Taisir Hassan

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Technical Skills

Languages: C/C++, Java, Python, C#, Go, VHDL, Verilog, SystemVerilog, Rust, MATLAB, SQL, JavaScript/ Typescript, HTML/CSS
CAD/Engineering Software: KiCAD, AutoCAD, Simulink, Multisim, LTspice, Vivado, Quartus Prime, SolidWorks, PSpice
Communication Protocols: I2C, SPI, UART, CAN
Frameworks/ Libraries: UVM, FreeRTOS, pandas, NumPy, Matplotlib, OpenCV, ROS, React, PyTorch, TensorFlow, React Native
Developer Tools: Git, CMake, Bash, Linux, Docker, Kubernetes,, GDB, GCC, Google Cloud Platform, VSCode, Visual Studio, CLion, Eclipse, CI/CD, Agile, Jira, Github, Gitlab, AWS (S3, Cloudfront, Terraform, X-Ray)

Experience

Incoming: Onboard Payload Embedded Software Engineering Co-op Jan 2025 – Apr 2025
Telesat *Ottawa, ON*
- Will develop software for satellite User Terminal systems using **C++** and **Python**
- Will implement networking solutions and software tools on **Linux** systems using **Git** and **GCC**
- Will perform testing and troubleshooting of software features to ensure robust system communication

Electrical Team Member May 2024 – Present
UW Rocketry *Waterloo, ON*
- Developed **PWM** and **ADC drivers** with **low-pass filter** logic for the **PIC18F26K83**, validated using **oscilloscopes** and **wave generators**
- Designing **Software Defined Radio (SDR)** with **APRS receiver** using **RTL in Verilog** for real-time telemetry data transmission
- Leading schematic design for **USB debug board PCB** featuring **12V boost converter** and **CAN-USB** communication with **Harwin** connectors

Autonomous Vehicle Research Assistant September 2024 – Present
Controls, Learning and Logic Research Group, University of Waterloo *Waterloo, ON*
- Verify **CAN bus messages** and implement **OBD-II** data logging to monitor vehicle control systems (throttle, brake, steering, shifting) using **Dataspeed DBW** drivers, debugging hardware firmware faults for system reliability
- Develop a **ROS2** node in **C++** for drive-by-wire control integration with **Dataspeed** modules, implementing both autonomous and joystick teleop control modes
- Create and manage **launch files** using **Python** to facilitate deployment and testing of **ROS2** nodes, including parameter configuration for different control modes

Autonomous Vehicle Embedded Systems Developer December 2023 – Present
Watonomous Design Team *Waterloo, ON*
- Engineered and debugged **ROS2** nodes for camera and LiDAR functionality in autonomous vehicles using **C++** and **Python**
- Optimized **Docker** containers for simultaneous operation of **FLIR camera** and **LiDAR**, resolving networking and **ROS DDS** compatibility issues
- Implemented **X11 forwarding** for real-time visualization of sensor data within containers, enhancing development and debugging capabilities

Data Quality Specialist May 2023 – Sept 2023, May 2024 - Aug 2024
Cohere.ai *Toronto, ON*
- Collaborated in the quality assurance of a state-of-the-art Large Language Model.
- Achieved an average task completion rate of **98%**, ensuring timely and accurate completion of text and code-based tasks.
- Decreased data discrepancies and inconsistencies by **25%** through meticulous data quality control measures

Junior Fullstack Developer Jan 2022 – Apr 2022
Playfair Technologies *Toronto, ON*
- Spearheaded the launch of a **React Native** mobile application, leading to a remarkable **50%** increase in user engagement. This initiative involved a strategic transition from existing Swift (iOS) and Flutter (Android) applications. ensuring timely and accurate completion of text-based tasks
- Significantly improved application performance and response time by **30%**, achieved through meticulous optimization of back-end functionalities utilizing **Scala**.
- Enhanced the application's deployment process by integrating **Docker** containers, leading to a **40%** reduction in deployment time. This advancement contributed to quicker and more efficient software releases.

Projects

URA Research Project: Digital Circuit State Verification via De Bruijn Sequences | *Scala, Verilog, SystemVerilog*
- Developing a **Verilog** parser and synthesis engine to extract gate-level circuit descriptions and state transitions from hardware designs
- Implementing De Bruijn sequence generation algorithms to create optimal test sequences that guarantee complete state coverage through Hamiltonian cycle analysis
- Creating a verification framework that automatically generates test vectors to traverse all possible state combinations in digital circuit designs

32-bit RISC-V Softcore Processor | *Verilog, GTKWave, Icarus Verilog*
- Designed and implemented RV32I base instruction set in **Verilog**, featuring 5-stage pipeline with hazard detection/forwarding logic
- Created test bench and assembly programs to validate instruction functionality, pipeline hazards, and branching logic
- Utilized **GTKWave** for waveform analysis and debugging of pipeline stages, ensuring correct instruction execution and timing

Firefighting Robot | *C++, Arduino*
- Developed an autonomous firefighting robot with a sophisticated navigation system capable of precise maneuvering through intricate physical environments utilizing servo motors
- Engineered and integrated specialized sensors for detecting heat and flames, coupled with an effective fire extinguishing system to address fire hazards.

Traffic Light Controller | *VHDL, Quartus Prime*
- Designed a Traffic Light Controller using **VHDL** to model sequential logic and state machines, integrating pedestrian crossing requests with traffic light sequences for an FPGA implementation.
- Employed both **Moore** and **Mealy** finite state machine models to design a synchronized traffic control system, ensuring safe and efficient pedestrian and vehicular movement.
- Utilized **Quartus Prime** for VHDL code compilation, simulation, and FPGA programming, demonstrating proficiency in digital design tools and methodologies.

Education

University of Waterloo Waterloo, ON
Candidate for BAsc in Honours Computer Engineering, Minor in Comb & Optimization *Expected Graduation: May 2028*
- **Cumulative GPA:** 3.3
- **Relevant Courses:** Data Structures & Algorithms (C++), Digital Circuits (VHDL), Digital Computers (RISC-V ASM), Electronic Circuits, Linear Algebra, Numerical Methods (MATLAB)