Shafik Houeidi

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Education

American University of Beirut (AUB), Beirut, Lebanon — Aug. 2025 – Present
M.Eng. in Electrical and Computer Engineering | Artificial Intelligence & Machine Learning
- **Graduate Coursework:** AI Agentic Systems | Trustworthy Machine Learning | Probabilistic Graphical Modeling | Data Driven Modeling in Science & Engineering.

American University of Beirut (AUB), Beirut, Lebanon — Aug. 2021 – May 2025
B.Eng. in Computer and Communications Engineering | Track in Artificial Intelligence — GPA: 3.73/4
- **Selected Coursework:** Machine Learning | Neural Networks | Computer Vision | Non-Linear Optimization | Algorithms | Ethical Hacking.
- **Career+ Certified:** Research | Data Science & Artificial Intelligence.

Projects

SARA: Situational Assessment & Response Agent, Master's Thesis / Research Project — Aug. 2025 – Present
https://github.com/shafikhw/SARA.git
- Building a disaster public-support agent for Lebanon supporting preparedness, real-time guidance, rumor checking, service/resource lookup, and recovery support.
- Designed a FastAPI and React system with streaming responses, tool calling, web search, location/time tools, incident classification, source ranking, SQLite chat persistence, and confidence scoring.
- Developed a latent-reasoning and Bayesian confidence layer that aggregates evidence, discovers uncertainty factors, builds dependency graphs, and conditions final answers on uncertainty.
- **Skills:** LLM Agents | FastAPI | React | TypeScript | Tool Calling | Bayesian Confidence | Disaster AI.

Graduate Course Projects — Aug. 2025 – May 2026
- **P-GALM:** https://github.com/shafikhw/P-GALM.git Built a verbalized probabilistic graph-augmented language model for ScienceQA that maps questions to latent Bayesian-style reasoning variables and posterior answer distributions.
- **Aptiva:** https://github.com/shafikhw/Aptiva.git Developed a dual-market LangGraph rental assistant with persona-aware search, ranking, scheduling, lease drafting, guardrails, Supabase storage, FastAPI backend, and streaming web UI.
- **AgentSafeBench:** https://github.com/shafikhw/AgentSafeBench.git Built a deterministic benchmark for tool-using AI agents, testing prompt injection, unsafe tool misuse, unauthorized disclosure, runtime defenses, trace logging, and safety metrics.
- **NeuroPixelsModel:** https://github.com/mohdfaour03/Neuro-Pixels-Model Modeled Allen Neuropixels neural population dynamics using Wilson-Cowan inspired universal differential equations, time-varying parameters, and symbolic regression.

Digital Twin of MSFEA Buildings, Final Year Project — Aug. 2024 – May 2025
- Built a real-time digital twin of IOEC 412 integrating ESP32 sensor networks, skeletal tracking, Python logic, Unity 3D visualization, MQTT alerts, and instructor-facing analytics.
- Deployed classroom scenarios including distancing, phone usage detection, distraction analysis, HVAC suggestion, lighting management, and attendance tracking.
- **Advisor:** Dr. Daniel Asmar | **Skills:** IoT | Unity 3D | Python | Real-Time Systems | Human-Centered Computing.

Undergraduate Course Projects — Aug. 2022 – May 2025
- **RT-3D:** https://github.com/shafikhw/RT-3D.git Built a stereo-vision pipeline for paper cup detection, 3D pose estimation, and status monitoring using camera-based spatial reasoning.
- **Hybrid LSTM-Transformer Model:** https://github.com/shafikhw/Hybrid-LSTM-Transformer-Model-for-Energy-Demand-Frocasting.git Developed a deep learning forecasting model combining LSTM sequence modeling with Transformer attention to predict energy demand from temporal data.
- **Other Examples:** Classified Vehicle Detection and Tracking | Pine Processionary Moth Nest Detection | FPGA Lane Detection | Pipelined Processor Core | MATLAB Physical-Layer Optimization | Client-Server Game | Capture the Flag | Solar Parking System.

