NOBEL DANG

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EDUCATION

Clemson University | *Doctor of Philosophy in Computer Vision, Ph.D. (**GPA:** x / 4.0)* **SC, USA** | *(2023 -Present)*
- **Research Interest:** Novel View Synthesis, 3D Reconstruction, Localization, Foundational Models, Vision Language Models, Perception, Geometric Learning.

New York University | *Master of Science in Computer Science (**GPA:** 3.97 / 4.0)* **NY, USA** | *(2021 - 2023)*
- **Coursework**: Computer Vision, Deep Learning, Machine Learning, Big Data, Cloud Computing, Information Visualization, Algorithms.

Guru Gobind Singh Indraprastha University | *B.Tech. in Computer Science & Engineering (**GPA:** 8.16 / 10)* **Delhi, India** | (*2016 - 2020)*
- **Coursework**: Artificial Intelligence, Machine Learning, Algorithms, Database Management Systems, Operating System, JAVA.

EXPERIENCE

VIPR, DEVCOM, CU *(Research Scientist)* **SC, USA | (***Aug 2023 – Present)*
- Developing hyperspectral-based foundation model with self-supervised learning.
- Developing VPR and localization techniques for autonomous AI.

AI4CE, NYU *(Research Assistant)* **NY, USA | (***Jun 2022 – Aug 2023)*
- Developing Computer Vision, Deep Learning and Robotics Perception methodologies to solve spatial reasoning and create dataset for autonomous driving for New York City.

Deep Learning, NYU *(Teaching Assistant)* **NY, USA |** *(Jan 2023 – May 2023)*
- Served as a Teaching Assistant in the Deep Learning course at NYU under Professor Chinmay Hegde.

Libsys Ltd *(Software Developer Intern)* **Gurugram, India** | (*Jun 2019 – Aug 2019)*
- Developed **hybrid application** for Library management system that uses RFID, using **Flutter**.

RESEARCH PROJECTS

Spatial-VPR || *Currently in progress with AutoAI@Clemson **SC, USA | (***Mar 2024 – Present)*
- Introducing new methodology that solves VPR task by combing multiple images to share information across them rather than individual image-based representation.
- Performed fundamental experiments with learnings from CroCo, CLIP, DIFT, MiDaS and DINOv2 to understand how they effect VPR task at scale.

Kinematics Estimation of Carpal Bones *(MS Thesis)* || Pytorch, Volume Registration, ANTs, Segmentation, HPC **NY, USA |***Sept 2022 – May 2023*
- Evaluated and estimated kinematics from volumetric 4D MR sequences of the carpal wrist bones by generating Dense Displacement vector fields in a novel way and detecting pathology in wrist using geometric learning from motion patterns.
- Performed 3D-segmentations and regression to get smooth trajectories of the carpal bones in SE(3) manifold.
- Created template of volumetric frame sequences of carpal bones using ANTs and ITK-SNAP and transferred the rigid segmentations from a high-resolution static image to the dynamic image sequences.
- Performed a novel quasi rigid image registration between the volume sequences that maintains the rigidity of carpal bones, but the rest of volume is deformable with minimum average DICE score **~ 0.9**.

PROJECTS

Optical Flow Analysis || Python (Pytorch), CNN, GRU, HPC *Nov 2022 – Dec 2022*
- Analyzed the optical flow of scene images using RAFT (Recurrent All-Pairs field Transform) on KITTI and Sintel dataset with validation **EPE score** of **1.86** on clean and **2.56** on final dataset.

PUBLICATIONS

Co-VisiON Reasoning || *In submission
- Introduced a new task of Co-VisiON reasoning to understand the spatial relationship and co-visible regions among images that are sparsely distributed in a scene.
- Curated large-scale dataset using habitat-sim from iGibson and HM3D datasets by parallel processing.
- Introduced baseline methods for co-visibility reasoning; like traditional vision methods **(SIFT & RANSAC)**, **contrastive methods (SimCLR with ViT)**, **place recognition (with NetVLAD), 3D reconstruction (MV-DUSt3R)** and **multimodal methods (GPT4-v and/or SigLIP)**.
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- **Malaria Detection on Giemsa-Stained Blood Smears Using Deep Learning and Feature Extraction** || AISC 1087, Chapter-7, Springer
  Detected malarial parasites in the Giemsa-stained blood smears using deep convolutional architecture and SVM with an **accuracy of 98.8%** and **F1-score of 0.9795.** Compared the architecture's result with transfer learning on models like RESNET, VGGNet and DenseNet.

SKILLS

- Image Retrieval, Visual Localization, 3D Reconstruction, View Synthesis, Large Language Models (and VLMs), Visual Language Models, Perception, 3D Geometry, Geometric Learning, Scene Understanding, Optical Flow, Depth Estimation.