Slack workspace, achieving 99% response accuracy, handling over 100 Q&A interactions, supporting 20+ unique users, and delivering responses in under 30 seconds, available 24/7 during the launch period. 3. Paper-Intelligent-Search: Developed an AI-powered search engine combining keyword search, vector search, and LLM-based semantic search, significantly improving data accessibility by understanding the context and intent of queries. 4. Paper AI Development (In House): Developed a comprehensive suite of AI models for document processing using YOLOv8 and FastAPI. Designed to detect, classify, and process various document types with over 90% accuracy, integrated with FastAPI for seamless handling. Tools included Receipt Detector (detecting, separating, cropping, and classifying receipts), KTP Detector, QRCode Extractor, and Meterai Classifier (distinguishing between physical and electronic duty stamps). 5. Paper OCR Adjustment and Enhancement: Created ImageProcessingOCR for processing invoices and receipts, optimizing image quality (brightness, contrast, sharpness, noise, and skewness) using OpenCV. Achieved a 10% improvement in OCR accuracy, a 40% reduction in document size, and a 50% increase in processing speed for OCR. 6. Paper KYC Face Recognition Development: Extracted, transformed, and loaded over 40,000+ KYC records using BigQuery. Developed the ImageFaceProcessor for face detection, orientation analysis, and vectorization using YOLOv8 and InsightFace. Implemented face recognition capabilities by integrating (InsightFace + MongoDB + Marqo.ai) for efficient face insertion and search functionality. 7. Paper AI Chatbot Multi-Agents RnD: Researched and developed an AI chatbot for employees using LangChain and Flowise.ai, incorporating conversational, retrieval, chain, and agent tools. Integrated with LLMs (ChatGPT, Gemini, and Claude), along with OCR and RAG tools, successfully deploying to the Paper Slack workspace.

Tech: LLMs, AI Agents, OCR, FastAPI, YOLOv8, OpenCV, LangChain, Flowise, InsightFace, MongoDB, BigQuery

Computer Vision Engineer — Masa Research

Jul 2024 – Sep 2024

Researched, developed, and deployed computer vision models and machine learning pipelines for automated geological mineral identification, color segmentation, and mineral content estimation. Projects: 1. Mineral Shape Detector & Segmentator: Collected and labeled over 1,000+ mineral images, including soil and boulder samples. Fine-tuned a model for mineral detection and segmentation using YOLOv8 and YOLO-World. Developed a Python program for precise

mineral detection and segmentation. 2. Mineral Color Detector & Segmentator: Extracted color palettes from 1,000+ segmented mineral images and matched each to the closest known mineral web colors. Developed a color segmentation algorithm to analyze pixel distribution for minerals. Utilized Python (OpenCV, ColorThief, and Numpy) for accurate color matching and segmentation. 3. Mineral Content Regressor: Extracted, transformed, cleaned, and analyzed over 1,000+ mineral records using Python. Performed feature engineering, feature selection, and principal component analysis (PCA) for model optimization. Trained a mineral regressor model using a range of algorithms, including Linear Regression, Ridge Regression, Random Forest, Support Vector Machine, and Neural Networks.

Tech: Machine Learning, Feature Engineering, Object Detection, Image Segmentation

AIoT Engineer — XL Axiata

Aug 2023 – Dec 2023

I was part of the 5G AI-IoT Use Case Development Project (X-Camp) under the Technology Strategy & Assurance division and New Ventures & Technology Incubation department, focusing on researching, building, and deploying edge computer vision models and real-time AIoT monitoring systems. Projects: 1. RoadInspecX: Compiled a diverse dataset of 45,000+ road damage images from global locations, categorized into four damage types. Developed a robust Road Detector YOLOv8 model with a 78% accuracy rate, enabling both image and video detection of road damage, and a program providing detailed damage summaries. 2. Helomet.v2: Curated a dataset of 10,000+ Personal Protective Equipment (PPE) images and built a high-accuracy (84%) PPE Detector using YOLOv8, designed for real-time identification in industrial settings on Raspi 4. 3. EyeCatching: Managed a dataset of 2,000+ person and head images, creating models using YOLOv8 for head and person detection. Developed a program capturing headcounts in images and videos, complete with an intuitive monitoring dashboard. 4. Fuse Inspection.v2: Created TensorFlow-based models for fuse and anomaly detection, optimized code, and compiled comprehensive project documentation.

Tech: YOLOv8, TensorFlow, Computer Vision, Edge AI, Raspberry Pi, IoT, Dashboards

AI Software Engineer — Ministry of Education, Culture, Research & Technology

Feb 2023 – Jun 2023

Part of Artificial Intelligence RnD Project. Projects: 1. Exploring ChatGPT: Conducted a comprehensive literature review of over 5+ relevant papers to explore and research the potential applications of ChatGPT in the field of education. 2. Proposing Educational Application Ideas: Proposed three educational application ideas: Personalized English Learning, Automatic Answer Grading, and a Lesson Plan Creator, leveraging the capabilities of ChatGPT. 3. Personalized English Learning App: Developed a web-based application called Personalized English Learning, utilizing OpenAI's ChatGPT to tailor language learning experiences for individual users.

Tech: NLP, Prompt and Context Engineering, Software Development

EDUCATION

Bachelor of Computer Science — Hasanuddin University

September 2020 – July 2024

Honors: Cumlaude • **GPA:** 3.97 / 4.00 (GPA)
Thesis: Development and Comparison of PPE Detection Models in Industrial Workers Based on Computer Vision

CORE SKILLS & TECHNOLOGIES

Programming: Python, JavaScript, TypeScript, SQL, C++, Bash / Shell

Data Analytics and Engineering: Pandas, NumPy, Scikit-Learn, Google BigQuery, PySpark, Matplotlib / Seaborn

Computer Vision: OpenCV, YOLOv8 / YOLO11, PyTorch, MediaPipe, Roboflow, Tesseract OCR

Natural Language Processing: Hugging Face, BERT & Transformers, spaCy, NLTK, Sentence-Transformers, Tokenizers & RegEx

Generative AI: Google Gemini, OpenAI GPT-4o, Anthropic Claude, Ollama, Prompt Engineering, vLLM

AI Agents: LangChain, LangGraph, CrewAI, Flowise, n8n, Agentic RAG

SELECTED HONORS & AWARDS

- **Open The Gate Hack 2025** (PT Bahana Security Sistem (BSS Parking)) — 🥇 *1st Place Winner*
- **AI Hackathon Competition (TECHNOART 2025)** (Universitas Bunda Mulia (UBM)) — 🏆 *Best Creativity Winner*
- **AI Talent Hub Indonesia 2025** (Universitas Indonesia X PT Pertamina (Persero)) — *Top 20 Finalist*
- **Kompetisi Website Budaya Nusantara (aksarahub.id)** (Media Cloud Indonesia X PANDI (.id)) — *Cultural Web Innovation*
- **Graduated Cumlaude (Highest Honors)** (Hasanuddin University) — *GPA 3.97 / 4.00*
- **Makassar Hackathon 2024** (Dispora Makassar X BINAR) — 🥈 *2nd Place Winner*