Experience

Graduate Administrative Assistant, AUB, Graduate Council — Mar. 2026 – Present
- Support graduate applications and scholarship workflows through statistical analysis, application processing, Slate management, and applicant decision notifications.
- Prepare admissions datasets, compare records across Slate and legacy systems, identify duplicates, and support reporting for enrollment and scholarship decisions.
- **Skills:** Data Analysis | Slate | Graduate Admissions | Scholarship Processing | Excel.

Graduate Research Assistant, AUB, Vision and Robotics Lab — Aug. 2025 – Present
- First author of *AI Applications in Public Health Across Different Disaster Phases: Preparedness, Response, & Recovery*, a scoping review mapping 93 studies across disaster phases and AI modalities.
- Continue research through SARA, a disaster public-support chatbot focused on uncertainty-grounded answers, misinformation checks, service-access guidance, and escalation from small models to larger models or humans.
- **Skills:** Research | AI for Public Health | Disaster AI | LLM Agents | Uncertainty-Aware Systems.

Graduate Laboratory Assistant, AUB, ECE Dept. — Jan. 2026 – May 2026
- Assisted students in EECE321L Computer Organization Laboratory by preparing experiments and supporting hardware/software debugging during lab sessions.
- **Skills:** Laboratory Operations | Hardware/Software Debugging.

Graduate Teaching Assistant, AUB, ECE Dept. (EECE693 Neural Networks) — Aug. 2025 – Dec. 2025
- Supported instruction for a graduate Neural Networks course through labs, problem sets, and student guidance.
- **Skills:** Teaching | Neural Networks.

Research Intern in 3D Reconstruction, AUB, Vision and Robotics Lab — Jun. 2024 – Aug. 2024
- Collected, calibrated, and synchronized RGBD and motion-capture data for 3D scene reconstruction; automated data extraction and model execution with shell scripts.
- Integrated data with Vox-Fusion and tested Nice-SLAM for real-time reconstruction. Drafted an ICRA paper contribution and replication guide.
- **Skills:** Research | 3D Reconstruction | Computer Vision.

Automation and Design Optimization Intern, VIP Program, Ubilite, Hamra, Beirut — Jan. 2024 – May 2024
- Contributed to automation and design optimization of wireless transceiver circuit blocks using Ocean Script, SKILL, and Cadence Virtuoso.
- **Skills:** Automation | Optimization | Ocean Script.

Undergraduate Research Assistant, AUB, ECE Dept. — Jun. 2023 – Jun. 2024
- Worked on AI applications in cloud security, focusing on cybersecurity measures and SOAR platforms.
- **Skills:** Research | Cybersecurity.

Undergraduate Teaching Assistant, AUB, ECE Dept. (EECE330 Data Structures) — Aug. 2023 – Dec. 2023
- Provided instructional support and developed learning materials to improve student performance.
- **Skills:** Teaching | Data Structures | Interactive Learning.

Undergraduate Laboratory Assistant, AUB, ECE Dept. — Sep. 2022 – Dec. 2022
- Prepared lab components, assisted in sessions, and facilitated an ideation session for FEAA200 students.
- **Skills:** Electronics | 3D Printing | Event Organizing.

Selected Research & Publications

- **Houeidi, S. et al.** *AI Applications in Public Health Across Different Disaster Phases: Preparedness, Response, & Recovery.* First-author scoping review of 93 studies and deployed AI disaster tools.
- **Houeidi, S. & Tajeddine, R.** *AgentSafeBench: A Benchmark for Evaluating Safety and Robustness in Tool-Using AI Agents.* Deterministic benchmark for prompt injection, unsafe tool misuse, and safety metrics.
- **Houeidi, S. & Tajeddine, R.** *P-GALM: Probabilistic-Graphical Augmented Language Model.* Verbalized probabilistic graph framework for interpretable question answering.
- **Faour, M., Houeidi, S., & Abu Raidah, S.** *Learning Interpretable Neural Population Dynamics with Wilson-Cowan UDEs.* Interpretable neural dynamics model using UDEs and symbolic regression.

