Aaron Moseley

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PROFESSIONAL EXPERIENCE

Carlson Software

Machine Learning Engineer *August 2024 - Current*
Machine Learning Engineer Intern *May 2024 - August 2024*

- Led development of multiple new features for Carlson IntelliCAD aimed at detecting boundaries of materials and roadways in aerial images using machine learning techniques
- Using semi-supervised learning with PyTorch to create image segmentation and boundary detection models
- Developed extensive tooling for ground-truth data creation using C++, PyQt, and SQL to transform 30+ drone-captured orthomosaics into usable labeled data for computer vision models
- Created post-processing pipeline with C++ to transform predicted segmentation masks into polyline data depicting class or class-pair boundaries
- Developed modular plugin system for a point cloud visualization software using C++ and ZeroMQ
- Created custom HTTP server and API to handle the automation of training computer vision models

Infineon Technologies

Computer Engineering Intern *May 2023 - August 2023*

- Developed physical verification rules in SVRF and designed transistor-level validation cells for unit testing

University of Kentucky

Medical Imaging/Machine Learning Research Assistant *January 2023 - January 2024*

- Used PyTorch to develop a novel training approach for image segmentation models, shown to improve over baselines by up to **32.4%** across multiple metrics and datasets
- **Full paper** published at **ISBI 2024**, poster presented at **CCS 2023,** received Research Fellowship for Fall 2023

Lockheed Martin

Software Engineering Intern *May 2022 - August 2022*

- Created **$33,000** in annual savings and reduced report creation time by **90%** by building automation tools with .NET

FEATURED PROJECTS (full portfolio)

Vulkan Dynamic Lighting Demo

- A demo project showing a simple general-purpose instance renderer with a moving light
- Uses vanilla Vulkan with C++ and GLSL to implement Blinn-Phong lighting

Deep State-Value Estimation for Long-Term Planning

- A novel reinforcement learning strategy combining deep image analysis models and tree-search algorithms
- Shows to improve over standard tree search by up to **10%** in a generic strategy game

Hydraulic Erosion Simulation

- Realistic simulation of gradual hydraulic erosion in real time on randomized or user-defined terrain
- Implements a Perlin noise procedural generation algorithm and allows for user customization

FEATURED PAPERS/PRESENTATIONS

PolyCL: Context-Aware Contrastive Learning for Image Segmentation - Published at ISBI 2024, First Author
Context-aware Multitasking for Medical Image Segmentation - First Author, Presented at UK's 5 Minute Fast Track
Development of a Modular Current-Mode NaI(Tl) Detector Array for Parity Odd n-γ Measurements - Paper In Progress

EDUCATION

University of Kentucky - Bachelor of Science in Computer Science and Mathematics, Summa Cum Laude
Lexington, KY *August 2020-May 2024*

- **GPA: 3.97 / 4.0**
- Lewis Honors College, Competitive Programming Team (placed 1st in Kentucky at ICPC Regionals 2024), Undergraduate Science Journal Club
- Department of Computer Science Award for Outstanding Academic Achievement, Dean's List for all 8 semesters
- Undergraduate teaching assistant for classes covering Linux, intermediate C++, and UI development
- Research assistant in nuclear physics where I deployed a **data-collection and processing software** on the J-PARC particle accelerator, presented project at **APS 2023** and **NCUR 2023**

TECHNICAL SKILLS

Languages: Python, Java, C#, C++, C, SQL, LaTeX
Frameworks/Libraries/Tools: PyTorch, PyTorch Lightning, sklearn, HDF5Lib, NiBabel, Qt/PyQt, Vulkan, Git/Github, Unity