Ahmed Fathy

Computer Engineer – Embedded Systems & Full Stack Developer
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Education

- **Cairo University, Faculty of Engineering** — Giza, Egypt
  B.Sc. in Computer Engineering; GPA: 3.6 — *2023 – 2027*

Experience

- **Al Nada Scientific Office** | *Technical Support Trainee* — *Giza, Egypt | June 2022 – 2024*
  - **Root Cause Analysis**: Investigated and isolated hardware faults using systematic debugging, performing firmware updates and maintenance.
  - **Documentation**: Created automated troubleshooting workflows to streamline issue resolution.

Projects

- **5-Stage Pipelined Processor (RISC)** | *VHDL, QuestaSim, Computer Architecture* — Source Code | *2025*
  - **Core Architecture**: Engineered a **32-bit 5-stage pipelined processor** in VHDL, supporting a custom ISA of over 25 instructions.
  - **Hazard Resolution**: Optimized throughput by implementing Hazard Detection and Data Forwarding units to resolve control and data dependencies.
  - **Verification**: Validated functional correctness through rigorous simulation and testbench environments in **QuestaSim**.
- **CNN Convolution Accelerator** | *Verilog, OpenLane2, ASIC Design* — Source Code | *2025*
  - **Architecture**: Designed a synthesizable **2D convolution accelerator** using **Systolic Arrays** and fully pipelined dataflow to maximize MAC throughput.
  - **Memory Hierarchy**: Implemented DMA-based loading and dual-port SRAM buffering to support up to **16x16 kernel** execution.
  - **Physical Design**: Executed RTL-to-GDSII synthesis using **OpenLane2**, validating physical feasibility and achieving timing closure.
- **Hankers (Social Platform)** | *Full-Stack Engineering* — Source Code | *2025*
  - **Architecture**: Built scalable social platform using Microservices principles, React.js, and TypeScript.
  - **Frontend**: Implemented responsive UI design and asynchronous API integration via AJAX.
  - **DevOps**: Established CI/CD pipelines and containerized services using Docker for consistent deployment.
- **Image Restoration Pipeline** | *Deep Learning & Computer Vision, Python* — Source Code | *2024*
  - **Pipeline**: Constructed end-to-end restoration pipeline: Denoising, Deblurring, and Inpainting.
  - **Algorithms**: Applied Telea (FMM) inpainting and deep learning models to restore damaged historical photographs.

Student Activities

- **IEEE** | *UI/UX Designer - Frontend Team Leader* — *Cairo | Oct 2025 – Present*
  - **Leadership**: Architected intuitive user interfaces and optimized user journey protocols for internal platforms.
- **Technical Center for Career Development (TCCD)** | *Frontend Developer* — *Cairo | June 2025 – Present*
  - **Development**: Engineered HR dashboard for event tracking and spearheaded optimization of the official TCCD web.
- **NASA Space Apps Challenge** | *Participant – Project: "Orrery"* — *Cairo | Oct 2024*
  - **Orrery App**: Developed an interactive orrery app visualizing near-Earth objects using React and Three.js.
- **Physics Helping District (PhD)** | *Team Leader* — *Cairo | June 2022 – 2024*
  - **Mentorship**: Led peer tutoring initiative in electronics, achieving measurable academic improvement.

Technical Skills

- **Languages**: Python (Advanced), Bash/Shell Scripting, C++, JavaScript/TypeScript, Verilog/VHDL
- **Automation & DevOps**: Linux (Fedora/RedHat), Docker, CI/CD Pipelines, Git, Make/CMake
- **Web & Frameworks**: React.js, Node.js, REST APIs
- **Domain Knowledge**: VLSI Design Flow, ASIC Verification, DRC/LVS Concepts, Static Timing Analysis