Joshua Feinglass

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Github
Linkedin
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Curriculum Vitae (PDF)

I'm a 5th year PhD student developing **generalizable** and **robust** models to ensure the deployment of safe and reliable AI systems.

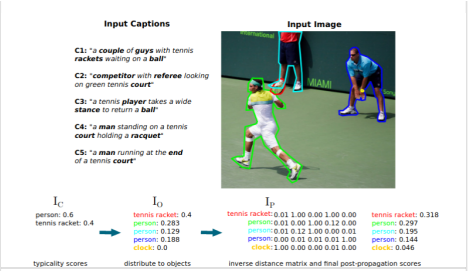
I work in the ASU APG lab where I'm advised by Yezhou Yang. I recently interned at Microsoft Research, where I developed novel datasets, machine learning models, and benchmarks for forecasting and analyzing cybersecurity incident escalation, and Lawrence Livermore National Lab, where I developed a novel zero-shot deep learning architecture using image and natural language data sources. Prior to pursuing my Signal Processing/Machine Learning specialized Master's degree in 2016, I also interned for two summers at Honeywell where I worked on web development, test automation scripts, electrical component diagrams, and hardware programming.

After recieving my Master's degree, I worked full-time as a Senior Digital Signal Processing Engineering at General Dynamics where I designed algorithms for spectral decomposition, detection, characterization, and classification of communication and radar signals before pursing my PhD.

News

2023	Our Misalignment in Object Detection work was accepted to **WACV 2024**.
2023	I joined **Microsoft Research** as a Research Intern.
2022	Our Covariate Shift Detection work was accepted into a **NeurIPS 2022 Workshop** as a **spotlight** presentation.
2022	I joined **Lawrence Livermore National Lab** as a Computing Scholar Intern.
2021	Our paper, SMURF, was accepted to **ACL 2021** as a competitively selected **oral** presentation.

Research Highlights



Misalignment In Object Detection

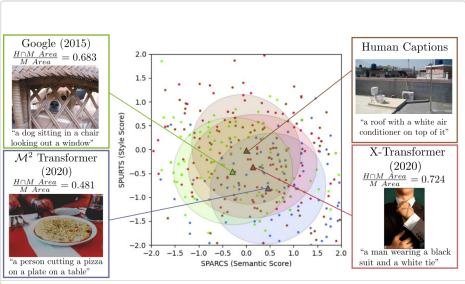
Introduces and addresses upstream and downstream task misalignment using semantic modeling and graph signal processing.

WACV 2024

Interpolation For Covariate Shift Detection

Covariate shift detection as a robustness benchmark as well as a proposed interpolation-based technique for improving covariate shift detection performance.

NeurIPS Workshop 2022



SMURF: SeMantic And Linguistic UndeRstanding Fusion

Identifying and incorporating style in evaluation and refining the semantic representation of captions.

ACL 2021

Education

Aug. 2019 — May 2024 **Ph.D. in Computer Engineering w/ Machine Learning Specialization**
Arizona State University, Tempe, AZ
Advisor: Yezhou Yang

Aug. 2016 — May 2018 **M.S. in Computer Engineering w/ Machine Learning Specialization**
Arizona State University, Tempe, AZ
GPA: 3.93/4.00

Aug. 2012 — May. 2016 **B.S. in Electrical Engineering**
Arizona State University, Tempe, AZ
Barrett, the Honors College Graduate
Electrical Engineering Student Mentor
GPA: 3.85/4.00

Work and Research Experience

May 2023 — Aug. 2023 **Microsoft Research**, Redmond, WA

Research Intern, Augmented Learning and Reasoning

Mentor: Jack (Jay) Stokes, Scott Freitas

Developed novel datasets, machine learning models, and benchmarks for forecasting and analyzing cybersecurity incident escalation. Further explored potential implementation options and use cases to demonstrate feasibility and product impact, respectively.

