Tony Tran

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EDUCATION

University of Houston, Cullen College of Engineering | Houston, TX

M.S. in Engineering Data Science and AI, GPA: **3.67/4.00**   **May 2026**

Thesis: ELASTIC: Efficient Once For All Iterative Search for Object Detection on Microcontrollers

B.S. in Computer Engineering Technology, GPA: **3.84/4.00**   **May 2024**

Minor in Technology Leadership and Innovation Management

Engineering in Training (FE/EIT) License in Electrical and Computer (*Texas: 81224*)   **June 2024**

EXPERIENCE

University of Houston | Houston, TX

Graduate Research Assistant   **Dec. 2023 - Present**
- Reduced NAS Search Time by **50%**, Improved Accuracy by **4.75%**, and Proposed Passthrough Tuning through DQNs
- Reformulated Robot Angle Estimation as a Classification Task (**21 Bins**), Applied **4** Unique Domain Randomization Techniques, Trained Robust DNN (**88% Accuracy**) on **28k** Synthetic Training Images and Validated on **28k** Test Images
- Streamlined Model Development Pipelines through Prompt Engineering and Distributed Training on HPC Clusters and the Lambda Cloud, Reducing End-To-End Experimentation Time by **3x**

Engineering Technology Teaching Assistant   **Aug. 2024 – Present**
- Lead Weekly Lab Sessions/Office Hours for **30+** Students per Class, Responsible for Grading Homeworks, Tests, Quizzes
- Designed **Six** New Lab Assignments Ranging from Deep Learning Models in PyTorch, Model Compression Techniques (Pruning/Quantization), and Model Deployment (Synthesizing Models to C Code)
- Taught AI in Robotics (SP2026), Embedded Systems (FA2024, SP2025), Sensor Applications (FA2024, SP2025), Introduction to C++ Programming (FA2024)

Research Mentor, UH RE-PST Program   **Summer 2025**
- Mentored **Two** End-to-End Embedded Machine Learning Projects, Building Cats vs. Dogs Image Classification and Keyword-Spotting Audio Recognition Demos on **Two** Different Microcontrollers in <**6 Weeks**
- Designed an Intensive AI in Embedded Systems Hands-On Curriculum Containing (**15+** Labs) and Guiding **Two** Undergraduate Researchers with No Prior Experience

SELECTED PROJECTS

ELASTIC – MASTER'S THESIS | Python, PyTorch (+DDP, AMP), Embedded C   **Aug. 2024 - May 2025**
- Designed Lightweight DNNs in under **32 KiB Memory**, Reducing Energy Consumption by **3.5x**, Requiring **1.6x** Less Power Usage, and Lowering Latency by **2.4x** utilizing Proposed Constrained Iterative OFA NAS Framework for Detection
- Deployed Tiny DNNs in under **1/4 MiB Flash** and Achieving **3ms** Inference Time on MAX78000/02 Platforms for Digit and Face Detection Demos
- Analyzed Iterative vs OFA NAS Search Space, Identifying Architectures with up to **25% Mean Accuracy**
- Project Website: https://nail-uh.github.io/elastic.github.io/

Otto Sorting Bin – Capstone Project, 1ˢᵗ Place, URD 2024 Poster | YOLO, OpenCV   **Aug. 2023 - May 2024**
- Finetuned YOLOv8 (**90%** Accuracy) Object Detection Model using TACO Detection Subset (**1.5k** Images) and >**500** Custom-Labeled Images for Robust Trash and Recyclable Detection Management on Nvidia Jetson Nano
- Engineered a Low-Cost T-Bot Sorting System and Constrained Object Priority Algorithm (>**85%** Physical Pickup Success) through Mechanical-Algorithmic Co-Design

TrashDet – Accepted to WasteVision2026 | Python (+OOP), PyTorch, YOLO, Embedded C   **Nov. 2025 - Dec. 2025**
- Achieved State-Of-The-Art Performance (**19.5 mAP**) on the TACO Dataset (**1.5k** Images), Outperforming Prior Waste Detectors with **2.8x** Less Model Size

