Ben Carnes

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Technical Skills

Languages: Python, C++, C, JavaScript, HTML, CSS
Libraries/Frameworks: PyTorch, PySide6, React, WordPress (JS/PHP)
Tools: Git, Bash, Linux, Docker, Jupyter
Platforms: Microsoft Azure, Qdrant
Systems: Familiar with Direct3D, Windows API, DLL Development, PyPI Packaging

Experience

AI Application Development Intern Apr 2025 – Aug 2025
Libertarian Christian Institute *Waterloo, ON*

- Designed and implemented an end-to-end RAG chatbot pipeline using Azure OpenAI and Qdrant, enabling the nonprofit to support natural language Q&A where no prior infrastructure existed.
- Containerized the Python orchestrator with Docker and deployed to Azure Container Apps; integrated content-safety and sentiment analysis checks into the pipeline.
- Provisioned and secured Qdrant on an Azure VM, and enforced access control via VNet + NSG rules to restrict connections to allowed services/admins.
- Built a WordPress plugin (JS/PHP/CSS) that authenticates via Microsoft Entra ID and routes user queries securely to the orchestrator without exposing server secrets.
- Automated monthly vector ingestion via Azure Container Instances and documented the architecture for long-term maintainability, while optimizing compute spend to stay under $200/month while expecting up to 500 concurrent users.

Project Team Member Feb 2024 – Apr 2024
Microsoft Azure Academic Project *Waterloo, ON*

- Collaborated with a team of 5 to design and develop a health advice chatbot prototype using Microsoft Azure AI resources.

Projects

Gamegrab

- Developed a desktop OCR application for PC games using PySide6, EasyOCR, and a custom C++/DLL backend, enabling on-demand text capture and translation.
- Built an end-to-end OCR pipeline with optional PyTorch GPU acceleration and DeepL API integration stored securely, providing instant Japanese to English translation of in-game text, menus, and dialogues.
- Engineered a robust cross-resolution text capture system to ensure consistent recognition across monitor setups.
- Designed a user-friendly 4 button GUI with capture, refresh, OCR, and translation controls; documented setup steps (including DLL compilation in Visual Studio if desired) to make the tool reproducible for end-users.

WGCapture

- Developed and published a C++/DLL-based screen capture library on PyPI, enabling consistent capture of fullscreen, borderless, and windowed applications.
- Created as a lightweight alternative to existing Python tools (e.g., `mss`, `pygetwindow`), which struggle with high-DPI scaling, fullscreen, and per-window capture.
- Implemented GPU-level frame capture via Direct3D's frame pool, providing more reliable screenshots than conventional monitor-snipping methods.
- Packaged as a reusable PyPI library to simplify integration into future projects and make it available to the broader Python community.

Chamber Crawler 3000+ (CC3k+)

- Co-developed a turn-based, console-rendered roguelike with maps, enemies, and item interactions.

Education

University of Waterloo Sept 2022 - Present
Bachelor of Mathematics *Waterloo, ON*