Kiran Kokilepersaud

Curriculum Vitae

Contact Information
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EDUCATION

University of Maryland 2016-2020
B.S. Electrical Engineering
Honors
Cum Laude
3.92 GPA

Georgia Institute of Technology 2020-2026
Ph.D. in ECE
Honors
3.83 GPA

RESEARCH INTEREST

My research interests lie in addressing discrepancies between the construction of representation learning algorithms and their usage in practical applications. This includes addressing these discrepancies in domains such as medicine, autonomous vehicles, and seismology.

RESEARCH EXPERIENCE

Graduate Research Assistant September 2020 - Present
OLIVES, Georgia Institute Technology Atlanta, GA
Faculty Mentor: Ghassan AlRegib

- Utilized deep learning to develop anomaly detection algorithms for the task of retinal disease detection.
- Performed analysis on contrastive explanations as a method to improve understanding of medical images in deep neural networks.
- Utilized contrastive learning techniques to integrate domain-specific self-supervision in medical, autonomous vehicle (AV), and general settings.
- Published over a dozen scholarly articles, funding proposals, and competitions related to the above topics.

Research Intern June 2020 - August 2020
Johns Hopkins Applied Physics Lab, Johns Hopkins Laurel, MD
Faculty Mentor: Jason Reid

- Developed an image registration algorithms to help with object detection pipeline using deep learning and OpenCV.
- Developed underwater vehicle simulations utilizing ROS and GAZEBO Software.

Research Intern December 2019 - June 2020
Maryland Cybersecurity Center, ECE, University of Maryland College Park, MD
Faculty Mentor: Tudor Dumitras

- Utilized knowledge of Public Key Infrastructure in order to research occurrences of signed malware.
- Created Python script utilizing OpenSSL library to analyze dataset of over 600,000 malware binaries in order to discover potential abuses of PKI.
- Developed scholarly article about abuse of certificates for Pipemon malware as a result of this research.
- Article can be found in blog section of signedmalware.org.

Research Intern September 2019 - December 2019
DSPCAD Research Group, ECE, University of Maryland College Park, MD
Faculty Mentor: Shuvra S. Bhattacharyya

- Utilized C and Java for Digital Signals Processing applications within the DSPCAD research group.
- Created graph structures for modeling Digital Signals Processing environments.

Capstone Project Lead September 2019 - December 2019
Autonomous Robot Capstone Project, ECE, University of Maryland College Park, MD
Faculty Mentor: Gilmer Blankenship

- Developed robot to perform various functionalities related to aiding people in emergency situations.
- Utilized Python language on NVIDIA Jetson TX2 and on OpenCV image processing applications.
- Created human to robot interaction through voice commands with the Amazon Echo Dot.
- Collaborated with other teams to wirelessly communicate with other robots.
- Created algorithms in order to create solution to Simultaneous Localization and Mapping problem.

TEACHING EXPERIENCE

Graduate Teaching Fellow January 2024 - Present
AI Foundations Course, Georgia Tech Atlanta, GA
Supervisor: Ghassan AlRegib

- Developed course content for introductory AI course to be given to entire undergraduate student population at Georgia Tech.
- Interfaced with developers of 26 million dollar AI Makerspace team to integrate high performance hardware systems with course content.

Graduate Teaching Assistant September 2020-August 2021
ECE 3038, ECE 2026, ECE, Georgia Tech Atlanta, GA
Supervisor: Department of ECE

- ECE 2026 Intro to Signals Processing Spring 2021, Summer 2021
- ECE 3038 Analog Circuits Lab Fall 2020

Undergraduate Teaching Fellow September 2017 - December 2020
ENEE 140, University of Maryland College Park, MD
Supervisor: Tudor Dumitras

- Lead class of 12-14 students through semester long introductory C programming class for 12 hours a week.
- Independently developed projects, lesson plans, and homework assignments for the course.

iD Tech Lead Instructor May 2017 - August 2018
American University Washington D.C.
Supervisor: Kim Coffey

- Taught weeklong programming courses on Java, JavaScript, and Lua to classes of 6-10 students.
- Aided in management of team of 9-12 instructors on procedures and guidelines for effective instruction.

PROFESSIONAL EXPERIENCE

Digital Technology Intern June 2019 - August 2019
Mission Systems, Northrop Grumman Linthicum, MD
Supervisor: Mark Sovaldi

- Created Verilog code to design various components for a final ASIC product.
- Used SystemVerilog to create a UVM environment for advanced verification of an ASIC product.
- Developed a direct programming interface in C for predicting final states within verification.

TECHNICAL SKILLS

- **Programming Languages:** Java, Python, C/C++, JavaScript, HTML/CSS
- **Developer Tools:** Git, Google Colab, JupyterLab, Visual Studio, PyCharm, IntelliJ, Eclipse
- **Libraries:** Pandas, NumPy, Matplotlib, OpenCV, OpenSSL, PyTorch, Tensorflows
- **Application Areas:** Computer Vision, Self-Supervised Learning, Digital Signals Processing, Optimization Theory, Spectral Analysis

VOLUNTEER EXPERIENCE & CAUSES

Center for Signal Processing Seminar Coordinator September 2022 - Present
Georgia Tech Atlanta, GA
Supervisor: Ghassan AlRegib

- Organized weekly research seminars for graduate signals processing students.
- Invited and coordinated talks from speakers in diverse research interest areas.
- Won CSIP service award as a result of this volunteer work.

