Roshan Kenia

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Education

Columbia University - New York, New York **Sep 2023 - Present**
M.S. in Computer Science GPA: 4.165/4.0

Stony Brook University - Stony Brook, New York **Aug 2019 - May 2023**
B.S. in Computer Science, Applied Math and Statistics GPA: 4.0/4.0, Ward Melville Valedictorian Award

Research Experience (Active Secret Clearance)

AI4VS Lab, Columbia University, NY — *Graduate Research Assistant* **Sep 2023 - Present**

- Developing hybrid cross-attention and convolutional neural networks for 3D OCT volumes to enable interpretable feature extraction, guiding clinicians in the classification of rare or atypical cases of glaucoma and AMD.
- Aggregated ophthalmologist gaze from OCT reports to refine ViT self-attention with a fused loss function.
- Merged gaze embeddings with contrastive learning to enhance OCT glaucoma detection in data-scarce settings.

MIT Lincoln Laboratory, Lexington, MA — *Biomedical Image Processing & ML Co-op* **Jan 2024 - Aug 2024**

- Advanced weakly supervised axon centerline detection and tracing algorithms for 3D brain microscopy data.
- Created first 3D U-Net for real-time detection/tracking of microbubbles in ultrasound localization microscopy.

Yin Lab, Stony Brook University, NY — *Undergraduate Research Assistant* **Dec 2021 - Sep 2023**

- Implemented real-time Mask-RCNN system for TRISO-fueled pebble digit classification from video data, advancing the safety and efficiency of next-generation nuclear reactors under the Generation IV initiative.

Koo Lab, Cold Spring Harbor Laboratory — *Undergraduate Research Assistant* **Sep 2020 - May 2021**

- Distilled knowledge from CNN teacher networks to student networks for regularization and generalizability.

Publications

- **Kenia, R.**, Amin, F., Roop, B., Brattain, L., Eastwood, B., Fay, M., Gerfen, C., Glaser, J., Gjesteby, L. Topology Preserving Deep Supervision for 3D Axon Centerline Segmentation Using Partially Annotated Data (In Review)
- **Kenia, R.**, Li, A., Srivastava, R., Thakoor, K. A. AI-CNet3D: An Anatomically-Informed Cross-Attention Network for Enhanced Glaucoma Detection and Interpretability in 3D OCT Volumes (In Review)
- Kaushal, S., **Kenia, R.**, Aima, S., & Thakoor, K. A. (2024, November). Medical-Expert Eye MovementAugmented Vision Transformers for Glaucoma Diagnosis. *2024 IEEE EMBS International Conference on Biomedical & Health Informatics (BHI)*. Retrieved from https://openreview.net/pdf?id=VLswaTSjiA
- Lau, W. T., Tian, Y., **Kenia, R.**, Aima, S., & Thakoor, K. A. (2024, June). Using Expert Gaze for Self-Supervised and Supervised Contrastive Learning of Glaucoma from OCT Data. *Proceedings of the fifth Conference on Health, Inference, and Learning (pp. 427–445)*. Retrieved from https://proceedings.mlr.press/v248/lau24a.html
- **Kenia, R.**, Mendil, J., Jasim, A., Al-Dahhan, M., & Yin, Z. (2024, January). Robust TRISO-fueled Pebble Identification by Digit Recognition. *2024 IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, 8142–8150. doi:10.1109/WACV57701.2024.00797

Relevant Courses

Machine Learning, Natural Language Processing, Data Science, Analysis of Algorithms, Data Structures and Algorithms, Linear Algebra, Graph Theory, Software Engineering, Computer Networks, Computer Vision

Technical Skills

- Languages: Python, Java, JavaScript
- Software Engineering Technologies: MongoDB, Express, React, Node.js (MERN)
- Deep Learning Technologies: Pytorch, Lightning, Ray, Numpy, Pandas, Matplotlib, OpenCV