Hassan M. Hammoud

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EDUCATION

American University of Beirut (AUB) Sep. 2021 – Jun. 2026

- BEng Mech. Eng. (Control & Robotics Focus Area), 4.0/4.0.
- BS Applied Math (Minor: Comp. Sciences), 4.0/4.0.
- Recipient of the USAID Higher Education Scholarship & Education Above All Qatar Scholarship.

Related Coursework: Machine Learning, Graphical Models, Stochastic Models, Nonlinear Optimization, Nonlinear Systems.

WORK EXPERIENCE

Association of Energy Engineers, Systems Engineering Intern — Beirut, Lebanon Jul. 2024 – Sep. 2024

- Optimized PV systems improving energy output by 10% via analysis of recorded tilt-angle and energy data.
- Designed solar solutions for a residential complex in Mataley, Liberia, achieving 28% reduction in carbon footprint.

Ark Energy, Energy Analyst Intern — Dubai, UAE & Antelias, Lebanon May 2024 – Jul. 2024

- Conducted ASHRAE Level 3 audits for 18 40-floor buildings in the UAE, identifying ∼$2M in annual energy savings.
- Analyzed data on Power BI and evaluated energy performance as part of Siemens' M&V plan.

RESEARCH & POTENTIAL PUBLICATIONS

Analysis of an SIRS Epidemic Model on a Contact Network

- Analyzed a continuous-time mean-field approximated Markovian network model on weighted graphs.
- Built a simulation pipeline to study phase transitions and convergence behavior across heterogeneous network topologies.

Autonomous Targeting of Pine Processionary Moth (PPM) Nests via a Multirotor Drone

- Mapped experimental data into a five-stage force profile to engineer for depth control (2–4 mm).
- Developed a hierarchical FSM-driven ROS/PX4 Gazebo stack coordinating GPS nav, visual servoing, and task execution.
- Integrated and tuned a MINCO trajectory planner for real-time replanning at 2 m/s on a 7.5 m horizon.

RELATED PROJECTS

Context-Aware Autonomous Navigation for Complex Environments (Dean's Creative Achievements for Best FYP)

- Developed a stereo-vision deep-learning pipeline (ZED + parallel YOLO) to enable context-aware scene understanding.
- Designed a POMDP planner (depth-5 action trees) for safe decision-making under uncertainty with <50 ms latency.

Machine Learning Project: High Energy Particles / Signal Classifications

- Preprocessed a 600K dataset into 28 features for Higgs–vs–background classification highlighting discriminative signals.
- Analyzed different architectures (LR, SVM, XGBoost, MLP) with 5-fold CV to identify the most robust one.

Stochastic Modeling of Customer Purchase Behavior

- Feature-engineered customer states from 100K+ transactions to represent key shopping behaviors.
- Performed empirical Markov Chain satistical analysis showing a potential increase of 6.9% in conversion rate.

Geometry-Aware Generative Modelling for OOD Detection

- Designed a geometry-aware VAE to align latent space with the hyperspherical geometry of Foundation Models.
- Achieved +8–9% AUROC in near OOD eval. but no improvement in far-OOD eval. with CLIP, DinoV2 and Resnet50.

SKILLS

Tools: Linux, Git, GitHub Actions, CI/CD, Docker, MS Office, SQL

ML & Data Frameworks: PyTorch, TensorFlow, Pandas, NumPy, PIL, scikit-learn

Programming Languages: Python, Java, MATLAB, C++

Languages: English, Arabic