May 2022 — Dec. 2022 **Lawrence Livermore National Lab**, Livermore, CA

Graduate Research Intern, Computing at LLNL

Mentor: Jayaraman Thiagarajan, Rushil Anirudh, Jayram Thathachar

Developed a highly generalizable Zero-Shot Learning architecture with pre-trained vision pipelines, automated external knowledge retrieval from natural language sources, and model regularization techniques.

May 2018 — Dec. 2019 **General Dynamics Mission Systems**, Scottsdale, AZ

Senior Digital Signal Processing Engineer, Trusted Space Solutions

Created specifications for the standard operation and packet-level communication of devices in an edge computing framework. Developed algorithms for detecting communication and radar signals of interest and estimating their time and frequency characteristics for downstream decoding, classification, and localization tasks. Automated and optimized the creation of data compression pipelines for efficient communication channels and downstream data visualization tasks based on project requirements.

Jan. 2020 — Present **Arizona State University**, Tempe, AZ

PhD Researcher, Active Perception Group

Mentor: Yezhou Yang

Exploring concepts like knowledge representation/extraction, model generalization/robustness, and inference consistency/evaluation in Natural Language and Image Processing applications. First author of a novel information theory based evaluation of captions for semantics and fluency presented in ACL 2021, outlier detection/uncertainty estimation using domain interpolation based sensitivity analysis presented as a spotlight presentation in the NeurIPS 2022 INTERPOLATE workshop, and an object detection work which introduces and addresses upstream and downstream task misalignment by computing object importance scores using semantic modeling and graph signal processing to be presented at WACV 2024.

Jan. 2017 — Dec. 2017 **Arizona State University**, Tempe, AZ

Master's Research Assistant, Image, Video, and Usability (IVU) Lab

Mentor: Lina Karam

Built software frameworks using C, Python, OpenCV, Ada, and Matlab on a Linux platform for data acquisition and signal processing on the Soli radar device. Developed biometric and gesture detection/estimation algorithms using machine learning, sensor fusion, feature point tracking, beamforming, spectral analysis and pattern recognition algorithms on Photoplethysmographic (PPG) and Frequency-Modulated Continuous-Wave (FMCW) signal information.

May 2016 — Aug. 2016 **Honeywell**, Phoenix, AZ

Intern, Test Services

Mentor: Craig Stevens, Bob Apodaca

Modified and updated PHP/HTML/CSS/JavaScript/Fusebox based web applications and tested any changes using a Debian VM. Created and restructured Perl scripts, Ladder Logic Programs (PLC), and other software programs used for Test Cell support. Implemented revisions to existing AutoCAD Electrical designs and developed a strain-

gauge specimen box to fulfill the electrical and mechanical requirements of a work request from another department.

May 2015 — Aug. 2015

Honeywell, Phoenix, AZ

Intern, Test Services

Mentor: Craig Stevens, Bob Apodaca

Modified and updated PHP/HTML/CSS/JavaScript/Fusebox based web applications and tested any changes using a Debian VM. Created and restructured Perl scripts, Ladder Logic Programs (PLC), and other software programs used for Test Cell support. Implemented revisions to existing AutoCAD Electrical designs and developed a strain-gauge specimen box to fulfill the electrical and mechanical requirements of a work request from another department.

Publications

Towards Addressing the Misalignment of Object Proposal Evaluation for Vision-Language Tasks via Semantic Grounding

Joshua Feinglass, Yezhou Yang

Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV). 2024.

Project BibTeX

Covariate Shift Detection via Domain Interpolation Sensitivity

Tejas Gokhale*, Joshua Feinglass*, Yezhou Yang

NeurIPS 2022 Workshop INTERPOLATE (NeurIPS Workshop). New Orleans, LA, 2022.

Project BibTeX * Authors contributed equally

SMURF: SeMantic and linguistic UndeRstanding Fusion for Caption Evaluation via Typicality Analysis

Joshua Feinglass, Yezhou Yang

Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics (ACL). Online, 2021.

Project BibTeX