RAKSHITH SUBRAMANYAM

📞 (+1)-480-543-0995 | ✉ rsubra17@asu.edu | 🌐 rakshith-2905.github.io | 🔗 rakshithsubra | 🔗 rakshith-2905

Summary

PhD student with expertise in generative models, meta-learning, few-shot learning, and Vision Language Models, complemented by a strong publication record in prestigious conferences such as ICML, ICASSP, and WACV. My diverse experience, which spans advanced research labs and industry, includes impactful applications in autonomous systems, medical diagnostics, and security.

WORK EXPERIENCE

Arizona State University, Tempe, Arizona   Aug 2019 – Apr 2024(Expected)

Ph.D. in Electrical Engineering- Research focus on AI ***CGPA – 3.86/4***

Arizona State University, Tempe, Arizona   Aug 2016 – May 2018

Master of Science in Electrical Engineering- Major in Control systems ***CGPA – 3.78/4***

SRM University, Chennai, India   Aug 2012 – May 2016

Bachelor of Technology in Mechatronics Engineering ***CGPA – 4/4***

WORK EXPERIENCE

Lawrence Livermore National Labs, Livermore.   Jun 2023 - Aug 2023

Summer Computing Intern

- Developed *CREPE*, an innovative approach utilizing learnable prompts and contrastive training to improve Visual Relationship Prediction (VRP).
- Demonstrated significant enhancements in VRP performance on Visual Genome and Unrel benchmarks, showcasing strong generalization capabilities without needing additional calibration.

Lawrence Livermore National Labs, Livermore.   May 2022 - Aug 2022

Summer Computing Intern

- Pioneered *SiSTA* a single-shot GAN adaptation technique for target-aware synthetic data generation. Achieved robust model adaptation and enhanced generalization in diverse classification tasks, notably improving face attribute detection and multi-class object recognition."
- Introduced *SPHInX*, a method for embedding out-of-distribution (OOD) images into the StyleGAN latent space.
- Demonstrated superior performance in high-quality reconstructions and ill-posed restoration tasks, with added benefits of semantic editing capabilities.

Lawrence Livermore National Labs, Livermore.   May 2021 - Aug 2021

Summer Computing Intern

- Innovated a Contrastive Knowledge-Augmented Meta Learning (CAML) framework that utilizes knowledge graph and contrastive distillation for improved few-shot meta learning and task adaptation.
- Demonstrated CAML's efficacy in challenging multi-domain adaptation and dataset generalization settings, significantly outperforming standard benchmarks.

Stanford Research Institute, New Jersey.   May 2020 - Aug 2020

Computer Vision Research Intern

- Developed a robust pedestrian identification and tracking system, capable of accurate performance with minimal sampling (4 samples/second, utilizing a spatial and temporal multi-headed self-attention technique for enhanced precision.
- Pioneered an automated image segmentation process with a self-improving model trained on weakly annotated data, significantly boosting labeling accuracy and efficiency.

Aputus Engineer Inc, Scottsdale, Arizona   Sep 2018 - Mar 2019

Computer Vision Research Intern

- Developed Region-CNN networks for medical diagnostics using X-Ray images.
- Designed and developed various hardware solutions including firmware development, PCB design and fabrication.

Autonomous Collective System Lab, Arizona State University   Jan 2017 - Current

Graduate Researcher

- Spearheaded the creation of the Chartopolis Testbed for autonomous vehicle research, incorporating lane tracking and signal detection features using traditional image processing techniques.
- Developed an innovative Ad-Hoc communication system for swarm vehicle systems, facilitating seamless vehicle-to-vehicle and vehicle-to-intersection communications.

Luminosity Lab, Arizona State University   Oct 2016 - Current

Lead AI and Image Processing Engineer

- Leading a project on text-conditioned motion synthesis, utilizing conditional stable diffusion to animate photos based on textual descriptions.
- Engineered a text-to-3D conversion tool using conditional diffusion and NeRF for 3D printing objects using text descriptions.
- Implemented a few-shot segmentation algorithm for precise neuroblastoma cell analysis.
- Transformed coffee shop operations by digitalizing hand-off counters with innovative use of homogenous image transformations and projections, securing a patent for this groundbreaking technology.
- Engineered a cutting-edge cyanobacteria monitoring system to cultivate and maintain optimal conditions for cyanobacteria on the Moon, integrating sensors and custom-designed PCBs for effective operation.

SELECTED PUBLICATIONS

- *(ICML'22)* **Subramanyam, R*.**, Narayanaswamy, V*., Naufel, N., Spanias, A., & Thiagarajan, J. J. (2022, June). [Improved StyleGAN-v2 based Inversion for Out-of-Distribution Images](). In International Conference on Machine Learning
- *(ICML'23)* Thopalli, K.*, **Subramanyam, R.***, Turaga, P., & Thiagarajan, J. J. (2023). [Target-Aware Generative Augmentations for Single-Shot Adaptation](). In International Conference on Machine Learning
- *(ICASSP'23)* **Subramanyam, R.**, Thopalli, K., Berman, S., Turaga, P., & Thiagarajan, J. J. (2023, June). [Single-Shot Domain Adaptation via Target-Aware Generative Augmentations](). In *ICASSP 2023-2023 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)* (pp. 1-5). IEEE.
- *(WACV'23)* **Subramanyam, R.**, Heimann, M., Jayram, T. S., Anirudh, R., & Thiagarajan, J. J. (2023). [Contrastive Knowledge-Augmented Meta-Learning for Few-Shot Classification](). In *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision*.
- **Subramanyam, R.**, Jayram, T. S., Anirudh, R., & Thiagarajan, J. J. (2023). [CREPE: Learnable Prompting With CLIP Improves Visual Relationship Prediction](). *arXiv e-prints*, arXiv-2307.
- *(Patent)* Adams, C., Smith, T., Naufel, M. and **Subramanyam, R.,** Arizona Board of Regents of ASU, 2023. *Systems and methods for a smart product handoff integrated platform*. U.S. Patent Application 17/998,142.

PROJECTS

NASA Space Robotics Challenge, Arizona State University   Fall 2020

- Led the project and directed the integration of navigation, obstacle avoidance, and vision subsystems, enabling effective task execution on the simulated lunar surface.
- Engineered a non-convex obstacle avoidance algorithm for lunar terrain navigation, avoiding rocks in a simulated lunar environment.

Medical Imaging Assistant, Arizona State University   Fall 2019

- Developed a probabilistic segmentation model trained with classification labels, employing class activation maps for improved accuracy using weakly annotated datasets.
- Improved interpretability and predictive performance for breast histopathological images using an unsupervised attention network.

CanSat Annual Competition, Burkett, Texas   Fall 2015

- Led a multidisciplinary team in constructing a miniature satellite for sampling planetary atmospheres, achieving world rank 1 in design reviews, and managing the entire project scope.
- Developed an innovative method for altitude determination in satellites, utilizing magnetic field strength measurements to complement barometric sensors under varying environmental pressures."

SKILLS

Expertise: Machine Learning, CNN, Image Classification, Object Detection, Segmentation, Transfer Learning, One-shot Learning, Linear Algebra, Linear Controls, Optimal Control, PCB designing, Electronics assembly, and Electrical testing.
Frameworks/Applications: Pytorch, Keras, OpenCV, NumPy, Flask, ROS, Docker, Git, CouchDB, and Eagle CAD.
Languages/Tools: Python, C++, React JS, HTML, CSS, Arduino, and Linux.