Yinghan Ma

+44 7594 723656 | yinghan.ma.mike@gmail.com | yinghanma.com | linkedin.com/in/yinghan-ma | github.com/Michaelmayinghan

Summary

MEng Robotics & AI student at University College London with hands-on experience in machine learning, autonomous robot navigation, embedded systems, and control theory. Co-authored and published at DAML 2024. Seeking a software engineering or AI internship to apply path-planning and LLM integration experience in a real engineering environment. Portfolio and projects: yinghanma.com

Education

University College London (UCL) — London, UK
MEng in Robotics and Artificial Intelligence — *Expected June 2029*

Engineering & Research Experience

Advanced Regression Framework for House Price Prediction | *Python, XGBoost, Feature Engineering*2024 (Co-authore

- **Built** a regression pipeline on **1,460 samples** × **81 features**, applying one-hot encoding (43 categorical variables), normalization of 35 numerical features, and missing-value imputation.
- **Reduced multicollinearity** via correlation-matrix analysis (threshold $r > 0.8$); benchmarked Linear Regression, Decision Tree, Random Forest, and XGBoost.
- **XGBoost achieved best results**: $R^2 = 0.9143$, MSE $= 6.57 \times 10^8$, outperforming all baselines; all authors contributed equally to the published work.

Autonomous Robot Navigation & AI Interaction System | *Python, KD-Tree, Dijkstra, Ollama Qwen2.5, Signal Processin*

- **Implemented** Dijkstra (binary min-heap, $O((V+E)\log V)$) and BFS for optimal path planning and TSP-style multi-stop routing on a real-world Olympic Park map.
- **Built** a balanced **KD-Tree** from scratch via recursive median-splitting, improving nearest-neighbour query speed by **87.3%** ($O(n) \to O(\log n)$; avg. 0.00522 s → 0.00066 s).
- **Integrated** a local LLM (**Ollama Qwen2.5**) for real-time NL command parsing, resolving mid-conversation intent changes and triggering dynamic trajectory re-planning via Dijkstra.
- **Processed** IMU/GPS signals using trapezoidal integration and **Savitzky-Golay filtering**; classified six motion phases (stop, slow-walk, normal, fast, accelerating, turning) with empirically tuned thresholds.

Smart Autonomous Security Safe System | *C/C++, Arduino Uno R4, UART, Embedded Systems* — Mar. 2026

- **Architected** a **dual-microcontroller master–slave system** over UART, decoupling biometric authentication logic from autonomous locomotion control.
- **Integrated** fingerprint sensing (capacitive DSP, 80-template storage), **TF-Luna LiDAR** (ToF, ±6 cm), and a **NAU7802 24-bit ADC** load cell for multi-modal threat detection.
- **Developed** event-driven firmware: unauthorised access or weight tampering triggers a 2400 Hz alarm and autonomous tracked evasion; door-timeout condition emits a 2 Hz reminder tone.
- **Engineered** a worm-gear locking mechanism with encoder closed-loop feedback for high-torque resistance and reliable lock/unlock state verification.

Wind Turbine Pitch Control System | *MATLAB, Simulink, Control Theory, State-Space Modelling* — Mar. 2026

- **Derived** a **3rd-order state-space model** ($\dot{x}=Ax+Bu$) from first principles, capturing blade pitch angle, motor angular velocity, and armature current.
- **Designed** a **lead-lag compensator** increasing closed-loop bandwidth 4× to 18.48 rad/s, maintaining phase margin $> 65°$ and $K_v \geq 20$ for ramp steady-state error < 0.05.
- **Applied** full state-feedback **pole placement** (ζ=0.7, ω_n=33.00 rad/s) under a 10 326 V actuator constraint; achieved rise time **0.067 s**, overshoot **4.36%**, zero steady-state error.
- **Validated** robustness against model uncertainty $\Delta G(s)=(s+5)/20$ via Bode, Nyquist, and root-locus analysis.

Technical Skills

Languages: Python, C/C++ (Embedded), Java, MATLAB, JavaScript, SQL
AI & Machine Learning: XGBoost, Scikit-learn, Pandas, Feature Engineering
LLM & Generative AI: Ollama, Qwen2.5, Prompt Engineering, Local LLM Deployment & Integration
Robotics & Control: State-Space Modelling, Pole Placement, Simulink, Signal Processing, Path Planning (Dijkstra, KD-Tree)
Hardware & Tools: Arduino, UART/I2C/SPI, LiDAR, 24-bit ADC, Git, Linux, LaTeX

Additional

Languages: English (IELTS 7.0), Mandarin (Native)
AP Scores: 5 in Calculus BC, Physics C Mechanics, Physics 1, Computer Science A, Macroeconomics; 4 in Statistics, Environmental Science, Microeconomics
Competitions: Australian Mathematics Competition (AMC) — Distinction (2022), Credit (2021); Math Kangaroo — Bronze (2022)