Sachin Chhabra

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Education

Arizona State University — **May 2024**
Degree: Doctor of Philosophy (Ph.D.) — Tempe, AZ
Major: Computer Science — GPA: 4.0/4.0

Arizona State University — **May 2019**
Degree: Master of Science (M.Sc.) — Tempe, AZ
Major: Computer Science — GPA: 3.9/4.0

VIT University — **Aug 2013**
Degree: Bachelor of Technology (B.Tech) — Vellore, India
Major: Computer Science

Publications

- Jiuxu Chen, Nupur Thakur, Sachin Chhabra, and Baoxin Li. **Unsupervised Action Anticipation through Action Cluster Prediction.** *IEEE Open Journal of Signal Processing (OJSP), 2025* [pdf]
- Sachin Chhabra, Hemanth Venkateswara, and Baoxin Li. **PatchRot: Self-Supervised Training of Vision Transformers by Rotation Prediction.** *British Machine Vision Conference (BMVC), 2024* [code]
- Sachin Chhabra, Hemanth Venkateswara, Baoxin Li. **Label Smoothing++: Enhanced Label Regularization for Training Neural Networks.** *British Machine Vision Conference (BMVC), 2024.* [code]
- Sachin Chhabra, Yaoxin Zhuo, Riti Paul, Javad Sohankar, Ji Luo, Shan Li, Wendy Lee, Yi Su, Teresa Wu, Baoxin Li. **Translation of Partially Paired Images with Generative Adversarial Networks** *IEEE-EMBS International Conference on Biomedical and Health Informatics (BHI), 2024.* [pdf]
- Sachin Chhabra, Hemanth Venkateswara, Baoxin Li. **Generative Alignment of Posterior Probabilities for Source-free Domain Adaptation** *Winter Conference on Applications of Computer Vision (WACV), 2023.* [web] [pdf]
- Sachin Chhabra, Hemanth Venkateswara, Baoxin Li. **PatchSwap: A Regularization Technique for Vision Transformers.** *British Machine Vision Conference (BMVC), 2022.* [web] [pdf] [code]
- JE Caviedes, BK Patel, R Gutzwiller, B Li, R Bhat, Sachin Chhabra. **A Cognitive Perspective on Subjective and Objective Diagnostic Image Quality Models** *International Conference on Image Processing (ICIP), 2022.* [pdf]
- Sachin Chhabra, Prabal Bijoy Dutta, Hemanth Venkateswara, Baoxin Li. **Glocal Alignment for Unsupervised Domain Adaptation.** *ACM Multimedia Workshop on Multimedia Understanding with Less Labeling (MULL), 2021.* [pdf] [code]
- Sachin Chhabra, Prabal Bijoy Dutta, Hemanth Venkateswara, Baoxin Li. **Iterative Image Translation for Unsupervised Domain Adaptation.** *ACM Multimedia Workshop on Multimedia Understanding with Less Labeling (MULL), 2021.* [pdf]
- Sachin Chhabra, PrasanthSai Gouripeddi, Hemanth Venkateswara, Baoxin Li. **LLS: Regulating Neural Network Training via Learnable Label Smoothing** *Under review at International Conference on Learning Representations (ICLR), 2025.*

- Sachin Chhabra. **Making the Best of What We Have: Novel Strategies for Training Neural Networks under Restricted Labeling Information** *Ph.D. Dissertation, 2024.* [PDF]

Ongoing Work

- Researching a novel Self-supervised technique for training transformers from scratch.
- Exploring training LLM-style models from scratch for specialized use cases.

Professional Services

- Regularly reviewed research papers for AAAI, CVPR, ICLR, NeurIPS, ICCV, ECCV, ICML, BMVC, WACV, ACM TIST, and Pattern Recognition.
- Outstanding Reviewer for BMVC 2024.

