

# Abbas Rizvi

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## EDUCATION

### Bachelor of Science; Computer Science

University of Alberta, Edmonton, AB

Expected Graduation: 2027

GPA: 3.78

## SKILLS

**Programming** C, C++, Python, Java, JavaScript

**Data & ML:** PyTorch, XGBoost, NumPy, Pandas, Matplotlib, SPSS, Excel, YOLO, OpenCV

**Web & Tools:** Flask, Render, WebAssembly, Node.js, HTML, Git, HPC, Android Studio, Google Colab

## EXPERIENCE

### Computer Vision Engineer Intern | Technologies: Python, YOLO, CVAT, NumPy, matplotlib, Google Colab, OpenCV

ChromacareLabs | Dec 2025 - Present

- Used OpenCV to generate and then correct pseudo-labels for a large dataset of Lateral Flow Assay cassettes and test windows, then trained a YOLO-obb model to detect the above from a variety of backgrounds.
- Building an image processing pipeline to ensure consistent test results across different smartphone models. Includes automated capture logic, use of RAW images, sensor calibration, and ambient light subtraction to standardize the data.

### ML Research Assistant, Servier Virtual Cardiac Centre | Technologies: Python, PyTorch, NumPy, Matplotlib, Pandas, Git, HPC

University of Alberta | May 2025 – Present

- First author** on a paper (IEEE BIBE 2025) after benchmarking deep learning models for cardiac MRI segmentation, demonstrating improved accuracy with transfer learning.
- Applying regression models and numerical integration to clinician-reviewed data, which estimates ventricular volumes from fewer short-axis MRI slices, suggests the potential to significantly shorten scan times.

### Teaching Assistant, CMPUT 201 – Practical Programming Methodology

University of Alberta | Expected Sept 2025 – Dec 2025

- Guide students in labs, office hours, and forums on C programming and developing well-structured programs, support Git version control and terminal usage, and assist with assignment creation.
- Evaluate assignments and exams, provide detailed feedback to help students improve programming and problem-solving skills, and ensure grading is consistent and aligned with course standards.

### Data Analysis Assistant

Faculty of Medicine & Dentistry, University of Alberta | Feb 2025 – Aug 2025

- Co-authored** a research article and a poster on pain assessment in dementia, presented at the Canadian Conference on Dementia, a leading national conference, by contributing data analysis and visualizations using SPSS and Excel.

## SOFTWARE PROJECTS

### 3D DICOM Cardiac MRI Visualizer | Technologies: C++, VTK, Qt

- Developed a C++/VTK/Qt tool to construct DICOM volumes from 2D slices using slice position, spacing, and orientation metadata, while mapping contours of anatomical structures onto the reconstructed volume.
- Enabled interactive 3D visualization of DICOM time series, letting users select slices and view volumetric changes.
- Will use generated 3D visualizations to explain methodology in a research paper.

### Barnes-Hut N-Body Simulation in C | Technologies: C, Python, Git, Matplotlib, multiprocessing

- Engineered a high-performance C physics simulation for gravitational N-body systems, reducing pairwise interaction complexity from  $O(n^2) \rightarrow O(n \log n)$  via the Barnes-Hut algorithm.
- Built a recursive quadtree to partition 2D space, dynamically subdividing dense regions for faster force calculations.
- Developed a Python visualization pipeline, parallelizing thousands of frames and simulating collisions of three galaxies.

### City of Edmonton Property Value Predictor | Technologies: Python, XGBoost, Sklearn, Pandas, NumPy, Flask, Render

- Collected and integrated property data for 360,000 Edmonton residences from open data sources and OpenStreetMap, including physical and location-based features.
- Processed datasets for model: handled missing values, encoded categoricals, applied log transforms, and standardization.
- Trained a 5-fold XGBoost model ( $R^2 = 0.917$ , MAE = \$21.5K, RMSE = \$83.4K) and deployed as a Flask app on Render.