Mohamed Ahsan

Flight Control Engineer
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PERSONAL PROFILE

Final-year PhD researcher at Coventry University, specialising in flight dynamics and robust fault-tolerant control for UAVs. I have expertise in model-based designing, software-in-the-loop, hardware-in-the-loop and actual flight testing. With proficiency in Matlab, Python and C++, as well as modelling and simulation with Simulink, I am actively seeking opportunities in the field of flight control that aligns with my expertise and research interests.

SKILLS

Software & Tools:	Matlab, Simulink and Simscape (7+ years of experience with Model-Based Designing, Software-in-the-Loop, Hardware-in-the-Loop Testing); Python; C++; Version Control (GitHub).
Hardware:	Flight testing with a quadcopter UAV, Pixhawk 6C microcontroller and custom-built PX4 firmware; Texas Instrument C2000 (F28335) DSP for power electronics control; Arduino, ESP-32, Raspberry Pi, etc.
Control Laws:	PID, Linear Quadratic Regulator, mixed-sensitivity H-Infinity, Perturb & Observe, Incremental Conductance, etc.
Modelling & Simulation:	UAV dynamics (multirotor, fixed wing, Vertical Take-Off and Landing), Solar Photovoltaics System, Electric Motors, etc.
Other Technical Knowledge:	Particle Swarm Optimisation; Recursive Least Square Estimation; Machine Learning; Power Electronics Converters (DC-DC); Renewable Energy; Maximum Power Point Tracking (MPPT) Control.

EDUCATION

Research Centre: CSMM – Coventry University, UK **September 2021 – Ongoing**
Doctor of Philosophy (PhD) in Flight Control Engineering – Fully Funded Scholarship
Research Focus: Enhancing the stability and safety of delivery drones by developing smart control systems that can adapt to motor faults and payload-induced weight imbalances as it picks up or drops off packages.

- Developed high-fidelity model of a quadcopter UAV with real-world uncertainties, such as wind disturbances.
- Developed a novel, robust and adaptive control strategy that detects motor faults and payload-induced weight imbalances, and adjusts the control parameters in real-time to maintain stable flight.
- Utilised model-based designing to evaluate the flight control algorithm through SITL and HITL simulations.
- Conducted real-world flight tests with a quadcopter UAV, Pixhawk 6C microcontroller and custom-built PX4 firmware to validate the flight control algorithm.

Asia Pacific University of Technology & Innovation, Malaysia **February 2017 – March 2021**
Bachelor of Engineering (BEng) in Electrical & Electronics Engineering
CGPA: 3.99 (First Class Honours, Best Student Award, Best Student Dissertation & Project Prize)

WORK EXPERIENCE

Skyfarer Ltd – Rugby, UK **July 2022 – Ongoing**
Systems Engineer & Data Analyst

- Developed and maintained Skyfarer system software, innovating scalable drone technologies.
- Configured and maintained operating systems, application software and management tools.
- Monitored and improved application performance, implemented solutions to bottlenecks, and ensured security and redundancy.
- Collaborated across teams to prepare data, supporting FlightOps, compliance, and decision-making.
- Analyzed and visualized flight data for sustainability and cost analysis, creating dashboards and reports for stakeholders.
- Provided IT support for hardware/software integration and resolved complex technical issues.
- Liaised with vendors and IT teams to troubleshoot and ensure seamless system operations, including Microsoft 365 administration.
- Designed and prototyped custom drone parts and components using SolidWorks and 3D printing.

Asia Pacific University of Technology & Innovation, Malaysia **November 2019 – January 2020**
Research & Development Engineer

- Conducted feasibility analysis for solar PV system installations, focusing on energy, space, and budget constraints to reduce electricity costs by harnessing solar energy on the university rooftop.
- Determined system specifications to meet a portion of the university's annual energy requirements.
- Developed the most cost-effective system size within the allocated budget, ensuring a sustainable solution.
- Estimated significant yearly savings from the proposed system, with a reasonable payback period.

PUBLICATIONS

Robust Auto-Tuning Control of a Delivery Quadcopter with Motor Faults, Mass and Inertia Estimation:

- Presented my research at the Modeling, Estimation, and Control Conference 2024 – Chicago, United States.
- Accepted for publication in the conference proceedings via IFAC-PapersOnLine, ScienceDirect.
- Preprint available: Coventry University's Research Portal.

PROJECTS

Group Leader: Autonomous Drone for Power Line Inspection:

- Designed an autonomous drone for real-time power line inspection using image processing, GNSS-based mapping, and RF data transmission.
- Won 'Best Innovation Award' at InnoServe 2020.

Group Leader: IoT-based Ionizing Radiation Detector:

- Developed a sensitive, low-cost and portable radiation detector with IoT capabilities to detect for any harmful background radiation and alert users.
- Won MSC Malaysia APICTA 2019 and 'Best Innovation Award' at InnoServe 2019, Taiwan.

Undergraduate Dissertation: Smart AI System for Solar Power Extraction:

- Improved the efficiency of solar PV systems by up to 95% against partial shading conditions by integrating conventional maximum power point tracking with AI-based optimisation.
- Extensively tested and validated using Matlab and Simulink for real-world conditions and the results proved the accuracy of the system.

Minor Projects:

- Designing & Building Multi-Stage Amplifiers using BJT and MOSFET (Analog Electronics).
- VLSI Design - VHDL & Verilog.
- Hands on Experiments with Electrical Machines (Generators, Motors, Transformers & Alternators).
- Designing & Building Arithmetic Logic Unit using Discrete Components (Digital Electronics).
- Circuit Designing & PCB Building.

CERTIFICATIONS & ACHIEVEMENTS

- Student Affiliate Member of the Institution of Mechanical Engineer (ID: 80394532).
- Registered Graduate Engineer under the Board of Engineers Malaysia.
- Silver Award at the Malaysia Technology Expo 2020.
- Award winner at Engineering Innovation Challenge 2019, organized by Institution of Engineers, Singapore.
- Award winner at Junior Inventor of the Year Competition 2015, organized by Institution of Engineers, Sri Lanka.

LEADERSHIP & VOLUNTEERING EXPERIENCE

- Engineering Technical Assistant at Asia Pacific University of Technology and Innovation.
- Technical Lead of IMechE APU Student Chapter 2019/2020.
- Treasurer of Institution of Engineers Malaysia APU Student Section 2018/2019.
- Director of Leo district 306 B2, Sri Lanka 2014/2015.

INTEREST

I love traveling, photography, and videography, always eager to capture new places. As a young traveller, I've embarked on solo trips to around 15 countries, immersing myself in diverse cultures and cuisines. I also enjoy flying drones and am currently learning FPV racing drones. I'm passionate about biking and long-distance road trips, always seeking new landscapes and exciting adventures.