HYSTON KAYANGE

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Seoul, South Korea

Professional Summary

AI Research Engineer with over 3 years of experience in discriminative and generative AI, including recommendation systems, computer vision, large language models (LLMs), and Retrieval-Augmented Generation (RAG). Also skilled in full-stack development, with over 4 months of hands-on experience using React, Next.js, and the MERN stack (MongoDB, Express.js, React, Node.js). Passionate about leveraging AI in an industrial setting to tackle real-world challenges and promote business growth.

Skills

- **AI (Machine Learning and Deep Learning):** Discriminative AI, Recommendation Systems Algorithms, Generative AI, Retrieval-Augmented Generation (RAG), and Computer Vision.
- **Programming:** Python (Pandas, NumPy, Scikit-learn, TensorFlow, Keras, PyTorch), Java, C++, ML pipelines, APIs.
- **Databases:** MySQL, MongoDB, SQLite, Firebase, Supabase.
- **Tools and Platforms:** Jupyter, Google Colab, Docker, GitHub, AWS (SageMaker), Hugging Face, Postman.
- **Research:** Data Analysis, Data Cleaning, Visualization, Model Evaluation, Literature Review.
- **Web Development:** HTML, CSS, JavaScript, React, Next.js.

Experience

- **Assistant Researcher** — Seoul, South Korea
  System Software Lab, Soongsil University — Sept 2022 – Feb 2025
  - Worked collaboratively with a Korean team member on the *"XR Twin-based Rehabilitation Training Content Technology Development"* project (IITP/MSIT-funded, Project No. 2022-0-00218), as part of the Digital Twin research team. Focused on AI-driven rehabilitation technologies. Responsibilities included performing data analysis and developing a hybrid heart rate prediction model to support AI-driven custom coaching through personalized fitness recommendations.
  - Led research on probabilistic and adaptive feature selection (ProAdaFs) for deep recommender systems (DeepFM, DCN, Wide & Deep), improving AUC to 0.8088.
  - Authored 3 peer-reviewed papers (1 journal, 2 conferences) on personalized fitness recommendations and feature selection.
- **ICT Manager** — Mzuzu, Malawi
  United Civil Servant SACCO - Head Office — Sept 2021 – Aug 2022
  - Managed Fintech systems and network infrastructure, ensuring 99.9% uptime across banking operations
  - Maintained databases for financial operations and reporting.
  - Handled hardware maintenance and software troubleshooting in the head office and branch locations

Projects

- **AI Personal Portfolio Chatbot (May 2025 – Present)**
  - Built and deployed a portfolio-based AI assistant chatbot using Retrieval-Augmented Generation (RAG) and OpenAI LLMs. [Live Demo].
  - Integrated Qdrant vector store with LangChain for semantic search across uploaded resumes and articles.
  - Developed full-stack features including a secure admin dashboard and user interface. [GitHub]

  - Tools: Next.js, TypeScript, LangChain, OpenAI, Qdrant, Firebase, Vercel.

- **XR Twin-based Rehabilitation Training Content Technology (July – Oct 2024)**
  - Performed data analysis
  - Developed a hybrid heart rate prediction model for the XR Twin project to support AI-driven custom coaching through personalized fitness recommendations. The model achieved an average mean absolute error of 5.1 BPM in predicting an individual's heart rate during workouts.
  - Tools: Python, PyTorch, Jupyter, Pandas, NumPy, DBNs.

- **Feature Selection Tool (Dec 2023)**
  - Developed a Python-based Feature Selector Tool for automated data preprocessing, feature importance analysis, and visualization, supporting classification and regression tasks.
  - Tools: Python, Scikit-Learn, Feature-Engine, Seaborn, Matplotlib.

- **Mthandizi: Communication Tool for the Deaf (Nov 2020 – June 2021)**
  - Developed a real-time sign language translation system with 87% accuracy using TensorFlow, CNN and OpenCV, featuring a PyQt5 interactive UI.
  - Tools: Python, TensorFlow, CNN, OpenCV, PyQt5.

Education

- **MSc in Computer Science and Engineering** — Seoul, South Korea, GPA: 4.14/4.50
  Soongsil University — Sept 2022 – Feb 2025
  - Thesis: "A Multi-Model Machine Learning Framework for Personalized Fitness Recommendations Using DBNs and LSTMs".

- **BSc in Information Communication Technology** — Lilongwe, Malawi, GPA: 3.30/4.0
  Daeyang University — Sept 2017 – Sept 2021

Licenses & Certification

- **Generative AI Fundamentals** — View Credential
  Databricks — May 2025 – May 2027

- **Introduction to Retrieval-Augmented Generation (RAG)** — View Credential
  Duke University (Coursera) — May 2025

- **Fundamentals of LLMs (The LLM Course)** — View Credential
  Hugging Face — May 2025

- **React Foundations for Next.js** — View Credential
  Vercel — May 2025

- **Next.js App Router Fundamentals** — View Credential
  Vercel — May 2025

Publications

C.1 H. Kayange et al. (2024). "ProAdaFs: Probabilistic and Adaptive Feature Selection in Deep Recommendation Systems." *ICOIN Conference*, Vietnam. DOI

C.2 H. Kayange et al. (2023). "Deep Adaptive Feature Selection in Deep Recommender Systems." *Korean Society of Information Science*, Jeju Island. DOI

J.1 H. Kayange et al. (2024). "A Hybrid Approach to Modeling Heart Rate Response for Personalized Fitness Recommendations." *Electronics*, Vol. 13, Issue 19. DOI

- **Google Scholar Profile:** Google Scholar

Languages

- **English:** Fluent
- **Korean:** Beginner