Leadership & Service

Google Developer Groups on Campus Organizer Lead, AUB — May 2024 – May 2025
- Led the club's *Build with AI* theme and organized AI-focused programming for students across disciplines; the club later grew to over 500 registered members.
- Organized Build with AI 2025, a full-day event with 600+ participants and 18 speakers, covering LLMs, RAG, OCR, AI security, scientific modeling, deepfakes, and AI observability.

AI Officer, AUB ACM Club — Sep. 2024 – May 2025
- Organized AI learning initiatives including the NVIDIA DLI certification workshop, weekly AI sessions, and *Beyond Predictions: How LLMs Reason* with speakers from OpenAI and academia.

Additional Leadership Roles — Sep. 2022 – May 2025
- **Vice President, AUB DDD Club** (Sep. 2024 – May 2025) | **Vice President, Arabic Student Society** (Sep. 2024 – May 2025) | **Event Officer, AUB GDSC** (Sep. 2023 – May 2024).
- **Member at Large, AUB IEEE Club** (Sep. 2022 – May 2023) | **Member at Large, AUB DDD Club** (Sep. 2023 – May 2024).

Awards, Scholarships, Certifications & Competitions

Graduate Scholarships
- **Viterbi Endowment Scholarship**, University of Southern California (USC), $35,000 award for Fall 2026.
- **Graduate Fellowship and Assistantship Program (GFAP)**, American University of Beirut (AUB), full graduate tuition coverage.

Undergraduate Scholarships
- **Dr. Reem Renno Scholarship**, AUB, 100% undergraduate tuition coverage with stipend support.
- **Multiple endowed and merit-based scholarships at AUB:** Munib and Angela Masri Endowed Scholarship | Palestinian Students' Fund Scholarship | Kamel Abdelrahman Endowed Scholarship | Mahmoud Abbas Foundation Scholarship | Palestinian Cultural Club Scholarship | Abdulrahim Abuissa Memorial Scholarship in Agricultural and Biosystems | Hassib J. Sabbagh Endowed Scholarship | Mohammad Al Saadi Scholarship | WAAAUB Swiss Chapter Endowed Scholarship.
- **Türkiye Scholarships and Islamic Development Bank Joint Scholarship**, awarded for Electronics and Communication Engineering at Istanbul Technical University, covering tuition, stipend, dormitory, Turkish language training, health insurance, and travel support.

High School Scholarship
- **President Rafic Hariri and Sheikh Ahmad Hashisho Scholarship**, full tuition coverage from Grade 7 to Grade 12 at Makassed Islamic High School.

Academic Recognition, Certifications & Competitions
- Dean's Honor List, multiple semesters | Selected semesters with perfect capped term GPA performance (4.0/4.0 scale).
- **International Universities Debate Championship:** highest individual score among participants from 100+ universities across 50+ countries | **Asian Universities Debate Championship:** participant.

Skills

- **Programming Languages:** Python | C++ | Java | MATLAB | Bash | VHDL | Verilog | Assembly | SKILL | Ocean Script.
- **Artificial Intelligence & Machine Learning:** Machine Learning | Deep Learning | Neural Networks | Computer Vision | Natural Language Processing | Probabilistic Graphical Models | Trustworthy AI | Agentic AI Systems | LLM Tool Calling.
- **AI Frameworks & Data Science Libraries:** PyTorch | TensorFlow | Keras | Scikit-learn | Hugging Face Transformers | LangGraph | PyMC | Pyro | Pandas | NumPy | SciPy | OpenCV.
- **Software, Web & Data Platforms:** FastAPI | React | Supabase | SQLite | Git | LaTeX | Unity 3D.
- **Embedded, Hardware & Robotics Tools:** ESP32 | MQTT | RTK-GPS | Pyzed | Leica | Cyclone | Cadence Virtuoso.
- **Cybersecurity & Operating Systems:** Penetration Testing | Network Security | Kali Linux | Ubuntu | Wireshark | Nmap | Burp Suite | Metasploit.
- **Languages:** English | Arabic.