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Education

Stony Brook, USA	Stony Brook University	Aug 2022 – Present
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- Ph.D. in Computer Science, GPA: 4/4.
- Pursuing Thesis in Computer Vision advised by Prof. Dimitris Samaras.
- Coursework: Machine Learning, Computer Vision, Robotics, Distributed Systems, Database Systems.

Bengaluru, India	R V College of Engineering	Aug 2016 – Aug 2020
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- B.E. in Computer Science and Engineering, GPA: 9.22/10.
- Coursework: Operating Systems, Analysis of Algorithms, Neural Networks, Data Structures, Compilers.

Research interests

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- Self-supervised Learning, Vision-Language Models.

Research Papers

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1. Li, X., **Belagali, V.**, Shang, J. & Ryoo, M. S. Crossway Diffusion: Improving Diffusion-based Visuomotor Policy via Self-supervised Learning, **ICRA 2024**.
 2. **Belagali, V.**, Zhou, L., Li, X. & Samaras, D. HyperMAE: Modulating Implicit Neural Representations for Efficient MAE Training, **NeurIPS 2023 Workshop - SSLTheoryPractice23**.
 3. Zhou, L., **Belagali, V.**, Bae, J., Prasanna, P. & Samaras, D. INRFormer: Neuron Permutation Equivariant Transformer on Implicit Neural Representations, **NeurIPS 2023 Workshop - NeurReps**.
 4. **Belagali, V.**, Rao, A. & Ghosh, P. K. Weakly supervised glottis segmentation using bounding box labels, **Interspeech 2023**.
 5. Roy, A., **Belagali, V.** & Ghosh, P. K. Air tissue boundary segmentation using regional loss in real-time Magnetic Resonance Imaging video for speech production, **Interspeech 2022**.
 6. Roy, A., **Belagali, V.** & Ghosh, P. K. An error correction scheme for improved air-tissue boundary in real-time MRI video for speech production, **ICASSP 2022**.
 7. **Belagali, V.**, Rao, A., Gopikishore, P., Krishnamurthy, R. & Ghosh, P. K. Two step convolutional neural network for automatic glottis localization and segmentation in stroboscopic videos, **Biomedical Optics Express 2020**.

Work Experience

Research Assistant - CV Lab	Stony Brook University	Sep 2022 – Present
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- *Self-supervised learning*
Masked Autoencoders: Explored the usage of implicit neural representations to efficiently train Masked Autoencoders (MAE). Our method, HyperMAE [2], achieved comparable image classification performance to MAE while using 46% - 72% of pre-training compute.
Robotics: Worked on improving diffusion-based visuomotor policy learning by using self-supervision [1]. State reconstruction task as self-supervision led to significant performance improvement of 17%.
DINO using synthetic data: Exploring the usage of synthetic images generated from image-conditioned diffusion models for DINO training. The goal is to investigate the benefit of synthetic images for data augmentation

instead of hand crafted augmentations (in progress).

- *Vision Language Models*: Working on referring expression-based object localization. Specifically, I am interested in understanding object motion in natural videos and hand-object interactions in egocentric videos using language as a descriptor (in progress).

Research Associate - Spire Lab

Indian Institute of Science

Oct 2021 – July 2022

- *Medical Imaging*: Designed a method for weakly supervised glottis segmentation in high-speed videoendoscopy using bounding box labels [4]. The method enhanced the segmentation quality by 20%.
- *Loss Functions*: Analyzed the drawbacks of existing deep learning methods for air tissue boundary segmentation in rt-MRI videos. Designed the use of regional losses and metrics to improve segmentation accuracy by 28.5 % [5, 6].

Software Engineer

Citrix

July 2020 – Sep 2021

- *Cloud Engineering*: Developed traffic manager tool in C# to handle cloud services during regional outages which improved time to mitigate by 20%. Led the cloud cost optimization project to reduce the cost by 65%.

Skills

- **Languages**: Python, C++, Matlab, Java, C#, C, SQL.
- **ML libraries**: PyTorch, Keras, OpenCV, Detectron, HuggingFace
- **Technologies**: Azure, Jenkins, Splunk, New Relic.

Teaching Assistant

- CSE 512: Machine Learning (Graduate level, Fall 2024, SBU)
- CSE 378: Introduction to Robotics (Undergraduate level, Fall 2023, SBU)
- CSE 416: Software Engineering (Undergraduate level, Spring 2023, SBU)
- ISE 369: Introduction to Political Informatics (Undergraduate level, Spring 2023, SBU)