William Daniels

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Education

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

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

Experience

NASA Goddard Space Flight Center, *Fall 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.
- Validated a variety of trained models (w/ various hyperparameters and architectures) for performance on multispectral/in-situ test sets.

NASA Goddard Space Flight Center, *Summer 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 to a point of convergence through various training paradigms given scarce data.
- Explored routes to quantitatively evaluate quality of generated samples through trained regression models.

Selected Projects

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

Master's 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 Paper Submission (Under Review)

- 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 Line-Art Colorization w/ GANs | https://github.com/WHDaniels/OnePunchGAN

- 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://bit.ly/3quFzPf

- 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.

BankBot4444 | https://github.com/WHDaniels/BankBot4444

- Led a team of 10 in developing a Python-based customer service chatbot to help online customers with information provision and tasks.
- Curated a JSON response dataset for 91 semantic intents, resulting in 455 total response phrases of training data.
- Ran experiments utilizing a morphological word analysis approach with NLTK, producing a model with 98.6% test accuracy performance.

Languages and Technologies

Experienced:	Python, Java	PyTorch, NumPy, PyQt5, Keras, TensorFlow, scikit-learn
Basic:	C, MATLAB, JavaScript, HTML, CSS, C++, SQL, Latex	OpenCV, pandas, Selenium, JUnit, Pillow, JSoup, NLTK, Seaborn

Selected Skills

Object-Oriented Programming | Statistical Machine Learning | Deep Learning (GANs, CNNs, RNNs, FFNNs) | Independent Research

Clubs & Organizations

Northwestern AI Journal Club, *Member* — *Fall 2021 to Present*

- 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.