Crisis Hotline Counselor March 2017 - May 2020
Help Center, University of Maryland College Park, MD
Supervisor: Joshua Lang

- Trained 8 hours per week to effectively work at a hotline and crisis intervention center.
- Assisted in training of new counselors to learn essential communication skills for hotline.

Program Developer January 2017 - June 2017
Greenbelt Community Center Greenbelt, MD
Supervisor: Frank Jones

- Developed weekly programming and mathematics course for group of 5-10 students.

HONORS, AWARDS & SCHOLARSHIPS

NextProf Workshop Acceptance	2024
ICIP 2024 Student Travel Grant Award	2024
CSIP Service Award	2023
IEEE Big Data 2023 Student Travel Grant Award	2023
President's Fellowship for New Graduate Students	2020
Dwight Scholarship Fund from the National Electronics Museum	2020
A. James Clark Legacy Scholarship	2018
Joseph A. Sciulli Memorial Scholarship	2018
BGE/Exelon Corporate Partners Scholarship	2017
George Corcoran Memorial Scholarship	2017

PUBLICATIONS

K. Kokilepersaud, S. Kim, M. Prabhushankar, G. AlRegib, "HEX: Hierarchical Emergence Exploitation in Self-Supervised Algorithms," in Winter Applications of Computer Vision (WACV), Tuscon, Arizon, 2025. Link

G. AlRegib, M. Prabhushankar, **K. Kokilepersaud**, P. Chowdhury, Z. Fowler, S. Trejo Corona, L. A. Thomaz, A. Majumdar, "Ophthalmic Biomarker Detection: Highlights From the IEEE Video and Image Processing Cup 2023 Student Competition [SP Competitions]," in IEEE Signals Processing Magazine, 2024. Link

Y. Yarici, **K. Kokilepersaud**, M. Prabhushankar, and G. AlRegib, "Explaining Representation Learning With Perceptual Components," in IEEE International Conference on Image Processing (ICIP), Abu Dhabi, United Arab Emirates (UAE), 2024. Link

K. Kokilepersaud, Yavuz Yarici, M. Prabhushankar, and G. AlRegib, "Taxes Are All You Need: Integration of Taxonomical Hierarchy Relationships Into the Contrastive Loss," submitted to IEEE International Conference on Image Processing (ICIP), Abu Dhabi, United Arab Emirates (UAE), 2024. Link

Z. Fowler, **K. Kokilepersaud**, M. Prabhushankar, and G. AlRegib, "Learning in Clinical Trial Settings," in NeurIPS 2023 Workshop: Adaptive Experimental Design and Active Learning in the Real World, Nov. 16, 2023. Link

K. Kokilepersaud*, Y. Logan*, R. Benkert, C. Zhou, M. Prabhushankar, G. AlRegib, E. Corona, K. Singh, A. Parchami,, "FOCAL: A Cost-Aware, Video Dataset for Active Learning," in IEEE Conference on Big Data 2023, Sorento, Italy, Dec. 15-18, 2023. (Regular paper acceptance rate 17.4%) Link

Z. Fowler, **K. Kokilepersaud**, M. Prabhushankar and G. AlRegib, "Clinical Trial Active Learning," in Proceedings of the 14th ACM International Conference on Bioinformatics, Computational Biology and Health Informatics (ACM-BCB), Jun. 11, 2023. (Oral presentation for top 10% of submitted papers) Link

K. Kokilepersaud, S. Trejo Corona, M. Prabhushankar, G. AlRegib, C. Wykoff, "Clinically Labeled Contrastive Learning for OCT Biomarker Classification," in IEEE Journal of Biomedical and Health Informatics, May 15 2023. (15% - 20% acceptance rate) Link

K. Kokilepersaud, M. Prabhushankar, Y. Yarici, G. AlRegib, and A. Parchami, "Exploiting the Distortion-Semantic Interaction in Fisheye Data," in Open Journal of Signals Processing, Apr. 28 2023. Link

K. Kokilepersaud, M. Prabhushankar, and G. AlRegib, "Clinical Contrastive Learning for Biomarker Detection," in NeurIPS 2022 Workshop: Self-Supervised Learn-

ing - Theory and Practice, Oct. 16 2022. Link

M. Prabhushankar, **K. Kokilepersaud**, Y. Logan, S. Trejo Corona, G. AlRegib, C. Wykoff, "OLIVES Dataset: Ophthalmic Labels for Investigating Visual Eye Semantics," in Neural Information Processing Systems Datasets and Benchmarks Track (NeurIPS), New Orleans, LA, Nov. 29 - Dec. 1 2022. Link

K. Kokilepersaud, M. Prabhushankar, and G. AlRegib, "Volumetric Supervised Contrastive Learning for Seismic Semantic Segmentation," in International Meeting for Applied Geoscience and Energy (IMAGE), Houston, TX, Aug. 28-Sept. 1 2022. Link

K. Kokilepersaud, M. Prabhushankar, G. AlRegib, S. Trejo Corona, C. Wykoff, "Gradient Based Labeling for Biomarker Classification in OCT," in IEEE International Conference on Image Processing (ICIP), Bordeaux, France, Oct. 16-19 2022. Link

Y. Logan, **K. Kokilepersaud**, G. Kwon and G. AlRegib, C. Wykoff, H. Yu, "Multi-Modal Learning Using Physicians Diagnostics for Optical Coherence Tomography Classification," in IEEE International Symposium on Biomedical Imaging (ISBI), Kolkata, India, Jan. 7 2022. Link