BHAVIN JAWADE

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Github – github.com/bhavinjawade•**Google Scholar** - Bhavin Jawade

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Education

University at Buffalo, SUNY	May 2025
PhD. - Computer Science | *Advisor - Dr. Venu Govindaraju*	GPA: 3.9
University at Buffalo, SUNY	May 2021
MS. - Computer Science | *Advisor - Dr. Sargur Srihari*	GPA: 3.8
SGSITS - Shri G.S. Institute of Technology & Science	May 2019
BE. (Honors) - Information Technology	GPA: 3.8

Work Experience

Yahoo Research | Research Scientist Intern | *New York City*, NY   May 2023 - Present

- Proposed SCoT, a novel pre-training strategy to improve zero-shot compositional retrieval.
- Performed LoRA based Instruction fine-tuning of a quantized Falcon LLM model to generate synthetic textual triplets. Utilized contrastive representations from textual triplets as a proxy supervision.
- Approach outperformed existing methods by ~10.2% on the Fashion-IQ dataset and ~8% on CIRR benchmark in zero-shot retrieval setting while only utilizing image-caption pairs. Qualitative experiments visualizing SCoT's latents with UnCLIP demonstrate its implicit compositional properties.
- Work under review at a top-tier computer vision conference.

Adobe Research | Research Scientist Intern | *San Jose*, CA   May 2022 - Nov 2022

- Proposed a Large-Scale Vision-Language contrastive pre-training strategy to learn embeddings that generalize over out-of-distribution tasks.
- Introduced a novel loss formulation incorporating tags, metadata, and clauses to create a semantic hierarchy, enhancing the alignment of vision and language embeddings.
- Performed large-scale distributed pre-training using torch-distributed, web-datasets and gradient-checkpointing. Trained on over 100 million image-text pairs on 160 A100 GPUs.
- Method outperforms Open-AI's CLIP by 6.4% on zero-shot ImageNet retrieval (Top-1) when trained on 50 million image-text pairs, 9.2% when trained on 15 million subset and 8.4% when trained on 5 million sub-set

Center for Unified Biometrics and Sensors (CUBS) | Research Assistant | *Buffalo*, NY   Jun 2020 – Present

- IARPA BRIAR Grant | Proposed a uni-modal feature fusion strategy - "CoNAN - Conditional Neural Aggregation Network for Unconstrained Face Feature Aggregation".
  Best Paper Award, IEEE, IJCB 2023, Slovenia
- NSF *National AI Institute Grant* | Working on a novel benchmark and evaluation metric to estimate hallucination in text conditioned image generation diffusion models.
- NSF CITER Grant | Developed a multi-task learning based CNN network trained with Deep metric losses (Contrastive, AdaCos) along with minutiae loss to match contactless fingerprints captured using smartphone camera against legacy fingerprints.
  Won Russell Agrusa Research Innovation Award, UB CSE, 2021. Received Best CSE PhD Poster Award (2022) and Best UB SEAS Poster Award (2023)
- NSF DIBBS Grant | Implemented full-stack machine learning framework called MLToolkit where the user can drag and drop the different elements to create and execute machine learning pipelines.

Persistent Systems | Machine Learning Engineer | *Pune, India*   Jul 2019 - Dec 2019

- Built OCR based ML application for banks to auto-analyze POS invoices saving ~$200,000 & 100 hrs/week.
- Developed an Invoice Management tool for a leading Supply Chain firm to automate the supplier-distributor financing process and decrease finance approval time by 43%.

IIT Madras, Department of Computer Science | Research Intern | *Remote*   Feb 2019 - May 2019
Advised by Dr. Rupesh Nasre, Professor IIT Madras.

- Designed a highly efficient algorithm for computing execution times in hierarchical task scheduling, targeting updates in million-node Directed Acyclic Graphs (DAGs).
- Achieved performance, with the algorithm processing 1,000 updates in a 1,000,000 node DAG in just 0.8 seconds, demonstrating near-linear $O(n)$ complexity

Selected Publications and Preprints

NAPReg: Nouns as Proxies Regularization for Semantically Aware Cross-Modal Embeddings   Jan 2023
IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2023) ***(Oral)***

CoNAN: Conditional Neural Aggregation Network For Unconstrained Face Feature Fusion   Sep 2023
IEEE International Joint Conference on Biometrics (IJCB 2023) (***Best Paper Award***, ***Oral***)

SCOT: Self-Supervised Contrastive Pre-training For Zero-Shot Compositional Retrieval   Nov 2023
(Under Review at Top Tier conference)

Hear The Flow: Optical Flow-Based Self-Supervised Visual Sound Source Localization   Aug 2022
IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2023) ***(Oral)***

