# Henry Vu

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## Education

**University of Texas at Dallas** — Richardson, TX
*M.Sc. Computer Science - Intelligent Systems* — *Sep. 2024 - Expected Aug 2027*

**University of Alberta** — Edmonton, AB
*B.Sc. Computing Science with Honors* — *Sep. 2019 - May 2024*

- **GPA: 3.83/4.0**, graduated *Summa cum laude*. International Student Scholarship, Dean's list 2020 - 2024.
- **Coursework**: Algorithms, Databases, Probability Theory, Optimization Theory, Deep Learning, RL, CV, NLP.

## Experience

**Computer Vision Intern** — Feb 2025 – Present
*Thormed Innovation* — *Dallas, TX*

- Developed lightweight semantic segmentation models in **LiteRT** for efficient bladder volume calculation.
- Fine-tuned pretrained **U-Net** and **ViT**-based architectures on bladder ultrasound segmentation datasets. Achieved Dice $\geq$ **90%** and Hausdorff Distance $\leq$ **10mm**. Quantized model, preserving up to **98%** of accuracy.
- Experimenting with **CycleGAN** and **Diffusion**-based models to synthesize ultrasound training data.

**Teaching Assistant** — Jan 2025 – Present
*University of Texas at Dallas* — *Richardson, TX*

- Held weekly office hours, prepared seminar and exam materials, and graded coursework.
- Mentored **100+** students in Advanced Algorithm and Data Structures through technical and code reviews.

**Undergraduate Researcher** — Apr. 2022 - May 2024
*Alberta Machine Intelligence Institute (Amii)* — *Edmonton, AB*

- **Online Learning**: Implemented algorithms for online optimization problems using the online **primal-dual** framework. Improved competitive ratios beyond traditional worst-case analysis with ML predictions.
- **Reinformcent Learning**: Conducted a comprehensive survey on adversarial, Markovian and restless multi-armed bandits. Simulated UCB, Exp3, Thompson Sampling, Gittins Index in **Python** on real-world data. [REPO]

## Selected Projects

**Decode EEG using Multi-Modal Approach** | *Python, PyTorch, MATLAB, HuggingFace*

- Identified bad electrodes, filtered, and transformed EEG data using **ICA** and *Automagic* in **MATLAB**.
- **LLMs**: Implemented RoBERTa for word embedding, resulting in an increase of **274%**, **78%**, and **1.4%** in F1-score compared to Gaussian, GloVe and BERT embeddings on a 10-label classification task.
- Using **PyTorch**, developed a novel EEG extraction framework by combining a **convolution** and a **self-attention** module. Achieved consistent increases in F1-score across all 4 embedding types. [PAPER][REPO]

**Modeling Political Sarcasm in Online Discourse** | *Python, PyTorch, HuggingFace, scikit-learn*

- Comparative study on political sarcasm detection using **100k+** Reddit comments.
- Developed **15+** novel engineered features: linguistic, sentiment dynamics, context, sarcasm-specific, boosting traditional model F1-scores by **2%** (reaching 0.71).
- Fine-tuned **DistilRoBERTa** achieved superior F1-score of **0.7814** and accuracy of **0.7833**.
- Interpreted model behavior via attention scores, error analysis, and LDA topic modeling. [PAPER][REPO]

**UManitoba Navigator** | *Python, FastAPI, React, HTML/CSS, Git*

- Mapped Manitoba with OpenStreetMap data, including tunnels and hidden pedestrian paths. Won first-time participant award at *.devHacks*.
- Designed backend with **FastAPI** serving geospatial data to **React Leaflet** frontend with 150ms response time.
- Implemented **Dijkstra's algorithm** for optimal route finding with geo-coordinates as graph vertices. [REPO]

## Technical Skills

**Languages**: Python, Java, Linux, C++, R, SQL, HTML/CSS, JavaScript, MATLAB, LaTeX.
**Frameworks and Libraries**: NumPy, PyTorch, TensorFlow, HuggingFace, React, Node.js, JUnit, FastAPI.
**Developer Tools**: Git, Linux, Docker, MongoDB, Android Studio, R Studio, VS Code, Firebase.