- Derived Deployable TinyML Models down to **1.1M** Parameters, Maintaining Real-Time Performance at **37 FPS** for Real Time Waste Detection

Traffic Severity Modeling | Python, Scikit-Learn, Matplotlib, Seaborn, Pandas, NumPy   **Aug. 2025 - Dec. 2025**
- Interpreted over **7.7 million** Traffic Records with over **40** Variables and Built Accident Severity Predictive Model (**85%** Accuracy) using Logistic Regression, Linear Discriminant Analysis, SVM, Naïve Bayes, Random Forest, and LightGBM
- Employed PCA and K-Means Clustering to Profile **Four** Data-Driven Crash Categories and Improve Interpretability

ADMM Pruning | Python (+OOP), PyTorch, Matplotlib, NumPy, Pandas, Excel   **Aug. 2025 - Dec. 2025**
- Cut Size of Mobile DNNs in **Half**, Retaining **97%** Predictive Performance, and Increasing Accuracy by **3.5x** Post Pruning
- Sped Up Model Convergence by **36%** and Discovered **One** Architecture Failure Mode under High Complexity

1-Lipchitz Layers Beyond Classification | Python (+OOP), PyTorch, Matplotlib   **Aug. 2024 - Dec. 2024**
- Extended 1-Lipchitz Robustness Theory to Object Detection, Evaluating **Three** Layer Designs on Tinier-SSD Detectors using the SVHN Detection Dataset (**>40k Images**)
- Benchmarked Robustness, Achieving **10%** Higher Accuracy, and Retaining **85%** Predictive Performance (Compared to **53%** Against Baseline)
- Quantified Cost of Robustness (**6x** Training Time, **20x** Parameters), Informing Production-Scale Trade-Offs

PUBLICATIONS

Published Publications
[1] **T. Tran** and B. Hu, "FACETS: Efficient Once-For-All Object Detection via Constrained Iterative Search", *2025 IEEE International Conference on Robotics and Automation (ICRA) Late Breaking Session*, 2025.

[2] R.R. Suganda, **T. Tran**, M. Pan, L. Fan, Q. Lin, and B. Hu, "Distributed Perception Aware Safe Leader Follower System via Control Barriers Methods", *2025 IEEE International Conference on Robotics and Automation (ICRA)*, Atlanta, GA, May 2025. (**Acceptance Rate: 38.67%**).

Publications Under Review
[3] **T. Tran** and B. Hu, "TrashDet: Iterative Neural Architecture Search for Efficient Waste Detection", *In Proc. IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) Workshop,* Int. Workshop on Smart Waste Monitoring (WasteVision), Tuscon, AZ, USA, MAR. 2026, to appear.

[4] **T. Tran**, Q. Lin, and B. Hu, "ELASTIC: Efficient Once for All Iterative Search for Object Detection on Microcontrollers", *Under review at IEEE Transactions on Computers – Briefs, 2025*.

AWARDS AND HONORS

- Summa Cum Laude (Awarded by UH 2024)
- Dean's List (**8 Semesters 2020-2024**)
- University Honors (Awarded by The Honors College at UH 2024)
- **7x** Engineering Project Awards (**5x 1st** Place, **2x 2nd** Place)

TECHNOLOGIES

- **Languages**: Python, C/C++, Java, HTML, MATLAB, Verilog
- **ML/DL**: PyTorch, TensorFlow, Scikit-Learn, LightGBM
- **CV**: YOLO, Detectron2, OpenCV, Roboflow
- **Systems**: NAS, OFA, Edge/TinyML, Latency/Memory/Energy Profiling
- **Data**: NumPy, Pandas
- **Visualization**: Matplotlib, Seaborn, Tableau
- **Hardware**: MAX78000/02 (ARM Cortex-M4F), Jetson Nano, TM4C123GXL (ARM Cortex-M4F)
- **Tools**: Git