Shihaab Alam

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Profile

Second-year Computer Science student doing continual reinforcement learning research (public technical report, v1.0) and statistical data analysis in Python. Seeking a 12-month placement (2027–28) or summer internship in data science, machine learning or software engineering.

Education

Aston University Birmingham, UK
BSc Computer Science (Sandwich Degree with Placement Year) *Sep. 2025 – Jun. 2029*

- Year 1: achieved a 2:1 overall, including 100% in the core AI & Data Science module
- Year 2 (2026–27): Data Structures, Algorithms & OOP; Software Engineering; Team Project; Programming Language Concepts

Projects

Celeste RL: Continual RL Research | *Python, C#, PyTorch, SB3 (PPO), Gymnasium* 2026

- Measured catastrophic forgetting: under standard PPO, learning Room 2 cut Room 1 success by 37–56pp in all 4 lineages (median 87% of Room 1 skill lost); removing PPO's entropy bonus, or anchoring to the Room 1 policy, cut the median loss to 18% and 6% with no lower median Room 2 score (public technical report v1.0)
- Built a lockstep *Celeste* RL environment (Python + C# game plugin) running at ∼2,600 fps, ∼85× faster than the previous interface, reproducing 926/926 frames exactly against normal-speed play
- Varied-start, demonstration-assisted PPO beat canonical starts on held-out Room 1 states (74.8% vs 52.2%, +22.6pp, p = .031, 6 matched seeds, predeclared protocol)
- Engineered for unattended runs: 469 unit tests, a 4.85M-step soak test, fault-injection checks, and a fix for a reset-time memory leak that consumed ∼8 GB in 4 minutes

WCA Database Analysis | *Python, pandas, NumPy, SciPy, Jupyter, pytest* 2026

- Analysed a 1.5 GB public WCA export; overturned a naive "home country advantage" hypothesis using paired statistical testing (p = 1.3e-67, n = 13,869), exposing selection bias
- Fit a trend-extrapolation model ($R^2 \approx 0.95$) at successive cut-offs, uncovering a systematic 2.5–4 year forecast bias despite high in-sample fit
- Found and fixed two bugs in loading the raw WCA export (duplicate competitor rows; a mixed int/str `event_id` dtype silently breaking event filters), locked in by a pytest suite run in GitHub Actions CI

DualSense Quick Menu | *Python, PySide6, pydualsense, WinRT* 2026

- Built a PS5-style Windows control centre with live Spotify *Now Playing*, volume/power controls and a controller-driven app switcher; in closed alpha with external testers
- Fixed input lag in CPU-heavy games, where presses waited 50–100 ms for CPU time, by raising the controller threads to highest OS priority
- Read the DualSense over raw USB HID (not XInput) at ∼125 Hz (8 ms sampling) on background threads, with Spotify Web API (PKCE OAuth) calls kept off the Qt UI thread

Technical Skills

- **Languages**: Python, C# / .NET, JavaScript, HTML/CSS
- **ML & Data**: PyTorch, Stable-Baselines3, Gymnasium, pandas, NumPy, SciPy, matplotlib; continual learning; experimental design and statistical testing (paired tests, predeclared evaluation)
- **Frameworks & Tools**: PySide6 (Qt), Git, VS Code, Jupyter, pytest, GitHub Actions, PyInstaller
- **Other**: Linux (Ubuntu), Windows API / WinRT, Fusion 360

Extracurricular

Sustainable Waste Management System Design | *Engineers Without Borders* May 2026

- Designed a communal bokashi composting system for Ladywood, Birmingham (∼13,000 households, ∼400 hubs, est. £60k–£100k), chosen from five options via a weighted cost/social/environmental matrix
- Coordinated a multi-person team, including Fusion 360 CAD modelling, and pitched the final proposal as lead presenter