Zachary Haufe

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Education

West Virginia University — Morgantown, WV
B.S. Computer Science | GPA: 3.72/4.00 — *Graduation: May 2026*

Experience

Generative AI Engineer — July 2026 – Present
The MITRE Corporation — *McLean, VA*

- Testing ASR models in an early-stage speech recognition pipeline on data I sourced, flagging pipeline issues and correcting a model setting that improved transcription accuracy.
- Took ownership of an agentic LLM workflow that automatically adapts transcripts for downstream ASR use, learning the system and demoing it to the team.
- Developing a web server with an interactive leaderboard that ranks tested ASR models by capability, giving the team and stakeholders a shared view for model selection.

Software Engineering Intern — May 2025 – May 2026
The MITRE Corporation — *Clarksburg, WV*

- Developed and automated translation evaluation pipelines using Python and Jupyter Notebook to evaluate AI and machine translation (MT) models.
- Engineered and optimized prompt designs for Google's LLM-based translation services to improve translation quality measured by SacreBLEU, METEOR, ChrF++, TER, CIDEr, ROUGE-L, and human evaluation across 14 different languages
- Awarded the MITRE Spark Award for excellent work on a translation evaluation project that guided the selection of optimal MT models for the sponsor
- Authored clear, reusable documentation and setup guides for automated pipelines to enable future use
- Collaborated within an agile team environment to deliver and iterate on project goals

Projects

AgeTech House: AI Companion

- Built an LLM-powered companion for elderly care, using intent classification and entity extraction to turn natural-language requests into actions such as health data queries, reminders, setting appointments, and answering general questions.
- Built a real-time chat interface supporting both text and voice input, enabling users to interact with the AI companion in a natural and accessible manner.
- Integrated two health-device APIs so the companion could retrieve live data and explain it in plain language, coordinating API contracts and data formats across teammates.

Knowledge Graph System

- Designed and implemented a Neo4j property graph with five node types, and nine relationship types from messy, real-world CSV data, translating inconsistent raw inputs into a structured, queryable knowledge base.
- Analyzed the graph with Cypher queries to identify the most valuable organization, most influential people, customer portfolios, and geographic structure, supported by a Plotly visualization.

MPX Operating System

- Developed a custom OS kernel in C with a CLI supporting 20+ commands (date/time management, PCB creation/modification, process scheduling/dispatching). Implemented process control blocks and state management to simulate core OS process handling. Designed memory management and interrupt-driven I/O mechanisms.

CPU Design

- Designed an 8-bit accumulator-based CPU in VHDL with a 3-bit opcode instruction set (LOADA, ADDA, STOREA), a 32-byte memory interface, and a datapath of PC, IR, MAR, MDRI/MDRO, and ALU components connected through port mapping.
- Implemented the control unit as a finite state machine sequencing the fetch-decode-execute cycle, defining state transitions and control signals for each instruction, including the STOREA sequence.
- Verified correct fetch, decode, and execution behavior through waveform simulation of register, memory, and program counter signals.

Technical Skills

Languages: Python, Java, SQL, Cypher, C, VHDL, JavaScript
AI/ML: Large Language Models, Agentic Workflows, Prompt Engineering, Natural Language Processing, Machine Translation, Machine Transcription, Model Evaluation
Tools & Platforms: Git/GitHub/GitLab, Streamlit, Docker, Neo4j, Jupyter Notebook, Linux, Windows, macOS