Saruulsaikhan Sainnyam

AI / ML Engineer

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SUMMARY

Machine learning engineer with a B.Sc. in Nanoscience and Engineering, building and deploying computer vision, document AI and retrieval-augmented generation (RAG) systems in production. Much of this work runs under tight constraints (CPU-only on-premise inference, low-resource Mongolian language data), which has made efficient, hardware-aware deployment one of my strengths.

PROFESSIONAL EXPERIENCE

Machine Learning Engineer, Rookie Systems | Sep 2025 – Present

Lead AI projects end to end: client scoping and requirements, system design, model training and deployment.

- **Mongolian bank-statement OCR (in production, on-premise):** Designed a five-stage pipeline (image correction, text detection, a Mongolian text recognizer trained from scratch on ~950k text images, layout and table-structure models), shipped as an encrypted CPU-only on-premise system. Replaced an EasyOCR baseline and optimized for CPU inference with ONNX export and INT8 quantization, cutting processing time from 20 to 30 seconds to 3 to 5 seconds per page (about 6x faster) and model size from 14 MB to 4 MB. Running in production at multiple banks.
- **Retail shelf analytics (in production):** Built a product-counting system for retail shelf photos (YOLO11 detectors for 49 product types and shelf structure) and the post-processing that turns detections into merchandising metrics. Used across ~3,000 retail outlets by field and management teams.
- **eKYC identity verification (multi-bank):** Trained the models for ID document detection, Mongolian ID-card OCR and face matching used in remote customer onboarding, now rolling out to several Mongolian banks and lenders.
- **Japanese enterprise RAG and document classification (AIBOO):** Led the design and delivery of a retrieval-augmented system on AWS Bedrock for a Japanese enterprise client, combining semantic and keyword search with grounding checks so the system

declines to answer rather than hallucinate. Passed client acceptance testing.
- **Educational RAG chatbot (sole engineer):** Built a grade-aware tutoring assistant over scanned Mongolian math textbooks, with OCR and safeguards against hallucinated answers. Used by ~1,500 students across 5 schools.

Software Developer (Contract), Innovestment | Aug 2025 – Sep 2025

- Took over an XGBoost pipeline that classifies bank-statement transactions to estimate a person's true income and expenses; fixed the edge cases causing production failures and made it faster and more robust.

Technology Engineer, MIRAPRO (ミラプロ) | Sep 2024 – Aug 2025

Hardware and software role on AI-based image inspection and IoT systems for a Japanese manufacturing company.

- Trained and evaluated defect-inspection models for manufacturing lines and built the image preprocessing stage, which sped up processing and improved detection of small defects.
- Drew electrical schematics and design drawings in SolidWorks Electrical for the company's inspection and IoT systems.
- Supported communication between the Japan headquarters and the Mongolian team, including onboarding and technical training for new hires.

EDUCATION

B.Sc. Nanoscience & Engineering, National University of Mongolia | Sep 2020 – Jun 2024

- Average grade 87.7/100 (GPA 3.3/4.0)
- Diploma thesis: Synthesis of Silver Nanoparticles of Various Shapes and Study of Their Properties (written in Mongolian). Supervisor: Assoc. Prof. N. Erdene
- Relevant coursework: nanophysics, nanoelectronics, fundamentals of electronics, algorithms, data structures, linear algebra, probability

RESEARCH EXPERIENCE

SEM Image-Analysis Pipeline, National University of Mongolia

Research project with a Japanese industry partner

- Built a pipeline combining classical image features with pretrained models to automate labeling of scanning electron microscope (SEM) images, reducing manual labeling time by about a third.

Diploma Thesis: Shape-Controlled Silver Nanoparticles | Supervisor: Assoc. Prof. N. Erdene

- Synthesized silver (Ag) nanocubes, nanospheres and nanorods and characterized their shape-dependent properties using UV-Vis spectroscopy, SEM and XRD.

Industry Feasibility Study: Copper Nanoparticle Production | Under Prof. Ch. Ganzorig

- Assessed how Erdenet Mining Corporation could establish a copper nanoparticle production facility, covering process design, equipment sourcing, staffing and cost estimates.
- Reviewed international production methods and presented the findings as reports and presentations in Mongolian.

AWARDS

- NEDO Challenge "Baggage-Loading Robot" Contest 2 (SIGNATE, Oct 2026): ranked 22nd of 1,180 teams in a team of two; designed and developed the team's algorithm.
- Tech Sprint hackathon, Financial Regulatory Commission of Mongolia: 2nd place, improving on 3rd place in the previous edition.

ACTIVITIES

- SusHi Tech Tokyo 2026 (April): took part with Rookie Systems, with support from JICA; connections made there led to the AIBOO enterprise RAG project.
- Founder, university game-dev club: grew it to ~35 active members through workshops and game jams.
- University and industry exchange: helped coordinate visits and meetings between NUM and Japanese companies and professors.

SKILLS & CERTIFICATIONS

- **Languages & ML:** Python, PyTorch, ultralytics/YOLO, OpenCV, scikit-learn, XGBoost, Hugging Face; RAG, OCR, computer vision, LLM integration

- **Infra & tooling:** Docker, Linux, Git, FastAPI, Celery, PostgreSQL/pgvector, Redis, SQL; AWS (Bedrock, ECS, Aurora, S3)
- **Hardware design:** SolidWorks Electrical
- **Spoken languages:** English (IELTS 7.5), Japanese (JLPT N3; conversational, currently studying reading and writing), Mongolian (native)
- **Certifications:** Google IT Automation with Python; AWS Cloud Practitioner