Teaching Experience & Invited Talk

- *Teaching Assistant* for Introduction to Machine Learning and Deep Learning for CEE 598/494 (Graduate and Undergraduate level) where duties included teaching lectures occasionally, creating teaching content and exams.
- Guest Lecture on Generative Adversarial Networks (GAN) for CEE 598/494.
- Teaching assistant experience for Intro to Deep Learning in Computer Vision (CSE 591), "Foundations of Machine Learning" (CSE475), Introduction to Machine Learning and Deep Learning (CEE 598/494), Object-Oriented Programming and Data Structures (CSE 205).

Industry Experience

Wayfair **July 2024 — Present**
Machine Learning Scientist *Mountain View, CA*

- Developed a recommendation engine for images for improving user product discovery.
- Designed a multi-task neural network for sales forecasting across multiple markets and stages of B2B customers.
- Tech Stack: PyTorch, Scikit-learn, Python, SQL, GCP, Composer Airflow.

Wayfair **June 2023 — Aug 2023**
Machine Learning Scientist Intern *Boston, MA*

- Automated product color extraction from images using object detection and segmentation based on input query text.
- Created a pipeline with state-of-the-art models: Segment-Anything-Model(SAM), GroundingDINO and modified them to adapt for our use case.
- Tech Stack: PyTorch, Huggingface, Scikit-learn.

Wayfair **May 2022 — Aug 2022**
Machine Learning Scientist Intern *Boston, MA*

- Designed and implemented a Graph Neural Network (GNN) framework to build an item-to-item-based recommendation system.
- Developed novel loss functions to optimize the training of GNNs.
- Tech Stack: PyTorch, Deep Graph Library(DGL), Scikit-learn, Python, SQL, GCP.

Systems Imagination **May 2020 — Aug 2020**
Machine Learning Research Intern *Tempe, Arizona (Remote)*

- Developed a hybrid neural network framework that processes time series and tabular data to predict COVID-19 case counts and risk for the US counties.
- Tech Stack: PyTorch, Scikit-learn, Python.

Accenture **Dec 2013 — Jun 2017**

Senior Software Engineer *Bangalore, India*

- Worked on migration scripts, stored procedures for databases, and wrote SQL queries for ETL transformation logic.
- Tech Stack: SQL.

Projects

Large Language Model (LLM) from Scratch in PyTorch [GitHub]

- Developed GPT3 and LLaMA-2 based Large Language Models (LLM) from scratch in PyTorch with functionalities like Byte-Pair Tokenizer, Rotational Positional Embedding (RoPe), SwishGLU, RMSNorm, and Mixture of Experts (MOE).

Vision Transformer from Scratch in PyTorch | [100+ ★] [GitHub]

- Built Vision Transformer (ViT) from scratch in PyTorch, including operations like self-attention.

Various Generative Adversarial Networks (GAN) [GitHub]

- Implemented Vanilla-GAN, Deep Convolution GAN (DCGAN), Least Squared GAN (LSGAN), Conditional GAN (cGAN), CycleGAN, Wasserstein GAN (WGAN), Improved Wasserstein GAN (WGAN-GP), and StarGAN for generating/translating images.

Facial Expression Recognition - *Master Thesis* **Apr 2019**

- Built a hybrid convolutional neural network (CNN) by fusing features from multiple domains to achieve better classification.
- Created a real-time system that detects a face and classifies it into one of the expressions using the trained model.

Duplicate Photos and Video finder [GitHub]

- Developed a Python program to solve my problem of getting duplicate photos from multiple shared sources.
- Program identifies and deletes duplicate images and videos within a folder and its subdirectories with high speed and accuracy.

Technical Skills

Programming	Python, SQL
ML Frameworks	PyTorch, Keras, Scikit-learn, OpenCV
Specialties	Deep Learning, Transformers, GANs, GNNs, Computer Vision
Cloud	Google Cloud Platform (BigQuery, AI Platform, Dataflow, Composer Airflow)