Musab Fiqi

614-495-6996 | fiqi.2@buckeyemail.osu.edu | linkedin.com/mfiqi | github.com/mfiqi

INTRODUCTION

Computer Science Master's student at The Ohio State University, graduating December 2024. Passionate about Computer Graphics & Software Development.

EDUCATION

3.6/4.0 GPA

Master's of Science in Computer Science & Engineering Columbus, OH
The Ohio State University *Aug. 2023 – Dec. 2024*

Bachelor's of Science in Computer Science & Engineering Columbus, OH
The Ohio State University *Jan. 2020 – May 2023*

Associate's of Science Columbus, OH
Columbus State Community College *Jan. 2018 – Dec. 2019*

TECHNICAL SKILLS

Languages: C, C#, C++, Java, Python, x86 Assembly, Scheme, SQL, HTML, LaTex
Frameworks: PBRT, WebGL, WebGPU, Model-View-Controller, Scikit-learn, Tensorflow, JUnit, MonoGame, Makefile
Developer Tools: Linux, Agile/SCRUM, Git, VIM, SVN, Unity, VS Code, IntelliJ, Visual Studio 22, Eclipse

MASTER'S PROJECT

Tetrahedral Volume Rendering of Unstructured Data Jan. 2024 – Dec. 2024
Department of Computer Science & Engineering at OSU *Columbus, OH*

- Project explores the use of WebGPU, a new graphics API, for direct volume visualization of tetrahedral meshes. This project began by the need to efficiently render complex, unstructured datasets using WebGPU's feature set to implement direct volume visualization for a tetrahedral mesh. The renderer traverses the tetrahedral mesh sequentially, accumulating color and alpha values. This continues until the ray exits the mesh.
- Renderer is capable to visualize the turbulence around a golf ball, but currently faces performance limitations when handling large meshes due to CPU-intensive pre-processing steps. Future work will focus on moving these pre-processing steps to WebGPU compute shaders to improve performance and enable the visualization of larger, more complex datasets.

EXPERIENCE

Internship at FABE May. 2022 – Aug. 2022
Department of Food, Agricultural, Biological and Environmental Engineering at OSU *Columbus, OH*

- Utilized PyTorch and Jetson Nanos to train a convolutional neural network for identifying various weed species. Jetson Nanos were attached to a stinger drone which was flown over crops to detect weeds such as canopy, waterhemp, giantragweed and marestail.
- Made the process of extracting frames from the recorded videos multithreaded, which substantially increased the speed at which frames were extracted. Processed 12TB of frames which helped increase the accuracy of the CNN model to 92%.

Research Study for the National Science Foundation May. 2022 – July. 2022
National Science Foundation *Columbus, OH*

- Collaborated closely with a select team of undergraduate students to design and program a Sociology research study, funded by the esteemed National Science Foundation.
- Utilized JavaScript within the Lioness Labs tool to dynamically modify various study behaviors that was requested by the graduate research student.

PROJECTS

NeonSense - Game Development | *Unity*   March. 2024 – Apr. 2024
- Part of the mechanics & engineering team for a collaborative game design project about a 3D first person cyberpunk-themed boomer shooter. Learned much about the game design process and how to effectively make a game with other developers. Link to the full game

3D Scene Rendering with PBRT | *PBRT-v3*   April. 2024
- Developed a 3D scene using physically-based rendering (PBRT), incorporating advanced rendering techniques like bump mapping and environment mapping for enhanced realism. The scene was rendered with 640 samples and a maximum depth of 160, resulting in high-quality images despite the challenges of complex materials and lighting.

Brawn Swan - Game Development | *Unity*   Jan. 2024 – Feb. 2024
- Part of the mechanics & engineering team for a fighting beat-em-up game where you play as one angry swan. Implemented the gameplay mechanics such as punch, bite, ultimate slam, etc. Link to the full game

Real-time 3D Graphics | *WebGL, JavaScript, GLSL, HTML*   Aug. 2023 – Dec. 2024
- Developed a WebGL renderer enabling real-time rendering in 3D with lighting, textures, and environment mapping. Proficiently utilized JavaScript and GLSL.

Mesh Subdivision | *Python*   Nov. 2023
- Divides a given mesh into n number of subdivisions using Catmull-clark subdivision which smooths out low-poly meshes. Demonstrated expertise in computational geometry and mesh processing techniques, contributing to the refinement of low-poly models for improved visual fidelity.

B-spline Surface | *Python*   Oct. 2023
- Combined two B-splines to create B-spline surfaces.

Spotify Playlist Generator | *Python, ElasticSearch, React*   Jan. 2023 – April. 2023
- Designed and implemented a Spotify playlist recommendation system utilizing Elasticsearch and React, where the user prompts the program to generate personalized playlist recommendations based on the input songs. Developed a specialized algorithm which considers various audio features such as danceability, energy, tempo, etc.

Custom Interpreter using Recursive Descent Parsing | *C*   Jan. 2023 – April. 2023
- Created an interpreter that adheres to a specific context-free grammar. Interpreter supports the execution of basic statements, functional calls, recursion, and garbage collection.

Soccer Ball Object Tracking | *Python, OpenCV*   April 2023
- Utilizing the meanshift object tracking technique, successfully achieved near real-time tracking of a soccer ball while also identifying the player responsible for shooting the ball into the goal.

TLOZ 1986 - Game Development | *C#, MonoGame*   Sep. 2022 – Dec. 2022
- Recreated the first dungeon in The Legend of Zelda (1986) with some added rooms inspired by Doom (1993). Implemented common software design patterns such as the singleton, factory, decorator, and state patterns. Youtube link to the full game.

Space Invaders | *C*   Jan. 2022 – March. 2022
- Executable 2D minigame space invaders minigame where you control a laser canon and try to shoot down incoming aliens. Link to repo.

Zero-Crossing Counter | *x86 Assembly*   April. 2022
- Counts the number of zero-crossings and calculates energy from raw analog frames that are used in automatic speach recognition.

Convolutional Neural Network Image Classification | *Python, Scikit-learn, Tensorflow*   April. 2022
- Classified images from the CIFAR-10 dataset using standard neural network techniques with an accuracy of 75%.

Virtual Store Database | *SQL*   Aug. 2021 – Dec. 2021
- Worked with a small team of undergraduate students to build a virtual store from using SQL and standard DBMS techniques. Supplied over 400 insertions and wrote over two dozen advanced queries to be used by store owners.