Nabil Mansour

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EDUCATION

Toronto Metropolitan *(formerly Ryerson)* University   Toronto, ON
Computer Science 5th year student (B. Sc) Co-op   *Expected Jan 2024*
- **3.94/4.33** CGPA
- Relevant Courses: Computer Graphics and VR, Machine Learning and AI, Computer Vision

EXPERIENCE

Research/Teaching Assistant   May 2021 – May 2022 & September 2023 – present
Toronto Metropolitan (formerly Ryerson) University   *Toronto, ON*
- Developed an **auto-marking** program in **LISP** that runs student programs and grades them automatically while also reporting any problems and handling any raised errors in their programs.
- Redesigned and modified CPS 305 (**Data Structures**) labs by improving on the instructions of the first drafts of the labs and providing solutions for them as supervised by Professor Marcus Santos.
- Administered weekly tutorials, critiqued students' code, and provided guidance for writing more efficient and readable code by discussing with them good standards and practices.
- Also TA-ed in other courses like CPS 506: **Comparative Programming Languages**.

Software Engineer   May 2022 – August 2022 & Jan 2023 – April 2023
Fairly AI   *Toronto, ON*
- Developed a reusable **pip-installable** Python library for enhanced code maintenance and future project extensions.
- Implemented big data verification functions that evaluate the potential risk of datasets and AI models.
- Optimized **Streamlit** applications and **Jupyter** notebooks for dynamic compatibility with diverse datasets and AI models, improving user experience.
- Redesigned the database for the back-end, and implemented a secure authentication system utilizing **Oso**, resulting in enhanced data integrity and improved system security.
- Created a user department system using **React** and **Flask** for efficient organization within companies.
- Restructured Data Validation processes, utilizing **Dask** to manage Big Data efficiently, resulting in improved accuracy and processing speed.

PROJECTS

Shaders | *GLSL*   **ShaderToy profile**
- Made various shaders that utilize signed distance fields for rendering different mathematical shapes.
- Some of those shaders visualize **3D raycasted objects** and others visualize mathematical concepts like the **Mandelbrot set**.

Fractal Glide | *C#, HLSL, Unity Game Engine, MonoBehaviour, .NET Framework, Steamworks*   **Website**
- Conceptualized, designed, and developed **FRACTAL GLIDE** an indie game available on **Steam**.
- Developed a custom **cone/ray marching engine** from the ground up as an extension to the **Unity3D** rendering pipeline, optimizing rendering performance and achieving stunning fractal visual effects

Neuro Gambit | *Python, Pytorch, Jupyter Notebook*   **GitHub**
- Developed Chess Artificial Neural Networks, using **PyTorch**, trained on datasets from **Kaggle** and **FICS** games.
- Designed and trained two distinct ANN models: Neuro-Gambit and Neuro-Gambit-resnet, where the former is a completely new model and the latter a fine-tuned resnet model.
- Utilized methods used to avoid overfitting like **L2 regularization**, **dropout neurons** and **early stopping.**

Slime Simulator | *Python, ModernGL, GLSL, imgui*   **GitHub**
- Implemented a slime mold cellular automata simulation that showcases the emergent behaviour of slimes.
- The purpose of this project is to learn how to utilize compute shaders in an effective manner and be able to use them in a rendering pipeline.

TECHNICAL SKILLS

Languages: Python, TS/JS, HTML5, CSS, C/C++/C#, GLSL, HLSL, LISP
Frameworks and Libraries: Pytorch, Numpy, Pandas, Dask, OpenGL, ModernGL, Node.js, React, Material UI, Cypress, Redux, Socket.io, Flask, SQLalchemy
Developer Tools: VS Code, Visual Studio, Git, Arduino, Emacs, Linux
Applications: Unity Game Engine, ShaderToy, MATLab, Fusion360