

Haychan Shin

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EDUCATION

University of Cambridge, Gonville and Caius College

October 2020 - June 2026

MEng, BA (Hons) Electrical Engineering and Information sciences

- Master's Dissertation Topic: Reconstructing 3D Object Motion from Videos: Developed deep learning architecture for spatio-temporal 3D reconstructions of quadrupeds from monocular video footage.
- Relevant Modules: Linear Algebra, Probability Theory, Information Theory and Coding, Data Transmission, Signals and Systems, Computer Vision, Probabilistic Machine Learning, Software Engineering, Accounting and Finance

SKILLS

Languages: Python, JavaScript, Octave, HTML, CSS, SQL, VHDL, C

Frameworks & Technologies: PyTorch, Tensorflow, HuggingFace, NumPy, pandas, Matplotlib, Seaborn, Flask, PyQt5, FastAPI, Git, Docker, Postman, MongoDB Atlas, SQLite, ChromaDB, LangChain, Ollama, AWS EC2

WORK EXPERIENCES

3D Reconstruction Researcher | Republic of Korea Army

December 2023 - May 2025

Python • Pytorch • FastAPI • Neural Radiance Fields • QGIS

- Contributed to the Space Systems team to design and implement a novel Deep Learning platform for improved terrain depth estimations under noisy illuminated satellite imagery, achieved 10% improved SSIM scores.
- Recognised with a Major-General's award after presenting research findings to senior military officials at Korea's largest defence exhibition, highlighting initiative and technical expertise.
- Initiated and organised meetings with a major defence firm to evaluate commercial solutions, showcasing proactive communication and networking ability.

Electrical Engineering Intern | TTP plc

July 2023 - September 2023

Python • Altium Designer • PCB Design

- Spearheaded the development of a dynamic ray-traced model in Python for a novel optical alignment system culminating in improved detection area and precision.
- Designed, populated and tested PCB designs for sensor arrays system in Altium Designer, evaluating accuracy and optical reflection properties.
- Built a large electronics panel, pneumatics system, and casing (screen fitting instrumentation, large cable connections, groundings) to deliver multiple test rigs to clients for respiratory device application.

PROJECTS

DJ Y - LLM Powered Assistant for Music Recommendation (Demo Video: <https://youtu.be/OErWRW5bmPE>)

Web Scraping • RESTful APIs • LLMs • CNNs • RAG • TTS (ElevenLabs)

- Built an AI-driven assistant that recommends music by analyzing lyrics sentiment and audio features derived from a custom CNN model for metric extraction such as genre, energy, acousticness for recommendation engine.
- Integrated Spotify Web API with real-time web scrapers to provide personalized listening experience alongside contextual information such as weather and trending news.
- Improved user engagement through natural voice interaction from prompt-engineered LLM and Text-To-Speech AI for seamless spoken dialogue.

Shazam Clone - Music Identifier (<https://shorturl.at/VbWLA>)

Python • AWS • RESTful APIs • MongoDB

- Engineered a high-accuracy music recognition system that identifies songs from short audio clips using a custom frequency-time hashing algorithm with O(1) lookup efficiency, achieving 78% accuracy in real world noisy environments.
- Developed and deployed a scalable, containerized API to AWS EC2 for song matching and library updates, leveraging **MongoDB Atlas** for fingerprint storage and integrating **SQL** for metadata mapping, enabling optimized retrieval across hybrid storage systems.

Vibralis Medical (On-going)

- Non-invasive percussion device for detecting fluid (blood, pus, ascitic fluid) or solid masses in various parts of the body for diagnosing conditions (pneumothorax, pleural effusions) through tympanic/resonant audio classification.