William Daniels

whdaniels3@gmail.com | whdaniels.github.io | https://www.linkedin.com/in/whdaniels/

Experience

Johns Hopkins University Applied Physics Laboratory, Associate Professional Staff I *Laurel, Maryland* | Jun *2024 to Present*

Applied research and engineering for machine learning capabilities with the A3G Weapon Control Concepts Development Group.

NASA Goddard Space Flight Center, *Machine Learning Intern* *Greenbelt, Maryland | Aug 2022 to Dec 2022*

- Developed multiple neural network regression models to predict in-situ water clarity from multispectral satellite data.
- Built a codebase for data collection, model training, and visualization with flexibility in mind for the NASA team going forward.
- Trained and validated a variety of models for performance on remote sensing test sets through SLURM on Goddard's PRISM GPU cluster.

NASA Goddard Space Flight Center, *Machine Learning Intern* *Greenbelt, Maryland | June 2022 to Aug 2022*

- Investigated using unsupervised deep generative models for supplementing current NASA remote sensing datasets.
- Trained a modified StyleGAN2-ADA model through various scarce data training paradigms with PRISM, the NCCS local GPU cluster.
- Explored routes to quantitatively evaluate quality of generated samples through trained regression models.

Education

Northwestern University, *Master of Science, Computer Science, GPA: 3.92* Evanston, Illinois | *Sept 2021 to June 2023*

Louisiana State University, *Bachelor of Science, Computer Science/Philosophy* Baton Rouge, Louisiana | *Jan 2019 to May 2021*

Selected Projects

Multi-Stage Automatic Line-Art Colorization with Style and Color Priors

Master's Thesis | https://whdaniels.github.io/projects/thesis

- Developed a multi-stage approach for fully-automatic character line-art colorization focusing on task separation and explainability.
- Achieved (as far as authors are aware) SOTA performance for automatic line-art colorization, halving the FID of previous methods.

Improving Extreme Value Prediction for Water Clarity Using Weighted Regression Models

IGARSS 2023 Conference Paper

- Proposes using a recent weighted regression approach for better prediction of extreme water clarity values in the Chesapeake Bay.
- Experiments show that the proposed weighted model, while performing slight worse on overall error metrics, performs significantly better (up to a 40% error decrease) than unweighted models on extreme values, allowing for a more robust regressor on noisy real-world data.

Deep Cartoon Colorization w/ GANs | https://whdaniels.github.io/projects/cartoon

- Constructed a color-to-line-art generator trained inside of a CycleGAN to alleviate a lack of paired data with the use of PyTorch.
- Developed a generator model incorporating both self-attention and a U-net encoder-decoder to produce plausible line-art colorings.
- Built a pipeline which applies extensive augmentation to input images to reduce model overfitting while retaining useful image features.

Data-Centric Approaches to Medical Imaging | https://whdaniels.github.io/projects/data-centric-medical

- Evaluated individual and combined data augmentations in a controlled environment on a subset of the NuCLS dataset using TensorFlow.
- Achieved a final model accuracy of 86.5% on a NuCLS test set solely through image-level augmentations on a ResNet classification network.

Artificial Life Exploration with Ludobots | https://whdaniels.github.io/projects/artifical-life

- Added functionality on top of the Ludobots environment for creature locomotion, based on body-brain "grafting" and "slicing" mutations.
- Selected for creatures who achieved high fitness on locomotion tasks using a custom encoding scheme for automatic creature generation.

Languages and Technologies

Experienced:	Python, Java	PyTorch, NumPy, Keras, TensorFlow, OpenCV
Basic:	C#, C, MATLAB, JavaScript, HTML, CSS, C++, Latex	scikit-learn, pandas, Pillow, PyBullet, pyrosim

Clubs & Organizations

Northwestern AI Journal Club, *Member* *Fall 2021 to Spring 2023*

- Presented review of "*Hierarchical Text-Conditional Image Generation with CLIP Latents*" by Ramesh, et al.
- Presented review of "*Tag2Pix: Line Art Colorization Using Text Tag with SECat and Changing Loss"* by Kim et al.
- Presented review of "*Segmentation in Style: Unsupervised Semantic Image Segmentation with StyleGAN and CLIP*" by Pakhomov et al.
- Presented review of *"Unpaired Image-to-Image Translation of Cycle Consistent Adversarial Networks"* by Isola et al.