Hasan IAA Mohammad

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EDUCATION

Master of Science in Electrical Engineering

West Virginia University, Morgantown, WV, USA

Graduation: 2003

- Problem Report: "DSP-Based Fuzzy Logic Controllers for Power Inverter Management" (GitHub)
- Advisor: Prof. Bojan Cukic (now at UNC Charlotte)
- Focus: Power inverters for fuel cell applications
- Developed real-time control software for DSP and PIC microcontrollers
- Full Research Assistantship (RA) funding throughout Master's program
- Research conducted in Electro-Mechanical Laboratory under Prof. Parviz Famouri

Bachelor of Science in Computer Engineering

West Virginia University, Morgantown, WV, USA

Graduation: December 2000

- Minor in Computer Science

Bachelor of Science in Electrical Engineering

West Virginia University, Morgantown, WV, USA

Graduation: December 2000

PROFESSIONAL EXPERIENCE

Senior Instrument Engineer

Kuwait Oil Company (KOC) | 2010 - November 2025 (Resigning to pursue PhD)

- Lead instrument and control systems engineer for oil & gas facilities
- Developed KOCGPT AI-powered document intelligence system for engineering standards
- Implemented predictive maintenance strategies using data analytics
- Managed DCS/ICSS systems and industrial automation
- Applied machine learning to optimize process control and fault detection
- Collaborated on digital transformation initiatives for Industry 4.0

Instrument Engineer

Ministry of Electricity & Water (MEW), Kuwait | 2004 - 2010

- Maintained instrumentation systems for power generation plants
- Developed HMI interfaces for plant operations and digital mimic
- Conducted root cause analysis for system failures
- Managed calibration and testing of field instruments

RESEARCH EXPERIENCE

Under Graduate Research Assistant

Virtual Environment Laboratory, WVU | 1998 - 2000

- Developed custom voxel engine in C++ with OpenGL for 4D point cloud visualization (3D coordinates + intensity)
- Processed GIS aerial data with 4-float representation per point (X, Y, Z, intensity value)
- Implemented octree-based spatial data structures for efficient 4D data management
- Created real-time rendering of intensity-weighted terrain models from aerial datasets

- Optimized memory handling for large-scale geospatial point clouds with radiometric data

Graduate Research Assistant - Department of Defense Project

Electro-Mechanical Laboratory, WVU | 2000 - 2003

- Achieved world's first recorded auto-ignition of diesel fuel in linear engine (DoD funded project)
- Designed and implemented real-time controllers using PIC microcontrollers for linear engine
- Developed power inverters for fuel cell applications with DSP/PIC control systems
- Created sensor fusion algorithms for multi-sensor data integration
- Full Research Assistantship under Prof. Parviz Famouri
- DoD funding for pioneering linear engine research at WVU

TECHNICAL SKILLS

Programming Languages

- **Expert:** Python, C++, SQL (MariaDB, PostgreSQL)
- **Proficient:** MATLAB, Arduino/ESP32, GDScript
- **Familiar:** JavaScript, Shell scripting

Geospatial & Remote Sensing

- GIS data processing and visualization
- Photogrammetric reconstruction
- OpenGL 3D graphics programming
- Voxel-based terrain modeling
- Spatial data structures and algorithms

Machine Learning & AI

- Deep learning frameworks (TensorFlow, PyTorch)
- Computer vision and image classification
- Natural language processing (RAG, LLMs)
- Vector databases (pgvector)
- Multi-agent AI systems

Data Management

- MariaDB/MySQL (extensive experience)

- PostgreSQL with spatial extensions
- Time-series data processing
- Large-scale data pipeline development
- Custom database engine development
- Real-time data streaming

Software Development

- Version control (Git)
- Docker containerization
- RESTful API design
- Client-server architectures
- Embedded systems programming
- Obsidian knowledge management (Since December 2022)

Hardware Development

- PCB design and fabrication (EasyEDA)
- Microcontroller programming (PIC, DSP TMS320, ESP32, ESP8266, Arduino, STM32)
- Power electronics design (inverters, fuel cell systems, motor controllers)
- Sensor integration (IMU, GPS, environmental sensors, gas detectors)
- Communication protocols (I2C, SPI, UART, LoRa, WiFi, MQTT)
- Rapid prototyping and 3D printing
- Electronic instrumentation and calibration
- Self-funded prototype development capability

RELEVANT PROJECTS

KOCGPT - AI Document Intelligence System (Prototype)

Kuwait Oil Company | Current

- Built functional prototype RAG system for single-user deployment
- Implemented PostgreSQL with pgvector for semantic search capabilities
- Integrated DeepSeek models for engineering document analysis
- Processed P&IDs, maintenance records, and technical standards
- Hardware limitations currently restrict multi-user scalability

AxiomM - Production AI System

Personal Project | 2024 | GitHub (Private repo - available upon request)

- Developed and deployed production-ready AI system
- Implemented robust architecture for real-world applications
- Created scalable backend infrastructure
- Currently in active production phase with ongoing enhancements

ESP32/Microcontroller Projects

IoT/Robotics Projects | 2023-2024 | Self-funded

RoverV2 - Environmental Monitoring (GitHub - Private repo, available upon request)

- Functional prototype with GPS, MQTT communication, gas sensors (CO detection)
- Color-changing indicators and base station communication
- Lab-tested sensor fusion, not field-deployed

PicoW Spider (GitHub)

- Completed educational robotics platform
- Designed for teaching kids coding, robotics, and sensor management
- Custom PCB design and fabrication

ESP32 MiniRobot Pro (GitHub)

- Supporting platform for rover development
- Custom PCB with sensor integration

Oranith Space Program (Early Development)

Game Development Concept | 2024 | GitHub (Private repo - available upon request)

- Early-stage spatial database design for game objects
- Initial PostgreSQL schema development
- Exploring client-server architecture with Godot 4.3
- Project in conceptual/planning phase

RoverV2 - Oil Leak Detection Prototype

Environmental Monitoring | 2023-2024 | GitHub (Private repo - available upon request)

- Built functional prototype for environmental monitoring
- Integrated CO gas sensor showing measurable detection variance
- GPS positioning with MQTT data transmission to base station
- Lab-tested only, not field-deployed for actual oil detection
- Self-funded hardware development

LANGUAGES

- **English:** Fluent (Professional proficiency)
- **Arabic**

ADDITIONAL QUALIFICATIONS

- Autodidactic
- Strong background in interdisciplinary research
- Proven ability to work independently and collaboratively
- Excellent problem-solving and analytical skills
- Experience with time-series analysis and change detection
- **Financial independence**: Self-funded PhD candidate, requiring only tuition waiver and residency
- **Full commitment**: Relocating to Bergen with family, available full-time from November 2025