

RISHAB BALASUBRAMANIAN

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ABOUT ME

I'm a current Masters student at Oregon State University, where I major in Computer Science and AI. My interests lie at the intersection of Machine Learning and efficiency. This includes both the research (e.g sparse neural networks, model distillation and pruning) and engineering (e.g parallel training, caching, software-hardware co-design) perspective. I'm looking for full-time positions starting from Jan 2024.

PROGRAMMING LANGUAGES AND FRAMEWORKS

Programming Languages: C, C++, Python, \LaTeX , Shell Programming

Frameworks: ROS, Gazebo, OpenCV, Keras, PyTorch, PyTorch3D

EDUCATION

- Oregon State University** Corvallis, OR
M.S in Computer Science & Artificial Intelligence Aug 2023 - Present
- Oregon State University** Corvallis, OR
PhD in Computer Science & Artificial Intelligence (Dropout) Sep 2021 - Aug 2023
- National Institute of Technology** India
B.Tech in Instrumentation And Control Engineering Aug 2016 - May 2020

PUBLICATIONS AND PREPRINTS

- Zichen Wang, **Balasubramanian, Rishab**, Hui Yuan, Chenyu Song, Mengdi Wang, and Huazheng Wang. Adversarial attacks on online learning to rank with stochastic click models. *arXiv preprint arXiv:2305.19218*, 2023
- Balasubramanian, Rishab**, Jiawei Li, Prasad Tadepalli, Huazheng Wang, Qingyun Wu, and Haoyu Zhao. Adversarial attacks on combinatorial multi-armed bandits. *under review at NeurIPS*, 2023
- Zeyu Zhang, Yi Su, Hui Yuan, Yiran Wu, **Balasubramanian, Rishab**, Qingyun Wu, Huazheng Wang, and Mengdi Wang. Unified off-policy learning to rank: a reinforcement learning perspective. *arXiv preprint arXiv:2306.07528*, 2023
- Balasubramanian, Rishab** and Kunal Rathore. Contrastive learning for object detection. *arXiv preprint arXiv:2208.06412*, 2022
- Balasubramanian, Rishab**, Lifeng Zhou, Pratap Tokekar, and PB Sujit. Risk-aware submodular optimization for stochastic travelling salesperson problem. In *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 4720–4725. IEEE, 2021
- Balasubramanian, Rishab** and Sujit PB. A cooperative framework for autonomous landings of quadrotors using vision on a moving ugv. In *AIAA Scitech 2021 Forum*, page 1880, 2021

RESEARCH EXPERIENCE

- Adversarial Attacks on Combinatorial Multi-Armed Bandits (code)** Oregon
Research with Dr. Huazheng Wang (OSU) March 2022 - Present
Led the work to design a novel adversarial attack algorithm on combinatorial multi-armed bandits (CMAB) which proved that not all CMAB instances can be attacked, and showed the requirements for the same. I also generated the experimental results on a variety of environments to support the theoretical guarantees. The results have been accepted to Neurips 2023.
- Block-wise Trainable Neural Networks (code)** Remote
Research with Dr. Beidi Chen (Meta) August 2022 - December 2022
Developed a method to train neural network architectures sequentially to reduce training time, memory consumption and computation. Enforced gradient blocking and data pruning methods to further improve efficiency, reducing training time by approx. 40% while limiting drop in test accuracy to $< 1\%$. Tested on a variety of networks including Transformers, ResNets and VGG models
- User-Controlled Contrastive Learning for Object Detection and OOD Detection (code)** Oregon
Course project with Prof. Stefan Lee (OSU) April 2022 - June 2022
Following similar works on boosting contrastive learning using ranked positives, we proposed a novel method to enforce ranking which leverages user expertise. By incorporating user-defined ranked positives into contrastive learning framework, we observed an improvement in performance (accuracy and mAP scores) of certain tasks such as object detection and classification, while reduction in other tasks such as OOD detection. We further perform a study of the results and provide explanations into what might be negatively impacting certain tasks.
- 3D Reconstruction from Endoscopy Images** India
Research Scientist at EndovisionAI January 2021 - April 2021
Trained an encoder-decoder model using transformation consistency losses for unsupervised depth estimation from RGB endoscopy images. Created an API for visualizing 3D pointclouds from the output depthmap, which was presented to doctors.