

Chris Morse

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Early career professional with specialized knowledge at the intersection of software engineering, machine learning, and robotics. Experienced problem solver with an M.S. in Computer Science, seeking a full-time role in machine learning.

EDUCATION	Master of Science , <i>Computer Science</i> , University of Virginia Thesis: <i>A Spatial Relation Inference Generator for Robot Systems</i> Advisor: Prof. Sebastian Elbaum, GPA: 4.00 / 4.00 Charlottesville, VA May 2023
	Bachelor of Arts , <i>Computer Science</i> , University of Minnesota GPA: 3.91 / 4.00, <i>Music Minor</i> Minneapolis, MN May 2021
LANGUAGES	Python (<i>strong proficiency</i>) – C++ (<i>high proficiency</i>) – C/Java/SQL (<i>adequate proficiency</i>)
SKILLS	Deep Learning – Generative Models – Digital Signal Processing – Software Analysis – Git – Docker
WORK EXPERIENCE	Research Assistant , <i>LESS Laboratory</i> University of Virginia Aug. 2021 – Dec. 2022 <ul style="list-style-type: none">Created a novel, highly modular system to infer safety specifications from spatial data.Utilized PyTorch-based panoptic segmentation to establish coverage metrics over rich scene graphs.Performed simulations to generate data and develop complex robot algorithms (Unity, Gazebo, CARLA).Published open-source tool at an international robotics conference (github.com/less-lab-uva/SpRInG). Research Assistant , <i>Interactive Robotics and Vision Laboratory</i> University of Minnesota – Twin Cities Jan. 2020 – Jan. 2021 <ul style="list-style-type: none">Compiled the first dataset of semantically segmented underwater images to enhance AUV perception.Performed dataset analyses to resolve training imbalances in object detection models.Created an image processing pipeline (OpenCV) to generate synthetic image pairs for facial recognition.Used modern development practices for software testing (C++, Python) and version control (Git). Research Assistant , <i>Intelligent Unmanned Systems Laboratory</i> NSF REU Program, University of Nebraska – Lincoln June 2019 – Aug. 2019 <ul style="list-style-type: none">Augmented training datasets to quantifiably improve TensorFlow detection model performance.Quantified performance of models with evaluations along precision, recall, and mAP metrics.Tested real-time model inference speed on an NVIDIA Jetson Nano and documented results in a report. Teaching Assistant “ <i>Robotics for Software Engineers</i> ”, University of Virginia Aug. 2022 – May 2023 “ <i>Discrete Math</i> ” and “ <i>Intro. to Programming</i> ”, University of Minnesota Sept. 2018 – Dec. 2019 <ul style="list-style-type: none">Led labs covering software testing, system design, and object-oriented programming for 150 students.Developed learning materials for robot control, sensing, localization, ROS design, and perception.
INDEPENDENT PROJECTS	VAE-Guided Testing Framework for OpenPilot’s Perception System Spring 2022 <ul style="list-style-type: none">Modeled feature distribution of training set through a custom variational autoencoder model in PyTorch.Performed PCA dimensionality reduction over latent vector representations to enable clustering.Formed feature clusters with K-Means to reveal rare image features.Evaluated perception model over rare features, revealing a 26% drop in lane confidence. Synthetic Data Generation for AUV Detection Enhancement Summer 2020 <ul style="list-style-type: none">Augmented scarce image training sets by generating synthetic data to improve object detection.Trained GAN models to perform domain transfer between underwater swimming pool and ocean images.Trained detection models on original and augmented sets, evaluations reporting +28% mAP.
PUBLICATIONS	1. “A Framework for the Unsupervised Inference of Relations Between Sensed Object Spatial Distributions and Robot Behaviors.” (ICRA 2023) 2. “Semantic Segmentation of Underwater Imagery: Dataset and Benchmark.” (IROS 2020)
HOBBIES	Rock Climbing – Mountain Biking – Skiing – Baking – Jazz Trombone