Matthew Maciesowicz

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Education

University of Toronto Expected Sept 2025
Bachelor of Applied Science in Computer Engineering Toronto, ON

- Relevant Courses: Algorithms & Data Structures, Intro to AI, Machine Learning, Deep Learning

Skills

Languages: Python, C/C++, JavaScript/TypeScript/CSS/Sass/HTML, Java, MySQL
Frameworks: PyTorch, scikit-learn, Numpy/Pandas/Matplotlib, React.js, Node.js, Express.js, Socket/Requests
Tools: Git/GitHub, Linux, MATLAB, MS Office
Hardware: Verilog, Raspberry Pi, Arduino, ATmega8 microcontroller
Media/Graphic Design: Adobe Suite (Photoshop, Illustrator, Premiere Pro, After Effects, Lightroom, Audition)
Modeling: AutoCAD, SolidWorks
Professional: Oral/Written Communication, Leadership & Teamwork, Mentorship, Passion for Learning

Projects

GIS Graphical Mapping Application maciesowicz.ca/projects/gis
Software Communication & Design Course, University of Toronto Jan 2023 - Apr 2023

- Worked in a team of 3 to develop a graphical mapping application (similar to "Google Maps") in **C++** using the OpenStreetMap dataset that allows users to search and navigate their city and locate points of interest.
- Utilized **Git** for version control to manage/track changes to the project codebase in a **Linux** environment.
- Utilized **GTK**, a graphics-rendering library, to render lines, points, and polygons onto an interactive canvas.

Etymology Offline Dictionary Android Application maciesowicz.ca/projects/etymology
Self-Initiated Project June 2024 - June 2024

- Designed & developed an **Android** app using **Java** & **XML** that explains the etymology/origin of words.
- Converted a 4 million entry **CSV** database to an **SQL** database in **Java** to store the etymology data locally.
- Implemented auto-complete data entry in the search bar by querying the **SQLite** database with **MySQL**.

"Shtei" Chess Variant Web Application shtei.maciesowicz.ca
Self-initiated Project Mar 2024 - June 2024

- Developed a web application using **React.js**, **JavaScript** and **TypeScript** for a chess-like game that I co-created called "Shtei" that involves uniting the queen and king on a 10x10 board with specialized rules.
- Created an **Express.js** server in **Node.js** that uses a **Socket** connection to allow users to play online with friends.
- Adapted and reverse-engineered open-source chess projects (react-chessboard, chess.js) to develop a Chess.com-like GUI for Shtei, enabling users to move pieces according to Shtei's rules.

Acne Detection & Severity Classification Application maciesowicz.ca/projects/acne
Applied Fundamentals of Deep Learning Course, University of Toronto Jan 2024 - Apr 2024

- Developed two deep learning models (R-CNN and CNN) in **PyTorch** that detect and locate regions of acne on an image of a patient's face, draws boxes around them, and classifies severity into 4 classes.
- Collected dataset images using a **Python** web-scraper with **Requests** to supplement the "acne04" dataset used.
- Utilized **Numpy** to store/manipulate the image data and **Matplotlib** to view training progress plots.

Spam Message Recognition Application
Intro to Artificial Intelligence Course, University of Toronto Mar 2024 - Mar 2024

- Developed a deep learning model using the torchtext library in PyTorch that distinguishes between a message being spam, and not spam allowing for use in filtering out unwanted messages from a message inbox.
- Implemented and trained a Recurrent Neural Network (RNN) on batches of messages from the "SMS Spam Collection Data Set" that resulted in an accuracy of 98%.

- Utilized the **Matplotlib** library to draw accuracy and error plots to aid visualization of model performance.

Crossword Vocabulary Quiz Web Application maciesowicz.ca/crossword
Self-initiated Project Mar 2024 - June 2024

- Designed and implemented an interactive website, "Crossword Word Quiz", blending classic crossword clues with quiz-style questions that helps users test and learn new vocabulary words and trivia knowledge.
- Employed Python with pandas to parse a 6-million entry crossword clues database (TSV) from 21 different publishers spanning a period of 15 years into an organized **JSON** format.
- Integrated the processed database seamlessly into a **React**-based website, utilizing **JavaScript** for dynamic content rendering.

File Transfer and Text Messaging Applications
Computer Networks Course, University of Toronto Jan 2024 - Apr 2024

- Developed a file transfer application in **C** that allows users to share/transfer files across a network using **UDP**.
- Implemented the client-side of a text messaging application in **C** that allows multiple users to connect to a group chat session and send messages individually or to a group across a network using **TCP**.
- Utilized **pthreads** to multithread multiple socket connections for communications between the clients & server.

Sign Language Detection Application
Applied Fundamentals of Deep Learning Course, University of Toronto Feb 2024 - Feb 2024

- Developed and trained a deep learning Convolutional Neural Network (CNN) model in **PyTorch** that distinguishes among 9 sign language gestures.
- Utilized PyTorch tensors and **Numpy** to store/manipulate the image data into a usable form for training.
- Utilized **CUDA** to allow for GPU accelerated and parallel processing to decrease training time.

Ray Caster/Ray Tracer Application
Computer Graphics Course, University of Toronto Oct 2023 - Nov 2023

- Created a 3D graphics rendering application that reads scene data (camera location, light sources, objects with positions, and material properties) and exports renditions into .ppm image files.
- Generated light rays from camera location that project onto a scene and ray-triangle (meshes), ray-sphere, and ray-plane intersections that calculate if a certain ray hits an object and gets rendered.
- Utilized the Blinn–Phong reflection model to render light reflection and refraction, shadows, and material textures to make realistic-looking renditions.

N64 to GameCube Controller Converters Demo
Self-initiated Project, Hamilton ON June 2022 - July 2022

- Constructed a set of adaptors to facilitate the conversion of input data from Nintendo 64 controllers to match the data signals of Nintendo GameCube controllers, allowing N64 controllers to be used for GameCube games.
- Successfully prototyped the proposed schematic design on a breadboard, featuring an **ATmega8 microcontroller** programmed in Assembly code.

Named Entity Recognition Application
Intro to Artificial Intelligence Course, University of Toronto Mar 2024 - Mar 2024

- Implemented Named Entity Recognition (NER) on the "MIT Movie Dataset" to identify and predict the context of each word in sentence, given a list of 12 named entries, resulting in an accuracy of 87%.
- Developed and enhanced a Hidden Markov Model (HMM) in **Java** that predicts the hidden state of the next word in a sentence for the Parts of Speech (POS) tagging.
- Implemented the Viterbi algorithm to backtrack and solve the most likely sequence of states in the HMM.

Experience

Language and Culture Teaching Assistant John Paul II Polish School – Hamilton, ON Sept 2016 – June 2017

- Conducted lessons and classes toward a group of 20 grades 4 & 5 students covering Polish grammar, vocabulary, history, culture, and conversational skills.
- Provided individualized support to students relating to relevant homework assignments and worksheets.

Awards

Edward S. Rogers Sr. Admission Scholarship June 2020

- Scholarship from University of Toronto recognized for academic achievement & extra-curricular involvement.