

# RISHAB BALASUBRAMANIAN

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## ABOUT ME

I'm currently a Masters student at Oregon State University, where I major in Computer Science and AI. My interests lie at the intersection of recommendation systems, multimodal deep learning (training vision+language models, grounding LLMs and representation learning), efficiency (sparse neural networks, model distillation, LoRA, 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.

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## PROGRAMMING LANGUAGES AND FRAMEWORKS

**Programming Languages:** C, C++, Python, L<sup>A</sup>T<sub>E</sub>X, Shell Programming

**Frameworks:** ROS, Gazebo, OpenCV, Keras, PyTorch, PyTorch3D, Pandas, Scikit, Numpy

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## EDUCATION

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

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## PUBLICATIONS AND PREPRINTS

- Zichen Wang, **Rishab Balasubramanian**, Hui Yuan, Chenyu Song, Mengdi Wang, and Huazheng Wang. Adversarial attacks on online learning to rank with stochastic click models. *Under Review at AAAI, 2023* [paper](#)
- **Rishab Balasubramanian**, Jiawei Li, Prasad Tadepalli, Huazheng Wang, Qingyun Wu, and Haoyu Zhao. Adversarial attacks on combinatorial multi-armed bandits. *Submitted to ICLR, 2023*
- Zeyu Zhang, Yi Su, Hui Yuan, Yiran Wu, **Rishab Balasubramanian**, Qingyun Wu, Huazheng Wang, and Mengdi Wang. Unified off-policy learning to rank: a reinforcement learning perspective. *Accepted to NeurIPS, 2023* [paper](#)
- **Rishab Balasubramanian** and Kunal Rathore. Contrastive learning for object detection. *arXiv preprint arXiv:2208.06412, 2022* [paper](#)
- **Rishab Balasubramanian**, 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 [paper](#)
- **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 [paper](#)

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## RESEARCH EXPERIENCE

- **Adversarial Attacks on Combinatorial Multi-Armed Bandits** ([code](#)) Oregon  
• *Research with Dr. Huazheng Wang (OSU)* September 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. I also generated the experimental results on a variety of environments to support the theoretical guarantees. Simultaneously, I also designed experiments for another work which showed that online learning to rank can be formulated as an offline reinforcement learning problem. Our results have been accepted to Neurips 23 and submitted to ICLR 24 and AAAI 24.
- **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 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.