Mahmoud Sunbul

Graduate Assistant — MS Robotics — Electrical Engineering

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Summary

Master's student in Robotics at Purdue University and **KFUPM-sponsored** faculty member (on leave). Research focus: **algorithms, optimization, and control for robotics**;

Education

Purdue University, West Lafayette — *May 2026*
MS in Robotics — (Expected)

King Fahd University of Petroleum and Minerals (KFUPM), Dhahran — *Dec 2023*
BS in Electrical Engineering — GPA: 3.8/4.0

Selected Coursework: Lumped Systems; State Estimation; Motion Planning; System Identification

Research & Projects

KAUST, RISC Lab *Jun–Aug 2025* (Supervisor: Prof. Shinkyu Park)

- **UR10e wave-mimic testbed:** Implemented **velocity trajectory planning** in **ROS 2** and **verified on UR10e hardware**. Built a **Python motion-profile generator** (7 profile types) with safety checks and user-friendly interface for non-robotics users; supports experimental AUV disturbance testing. *Artifacts:* code/setup notes; see personal site (link below).
- **3D palm-canopy meshing:** Built stereo vs. depth workflows; after preprocessing, depth-sensor meshes achieved **∼2.0M vs ∼0.7M vertices** (stereo). *Cameras:* ZED 2 (stereo); iPhone 16 Pro Max / Google Pixel depth (typ. usable range ∼2.5 m). Delivered Python pipeline and capture settings for robotics/AI dataset creation.

Purdue University, MARS Lab *Jan–May 2025* (Supervisor: Prof. Yu She)

- **Underwater glider AUV modeling:** Designed the vehicle model (dual thrusters, variable ballast) and extended **ROS 2/Gazebo UUV** physics (buoyancy, thrust, angular dynamics). Integrated and validated behaviors in simulation; coordinated with hardware collaborators for parameter checks.

KFUPM Research Center *Feb–Jun 2023*

- **Driver-fatigue detection prototype:** Built a CNN/OpenCV pipeline for eye-closure detection; delivered trained model, evaluation metrics, and deployment criteria.

Robotic Water Quality Boat (Senior Project, KFUPM) *Sep 2022–Dec 2023*

- Led a 5-person team; autonomous boat with **pH, GPS, IMU** and RF control. **Endurance:** ∼30 min/charge; **range:** ∼0.6 km; **power:** ∼1800 W. Delivered prototype, demo, report, poster, and videos; managed ∼$30k budget.

Publications & Technical Outputs

- *Consensus-Driven Adaptive Signal Control for Scalable Intersection Management* — **first author, manuscript in preparation**.
- *UR10e Mimicry of Ocean Wave Dynamics for AUV Testing* — **Manuscript TBD**, **expected submission ∼15 Feb** (2nd author).

Skills & Tools

- **Robotics:** ROS 2, Gazebo, CoppeliaSim
- **Engineering:** MATLAB, Simulink, Python

Public artifacts (code, videos, reports): **Personal site** (*all public files will be listed here*).