Ankith Jain Rakesh Kumar

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Education

University of California, Riverside **CA, USA**
Ph.D. in Electrical and Computer Engineering *September 2025 (exp.)*
Advisor: Prof. Bir Bhanu

University of California, Riverside **CA, USA**
M.S. in Electrical Engineering *2016–2018*
Advisor: Prof. Hyoseung Kim; Thesis: WCET Analysis on DNNs

Visvesvaraya Technological University **Bangalore, India**
B.E. in Electronics and Communication Engineering *2012–2016*

Publications

2025: **Ankith Jain Rakesh Kumar** and Bir Bhanu, *Dirichlet-Energy-Guided GNNs with Dynamic Weighting for Molecular and Protein Graphs*. (Under Submission)

2025: **Ankith Jain Rakesh Kumar** and Bir Bhanu, *From Fixation to Diagnosis: Attention-Guided Graph Fusion for Chest X-ray Diagnosis*. *IEEE Transactions on Medical Imaging* (Under Review)

2025: **Ankith Jain Rakesh Kumar** and Bir Bhanu, *Masked Graph Attention Network for Classification of Facial Micro-Expression*. *Image and Vision Computing (IMAVIS)*

2025: **Ankith Jain Rakesh Kumar** and Bir Bhanu, *Micro-Expression Classification With Weighted Locally Constrained Graph Network*. *IEEE Transactions on Biometrics, Behavior, and Identity Science*

2024: **Ankith Jain Rakesh Kumar** and Bir Bhanu, *Uncovering Hidden Emotions with Adaptive Multi-Attention Graph Networks*. *IEEE/CVF CVPR Workshop on ABAW*

2023: **Ankith Jain Rakesh Kumar** and Bir Bhanu, *Relational Edge-Node Graph Attention Network for Classification of Micro-Expressions*. *IEEE/CVF CVPR Workshop on ABAW*

2022: **Ankith Jain Rakesh Kumar** and Bir Bhanu, *Three Stream Graph Attention Network using Dynamic Patch Selection for the Classification of Micro-Expressions*. *IEEE/CVF CVPR Workshop on ABAW*

2021: **Ankith Jain Rakesh Kumar** and Bir Bhanu, *Micro-Expression Classification based on Landmark Relations with Graph Attention Convolutional Network*. *IEEE/CVF CVPR Workshop on Analysis and Modeling of Faces and Gesture*

2021: **Ankith Jain Rakesh Kumar**, Bir Bhanu, C. Casey, S.C. Cheung, and A. Seitz, *Depth Videos for the Classification of Micro-Expressions*. *International Conference on Pattern Recognition (ICPR)*

2019: **Ankith Jain Rakesh Kumar**, R. Theagarajan, O. Peraza, and Bir Bhanu, *Classification of Facial Micro-Expressions using Motion Magnified Emotion Avatar Images*. *IEEE CVPR Workshop on Face and Gesture Analysis for Health Informatics*

Research Experience

UC Riverside **Riverside, CA**
Graduate Student Researcher *2019–Present*

- Developed a series of graph neural network (GNN) architectures tailored for facial micro-expression recognition, addressing challenges like subtle motion, occlusion, and data scarcity.
- Proposed the **Masked Graph Attention Network (MaskGAT)**, integrating node-level entropy analysis and attention-based pooling for robust micro-expression classification; published in IMAVIS and CVPR workshops.
- Designed a **Gaze-Guided Multi-Attention Graph Transformer** for chest X-ray diagnosis using radiologist fixation maps, achieving competitive performance on benchmark datasets; under review at IEEE TMI.
- Introduced Dirichlet energy-based dynamic edge weighting for molecular and protein graphs, improving interpretability and generalization across OGB and LRGB datasets; submitted to a top-tier journal.

UC Riverside **Riverside, CA**
Graduate Research Assistant *2017–2018*

- Performed statistical worst-case execution time (WCET) analysis for deep learning workloads on embedded platforms, using timing measurements across varying DNN architectures.
- Developed sensor fusion modules for autonomous navigation by combining LiDAR and IMU inputs to improve real-time localization and mapping under uncertain environments.

Dayananda Sagar College of Engineering **Bangalore, India**
Research Assistant *2014–2016*

- Implemented video object detection using background subtraction and optical flow methods (GMM, Horn-Schunck), evaluated on surveillance footage with varying occlusions.
- Designed a biometric medical access control system using fingerprint authentication, integrating hardware prototyping with software backend to restrict access to critical patient data.

Technical Skills

Programming: Python, C, SQL, R, Matlab

ML Libraries: PyTorch, TensorFlow, Keras, Scikit-learn, OpenCV, NumPy, Pandas, Matplotlib

Specialties: Computer Vision, Facial Expressions, Multi-Modality, GNNs, Vision and Graph Transformers, Diffusion Models, Data Visualization

Tools: Linux, Git, VSCode, Jupyter, LaTeX

Teaching & Mentorship

Instructor:

- **Data Analysis for Engineering Applications** (2024, 2025)
- **Linear Algebra** (2023)
- **RUSD-UCR AI Summer Camp for High School Students** (2022–2025)

Teaching Assistant: Computer Vision, Computational Learning, Circuits I & II, Sensing for Embedded Systems, Electronic Circuits

Mentorship: Omar Peraza, Qifeng Zhao, Malhar Thombare

Honors & Activities

Fellowship: UCR Graduate Dean's Fellowship (2019)

Reviewer: CVPR, ICPR, IEEE Transactions on Human-Machine Systems, Image and Vision Computing

Relevant Coursework

Computer Architecture, GPU Programming, Operating Systems, Data Mining, Real-Time Systems, Cyber Security, VLSI Design, RFIC Design, Network Routing, DSP, Stochastic Processes