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## Education

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**Stony Brook, USA** **Stony Brook University** **Aug 2022 – Present**

- PhD 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**

- B.E. in Computer Science and Engineering, GPA: 9.22/10.
- Coursework: Operating Systems, Analysis of Algorithms, Neural Networks, Data Structures, Compilers.

## Research Interest

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- Self-supervised Learning

## Research Papers

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1. **Belagali, V.\***, Yellapragada, S.\*, Graikos, A., Kapse, S., Li, Z., Nandi, T. N., ... & Samaras, D. Gen-SIS: Generative Self-augmentation Improves Self-supervised Learning, **arXiv** preprint 2024.
2. Li, X., **Belagali, V.**, Shang, J. & Ryoo, M. S. Crossway Diffusion: Improving Diffusion-based Visuomotor Policy via Self-supervised Learning, **ICRA** 2024.
3. **Belagali, V.**, Zhou, L., Li, X. & Samaras, D. HyperMAE: Modulating Implicit Neural Representations for Efficient MAE Training, **NeurIPS** 2023 Workshop - SSLTheoryPractice23.
4. Zhou, L., **Belagali, V.**, Bae, J., Prasanna, P. & Samaras, D. INRFormer: Neuron Permutation Equivariant Transformer on Implicit Neural Representations, **NeurIPS** 2023 Workshop - NeurReps.
5. **Belagali, V.**, Rao, A. & Ghosh, P. K. Weakly supervised glottis segmentation using bounding box labels, **Interspeech** 2023.
6. 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.
7. 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.
8. **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

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**Research Assistant - CV Lab** **Stony Brook University** **Sep 2022 – Present**

- *Self-supervised learning*  
*Masked Autoencoders*: Explored the usage of implicit neural representations to efficiently train Masked Autoencoders (MAE). Our method, HyperMAE [3], 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 [2]. State reconstruction task as self-supervision led to significant performance improvement of 17%.

*Self-augmentations*: Exploring usage of synthetic images generated from self (image)-conditioned diffusion models to improve SSL models. Proposed disentanglement pretext task for self-supervised learning using synthetic interpolated images [1].

**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 videendoscopy using bounding box labels [5]. 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 % [6, 7].

**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**

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

### **Teaching Assistant**

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- 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)