KSHITIJ NIKHAL

AI Researcher

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EDUCATION

Ph.D. Electrical Engineering **University of Nebraska-Lincoln**
2023 (Expected) Lincoln, NE, USA

- My research is focused on answering: *"How to distill discriminative information across domains with minimal or no supervision, while mitigating the impact of poor generalization?"* for biometric applications.
- Minor: Computer Science. PhD Advisor: Dr. Benjamin S. Riggan.

M.S. Electrical Engineering **University of Nebraska-Lincoln**
2021 Lincoln, NE, USA

- GPA: 4.0. Research focus: Computer Vision & Unsupervised Learning.
- Master's Thesis: Learning Discriminative and Efficient Attention for Person Re-Identification Using Agglomerative Clustering Frameworks.

B.E. Computer Science **University of Pune**
2017 Pune, MH, India

- Grade: First class with Distinction.
- Bachelor's Thesis: Evaluating Facial Expressions in Real Time.

EXPERIENCE

Research Assistant **University of Nebraska-Lincoln**
Jan 2020 – Present Lincoln, NE, USA

- My primary focus is directed towards the IARPA BRIAR (Biometric Recognition and Identification at Altitude and Range) program, to build advanced capabilities that enable reliable and accurate biometric intelligence in highly challenging scenarios, including long-range (up to 500m), atmospheric turbulence, aerial sensors (UAVs), etc.
- I am also part of the U.S. Army Research Lab/UMD's ArtIAMAS (AI and Autonomy for Multi-Agent Systems) program to build efficient, dynamic and deployable biometric models, ensuring the utmost accuracy and reliability in extreme environments.

AI Resident **Google X, the Moonshot Factory**
May 2021 – Aug 2021, Aug 2022 – Dec 2022 Mountain View, CA, USA

- In my first residency, I designed and developed a few-shot learning vision model to identify defects on the electrical grid using StreetView-like imagery, providing unparalleled insights into the overall health of this critical infrastructure.
- During my second residency, I leveraged photogrammetry techniques on oblique aerial imagery to infer key electrical properties of power poles, which allowed to build a fine-detailed map of the electric grid.

Software Engineer **TomTom Maps**
Jan 2017 – Dec 2019 Pune, MH, India

- I developed an end-to-end production-ready pipeline for feature extraction of various map features like roads, buildings footprints, parking areas, etc., successfully cutting down hundreds of man hours.
- I played a key part in solving road-building intersection violations by utilising graph and machine learning models that incorporated multi-modal data (e.g., GPS, multi-spectral imagery, third-party sources).

SUMMARY

"I have nearly 7 years of research experience, spanning Concept Development at TomTom, research assistantship at UNL, and at Google X working on the 'world's most intractable problems'.

My PhD is focused on self supervised vision, funded by two "high-risk/high-payoff" projects: US Intelligence's IARPA BRIAR and US Army/UMD's ArtIAMAS.

SKILLS: UNSUPERVISED LEARNING, COMPUTER VISION, OPTIMIZATION, DOMAIN ADAPTATION, PYTHON, C++, PYTORCH, TENSORFLOW, OPENCV.

PATENTS

Meta-learning for detecting object anomaly from images.

Inferring Electrical Properties using Photogrammetry (Pending)

RECENT PUBLICATIONS

Cross-Spectral Attention for Unsupervised RGB-IR Face Verification and Person Re-identification
Under Review at TIPS Journal 2023

Mitigating Catastrophic Interference using Unsupervised Multi-Part Attention for RGB-IR Face Recognition
CVPRW 2023

Multi-Context Grouped Attention for Unsupervised Person Re-Identification
TBIOM Journal 2023

Unsupervised Attention Based Instance Discriminative Learning for Person Re-Identification
WACV 2021

Understanding Cross Domain Presentation Attack Detection for Visible Face Recognition
FG 2021

MAGEC: Machine Assisted Geometry Extraction and Creation
ICMV 2019

Evaluating Facial Expressions in Real-Time
IntelliSys 2017