Nick Kroeger

NKroeger.cs@gmail.com • kroegern1.github.io • 954-805-1427 • kroegern1

Education

Ph.D. in Computer Science – Machine Learning, University of Florida *Expected 2023*
GPA: 3.77/4.0

B.S. in Computer Science, University of Florida *May 2018*

Minor in Music Performance – Saxophone, University of Florida
GPA: 3.84/4.0

Publications

1. Meerdink, S., Bocinsky, J., Zare, A., **Kroeger, N.**, McCurley, C., Shats, D., & Gader, P. (2019). "Multi-Target Multiple Instance Learning for Hyperspectral Target Detection." *arXiv preprint arXiv:1909.03316*.
2. Koelmel, J. P., **Kroeger, N. M.**, Ulmer, C. Z., Bowden, J. A., Patterson, R. E., Cochran, J. A., Beecher, C. W. W., Garrett, T. J., Yost, R. A. (2016) "LipidMatch: a tool for rule-based accurate annotation of lipids using tandem mass spectrometry data." *BMC Bioinformatics*.
3. Koelmel, J. P., **Kroeger, N. M.**, Gill, E. L., Ulmer, C. Z., Bowden, J. A., Patterson R. E., Yost, R. A., Garrett, T. J. (2016) "Expanding lipidome coverage using LC-MS/MS data-dependent acquisition with automated exclusion list generation." *Journal of American Society for Mass Spectrometry.*

Research Experience

Graduate Research Assistant | Dr. Paul Gader, CS Professor *August 2018 – Present*
University of Florida – Gainesville, FL

- Conduct literature review on *interpretability* for deep learning models with sequential data
- Leverage null space information in neural networks for *out-of-distribution detection*
- Develop *anomaly detection* algorithms for bio-acoustic responses indicative of underwater vehicles
- Devise *unsupervised learning algorithms* for characterization of underwater coral reef soundscapes

Undergraduate Research Assistant | Dr. Paul Gader, CS Professor *October 2016 – May 2018*
University of Florida – Gainesville, FL

- Translated and optimized hyperspectral unmixing algorithms from Matlab to C++ that detect materials, or endmembers, in an image
- Analyzed convolutional and morphological neural networks' ability for detecting landmines

Undergraduate Research Assistant | SECIM Core 1: Mass Spectrometry *January 2015 – August 2016*
University of Florida – Gainesville, FL

- Designed computer programs and scripts in R for cutting edge research in biomarker discovery
- Presented software in oral presentations and co-authored in 2 peer reviewed articles
- Optimized previous in-house software from hour run times to minute run times

Professional Experience

Research Mentor *March 2019 – March 2020*
University of Florida – Gainesville, FL

- Mentored two undergraduate students to create a GUI for labeling underwater acoustic data
- Teach students to implement and train various models for fish call classification

Teaching Assistant | "Computer Programming for Engineers - MATLAB" *May 2017 – August 2017*
University of Florida – Gainesville, FL

- Graded student assignments and held office hours for one-on-one programming assistance

Founder and President | ACM's Artificial Intelligence Club *January 2016 – April 2017*
University of Florida – Gainesville, FL

- Created interest among 250+ students at UF in the field of Artificial Intelligence/Machine Learning
- Conducted weekly presentations, with coding demonstrations, ice breakers, and project discussion
- Led meetings to prepare for semester projects, presentations, promotion, and funding

Resident Assistant | Department of Housing & Residence Education *June 2015 – May 2018*
University of Florida – Gainesville, FL

- Planned and executed 10-15 programs per semester aimed to promote campus involvement, inclusion, academic excellence, and health
- Built community for 40 diverse residents through advising and educational events

Volunteer Programming Teacher | The Boys & Girls Club *January 2016 – August 2016*
Alachua County, FL

- Educated and motivated diverse and underprivileged youth of Alachua County to train for higher levels of education through computer programming
- Taught 9-14 year-old kids how to program games in the computer language "Scratch"

Projects

Genre Classification | Language: Python (library used: PyTorch) *March 2019 – May 2019*

- Created models to classify raw audio as either Progressive or Non-Progressive Rock
- Extracted Mel-frequency cepstral coefficient features from audio
- Compared four types of neural networks: 1) fully-connected, 2) convolutional-recurrent, 3) encoder-decoder long-short term memory (LSTM), and 4) residual encoder-decoder LSTM with self-attention

Musical Instrument Classification | Language: Python *January 2018 – May 2018*

- Implemented a *trainable* fully-connected neural network (using stochastic gradient descent) *from scratch* in Python that supports any number of layers
- Classified raw audio as belonging to one of these nine instruments: cello, clarinet, double bass, flute, guitar, saxophone, trumpet, tuba, or violin

TigerIsland | Language: Java *March 2017 – April 2017*

- Implemented a two-player board game using Agile and test-driven development methods
- Produced an AI to play tournaments against other AIs via server/network protocols

Comparison of Classification Techniques | Language: MATLAB *January 2017 – April 2017*

- Created a multi-class classification algorithm using least-squares regression on four datasets, then we compared the results to a multi-class support vector machine algorithm

Awards & Affiliations

Graduate Student Preeminence Award *Fall 2018*

- GSPA is awarded to the strongest Ph.D. applicants to support highly competitive research

Gartner Group Info Tech Scholarship *Spring 2017*

- Awarded by the UF's Computer Science Awards & Recognition Committee to four undergraduate students that exhibited outstanding GPA, research, awards, and professional services

John & Mittie Collins Engineering Scholarship *Spring 2016*

- Awarded to a student in the Herbert Wertheim College of Engineering at UF who promotes scholarly excellence and innovation through UF's engineering programs

Resident Assistant of Distinction – Service *Spring 2016*

- An award, chosen by coworkers, to honor an RA that demonstrated outstanding crisis management

Dean's List *Fall 2014, Spring 2015, Fall 2015, Spring 2016*

- Awarded for achieving 3.2 GPA or higher with at least 14 credits a semester

Skills & Strengths

Programming Languages Python, MATLAB, Java, R, C++, Elixir, and SQL
Utilities PyTorch, Numpy, Pandas, scikit-learn, OpenCV
StrengthsQuest Top 5 Learner, Achiever, Intellection, Connectedness, Discipline