NITANSH THAKER

BSc General Engineering – Cyber Systems
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Research Profile

Cyber Systems engineering student at the Technical University of Denmark with experience spanning reinforcement learning, simulation, embedded systems, and mission-control engineering. Currently developing autonomous decision-making strategies for battery and local-energy-market operation and building reliable software for interaction with physical systems. Seeking research opportunities in autonomous systems, learning-enabled robotics, and cyber-physical systems; intends to pursue an MSc in Autonomous Systems.

Education

BSc General Engineering – Cyber Systems Sep 2024 – May 2027
Technical University of Denmark (DTU) *Denmark*

- Approximate weighted average: **10.27/12** across graded courses, excluding pass/fail courses.
- Selected **12/A grades**: Embedded Systems Programming, Functional Programming, Physics, Introduction to Cyber Systems, Computer Programming, and Mathematics 1a.
- Relevant coursework: Embedded Systems Programming; Introduction to Cyber Systems; Computer Programming; Functional Programming; Formal Methods; Agile Object-Oriented Software Development; Mathematics; Statistics; Physics; design-build engineering projects.

Research and Engineering Experience

Research Intern – Reinforcement Learning for Local Energy Markets Jun 2026 – Aug 2026
PHAETHON Centre of Excellence *Cyprus*

- Develop a Python simulation of a residential prosumer with photovoltaic generation, electricity demand, battery storage, grid import/export, and time-varying market-price signals.
- Implement and compare autonomous control strategies including a transparent rule-based baseline, tabular Q-learning, Expected SARSA, and Dueling Deep Q-Networks.
- Design state representations, discrete action spaces, reward functions, exploration behaviour, and terminal handling for constrained battery and market decisions.
- Model battery state-of-charge and operating constraints together with grid transactions, then benchmark economic and operational behaviour against the baseline using simulation outputs and data analysis.
- Extend the environment toward price–quantity bidding and local-market interaction, studying sequential decision-making under uncertain production, consumption, and prices.

Mission Control Engineer Sep 2025 – Jun 2026
DanSTAR Rocketry – Technical University of Denmark *Denmark*

- Rebuilt the rocket mission-control timeline as a single flowchart-aligned state machine, clarifying mission phases and phase-specific Continue, Abort, and Reset logic.
- Designed a binary command protocol with strict payload and state validation and implemented ACK-confirmed transitions to prevent software state from advancing before flight-computer confirmation.
- Contributed to queued asynchronous command handling and ZeroMQ-oriented messaging for reliable, non-blocking communication between mission-control and flight-computer software.
- Built and extended a Python flight-computer simulator supporting state progression, command handling, UDP discovery, log emission, and hardware-free scenario testing.
- Developed test modes, validation rules, logging, and debugging workflows to improve repeatability and diagnose integration issues across software and physical-system interfaces.

Selected Technical Projects

Embedded Sports Timing and Control System Jan - Feb 2026
Embedded Systems Programming, DTU – C, ESP32

- Integrated ultrasonic sensing, temperature/humidity sensing, stepper-motor control, IR input, OLED and seven-segment displays, RGB feedback, and PWM audio on an ESP32.
- Implemented I^2C device communication, sensing-driven lap detection, environmental warning logic, and hardware/software integration in a four-person Git/GitHub workflow.

Web-based IoT Monitoring and Control Dashboard Mar–Apr 2025
Cyber Systems, DTU – ESP32, MicroPython

- Built an ESP32 web server exposing REST/JSON endpoints for real-time sensor and GPIO data over Wi-Fi.
- Implemented remote monitoring and control through HTML/JSON endpoints and HTTP response logic, with deployment and troubleshooting documentation.

Automated Wordle Solver with Visual Perception Feb–Apr 2025
Personal project – Python, OpenCV, OCR, Streamlit

- Built a real-time assistant that detects a game board from screenshots using OpenCV and OCR tools including Tesseract and EasyOCR.
- Implemented colour classification, state extraction, heuristic word filtering, and live feedback visualisation to recommend subsequent actions.

Instruction-Set Architecture Simulator Feb–Mar 2025
Cyber Systems, DTU – Python

- Implemented a modular simulator for arithmetic, logic, memory, and branching instructions, modelling registers, memory, parsing, and program execution.
- Validated behaviour with control programs and test cases and documented the architecture and verification methodology.

Additional Research, Engineering, and Leadership

Engineering Intern – Lab Engineering, Remedica Jul 2025 – Aug 2025
Produced GMP-compliant technical documentation and standardised laboratory workflows for audit readiness and reliable execution.

Lance Corporal, Cyprus National Guard Jul 2023 – Aug 2024
Awarded the Red Battle Emblem for top-10 performance in a structured operational environment.

Chemical Research Partner Nov 2022 – Apr 2023
Stockholm Junior Water Prize Competition *Limassol, Cyprus*

- Co-authored a project on mitigating salinity effects on agriculture; placed fourth nationally and collaborated with a university-affiliated water and health laboratory on experiments and data processing.
- Synthesised and evaluated an AgAlFe coagulant and measured water-quality parameters including pH, conductivity, sodium, chloride, and hardness.

Manufacturing Engineer Nov 2020 – Jul 2022
F1 in Schools Competition *Cyprus and UK*

- Designed and simulated aerodynamic car bodies in SolidWorks, adapted designs to CNC manufacturing constraints, and contributed to a team that placed third nationally and qualified for the World Finals.

Languages

English (native) | Gujarati (native) | Greek (proficient) | Hindi (advanced) | Danish (beginner)