RealCQA: Scientific Chart Question Answering as a Test-bed for First-Order Logic   Feb 2023
IEEE/IAPR International Conference on Document Analysis and Recognition (ICDAR 2023)

DIOR: Dataset for Indoor-Outdoor Reidentification-Long Range 3D/2D Skeleton Gait Collection Pipeline, Semi-Automated Gait Keypoint Labeling and Baseline Evaluation Methods *(Preprint)*   Aug 2023

Liveness Detection Competition-Noncontact-based Fingerprint Algorithms and Systems   Sep 2023
IEEE International Joint Conference on Biometrics (IJCB 2023)

GestSpoof: Gesture Based Spatio-Temporal Representation Learning For Robust Fingerprint Presentation Attack Detection. *(Under Review at Top Tier conference)*   Sep 2023

Conditional Neural Aggregation Network For Unconstrained Long Range Person Feature Fusion   Nov 2023
IEEE transactions on biometrics, behavior, and identity science (TBIOM) ***(Invited Extended Paper)***

Deep Metric Learning for Computer Vision: A Brief Overview   Dec 2022
Book Chapter in Handbook of Statistics, Special Issue – Deep Learning ***(Invited Book Chapter)***

RidgeBase: A Cross-Sensor Multi-Finger Contactless Fingerprint Dataset   Jun 2022
IEEE/IAPR International Joint Conference on Biometrics (IJCB 2022)

Attribute De-biased Vision Transformer (AD-ViT) for Long-Term Person Re-identification   Sep 2022
IEEE International Conference on Advanced Video and Signal-Based Surveillance (AVSS 2022)

Multi Loss Fusion for Matching Smartphone Captured Contactless Finger Images   Sep 2021
IEEE International Workshop on Information Forensics and Security (WIFS 2021) ***(Oral)***

Low computation in-device geofencing using hierarchy-based searching for offline usage   Nov 2018
IEEE International Conference on Inventive Computation Technologies' (ICICT 18') ***(Oral)***

Research Datasets

RealCQA, Chart Visual Question Answering Dataset	2022
RidgeBase, Contactless Fingerprint Dataset	2021
DIOR, Long-Distance Person ReID Dataset	2023
LivDet 23, Contactless Fingerprint Liveness Dataset	2023
GestSpoof, Spatio-Temporal Fingerprint Liveness Detection Dataset	2023

Achievements and Awards

Best Paper Award, IEEE IJCB	2023
Graduate Leadership Award, University at Buffalo	2023
Russell Agrusa Research Innovation Award, University at Buffalo	2021
Research Award: Best SEAS PhD Poster Award, University at Buffalo	2022
Research Award: CSE PhD Poster Award, University at Buffalo	2022
Hackathon Winner, Adobe Code Jam	2022
Best Social AI Idea Award: Blackstone Launchpad	2021
Hackathon Winner, Maple Ridge Hackathon (Govt of British Columbia)	2021
Hackathon Winner, WittyHacks Hackathon	2018
Project Award, Hon' Minister of State (Education Minister, Govt of M.P., India)	2018

Service

Reviewer, IEEE CVF Computer Vision and Pattern Recognition Conference, 2023 (**CVPR**)

Reviewer, IEEE International Conference on Acoustics, Speech and Signal Processing, 2023 (**ICASSP**)

Reviewer, IEEE Transactions on Biometrics, Behavior, and Identity Science, 2023 (**TBiom**)

Reviewer, IEEE International Joint Conference on Biometrics, 2023 (**IJCB**)

Reviewer, IAPR International Journal on Document Analysis and Recognition, 2022 (**IJDAR**)

Reviewer, IEEE Multimedia, 2023 (**MM**)

Invited Lecture, Large Vision-Language Models, **Clarkson University**, 2023

President, Computer Science Graduate Student Association, 2021-22 (**CSE-GSA, UB**)

Co-lead, Facebook Developer Circle Indore, 2017-19

Lead organizer, HackIndore, the largest hackathon of Central India, 2019

City Lead, Microsoft Student Partner, 2017-18

Founder and Head, SGSITS' first techno-learning club (#include), 2017-19

Head, Design, Entrepreneurship Cell SGSITS. 2017

Vice-Captain, Aeromodelling club SGSITS, 2016

Skills

Languages and Frameworks:	**Python**, **Pytorch**, TensorFlow, JavaScript, Go (Golang), C++, C, SQL, HTML, CSS, R, Dart, Angular 8, React, Laravel, PHP, Pandas, Dask, PySpark, Numpy, React Native, Android, Java Spring
Databases & Cloud:	SQL Server, MySQL, MongoDB, Redis, Cassandra, Solr, No-SQL, AWS, GCP
Software Tools:	MATLAB, Visual Studio, Android Studio, Jupyter Notebook, Xcode