Kanay Gupta

Sydney, NSW — kanayg@icloud.com — 0480 121 598 — [LinkedIn](#) — [GitHub](#) — [Portfolio Website](#)

EDUCATION

University of New South Wales (UNSW)   February 2023 — Expected December 2026
Bachelor of Advanced Computer Science (Honours)

- Achieved Faculty of Engineering Dean's Honours List (2023).
- WAM: 86 (High Distinction)

PROJECTS

AI-Powered Job Ad Information Extraction (SEEK Industry Group Project)
Tech Stack: Python, PyTorch, HuggingFace, Scikit-learn, Pandas, Gemini API, TinyLlama

- Led a comparative analysis of three distinct models for a SEEK-sponsored project: a traditional Scikit-learn baseline, a fine-tuned open-weight LLM (Pythia), and the proprietary Gemini API.
- Engineered and fine-tuned a Pythia-160m model with custom prediction heads, reducing MAE by over 95% compared to the logistic regression baseline.
- Benchmarked the Gemini API, establishing its state-of-the-art performance (MAE <$1k) for numerical extraction, and built the foundational dataset by annotating 50+ samples to achieve a 94% inter-annotator agreement.

Ray Tracing Engine from Scratch in Rust - [GitHub](#)
Tech Stack: Rust, Multithreading

- Architected a high-performance, multithreaded path tracing engine in Rust from the ground up without the use of external crates, implementing physically-based materials (metals, dielectrics), a configurable camera with depth-of-field, and texture mapping.
- Leveraged Rust's concurrency primitives (Arc, Mutex) to parallelize rendering, achieving a 7.16x performance increase on a 16-core CPU compared to a single-threaded approach.

Health Tracking Web App (Hackathon Project)
Tech Stack: React.js, Next.js, Tailwind CSS, Gemini API

- Spearheaded the development of a core feature: an AI-powered natural language food-to-calorie estimator by integrating the Gemini API.
- Engineered the React front-end and managed state for a personalized calorie tracker and a user-facing blog, delivering a fully functional prototype within the 48-hour hackathon timeframe.

Game Engine Memory Analysis for CS:GO
Tech Stack: Python, Windows API, Reverse Engineering

- Conducted in-depth reverse engineering of the CS:GO game engine to map critical memory structures for real-time player and game-state data.
- Engineered a Python-based external tool to directly manipulate game memory, capable of both reading game-state for a custom visual overlay and writing to memory to programmatically control player input.

Autonomous Tetris Agent with Computer Vision
Tech Stack: Python, OpenCV, PyAutoGUI

- Engineered an autonomous Tetris agent by creating a computer vision pipeline in Python and OpenCV that performs real-time screen analysis to determine optimal block placement, consistently clearing 40 lines in 15 seconds, a performance ranking within the top 3 of global player leaderboards.

EXPERIENCE

Cluey Learning
High School Tutor   April 2023 - Ongoing

- Mentored 15+ students from Year 9 to Year 12 in various concepts from Mathematics Standard to Mathematics Extension 1 leading to an average grade increase of over 20% for long-term students.
- Designed personalized learning plans and provided curriculum feedback to supervisors, resulting in improved student engagement and course materials.

SKILLS

- **Languages:** Python, Rust, TypeScript/JavaScript, Java, C#, SQL, HTML/CSS
- **Frameworks and Libraries:** React.js, Next.js, Node.js, Tailwind CSS, OpenCV, PyAutoGUI, HuggingFace, Scikit-learn, Pandas
- **Developer Tools and Platforms:** Git, PostgreSQL, Linux, Bash, Unity, LaTeX, Windows API, Gemini API