Shreyas Bhat

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Education

University of North Carolina at Chapel Hill — Chapel Hill, NC
PhD, Computer Science — *Aug. 2024 - Present*

Birla Institute of Technology and Science, Pilani — Goa, India
B.E. Electronics, MSc. Biology and Minor in Data Science — *Aug. 2019 - 2024*

Research Interest

Generative Models for tabular data, sets, language, images, Large Language Models for Decision Making, Reinforcement Learning, Active Learning, AI for Health, and Medical Imaging.

Experience

LUPA Lab, UNC Chapel Hill — Aug. 2024 – Present
Research Assistant — *Chapel Hill, United States*

- Working on training novel architectures, foundational models for tabular data, arbitrary sets.
- Working on enhancing the performance of black-box decision-makers(LLMs) using ideas from Active Learning and Reinforcement Learning.
- Supervisor: **Prof. Junier Oliva**

QTIM, Harvard University/MIT and MGH — Jan. 2023 – June 2024
Research Intern — *Boston, United States*

- Developed a deep learning model to predict gene expression of oncologic drivers of brain metastases from multi-sequence MRI.
- Supervisor: **Prof. Jayashree Kalpathy-Cramer**, **Prof. Bruce Rosen**, **Prof. Christopher Bridge**, **Prof. Albert Kim**

APPCAIR AI Labs, BITS Pilani — Jan 2022 – May 2023
Undergrad Student Researcher — *Goa, India*

- Worked on generating drug-like molecules for specific targets by self-refining Large Language Models using logical feedback.
- Worked on reliable model compression using iterative knowledge distillation and calibration-sensitive procedure to improve the fidelity of the student model predictions.
- Worked on predicting properties of small molecules using Graph Neural Networks and Message Passing Neural Networks.
- Supervisors: **Prof. Ashwin Srinivasan**

CVRL, University of Illinois Urbana-Champaign — Sept. 2021 - May 2022
Undergrad Student Researcher — *Remote*

- Worked on using CNN based models for plant phenotype prediction on the layers of the leaf.
- Supervisor: **Prof. Narendra Ahuja**

Publications

1. **Shreyas Bhat Brahmavar**, Ashwin Srinivasan, Tirtharaj Dash, Lovekesh Vig, Arijit Roy, Sowmya Krishnan, Raviprasad Aduri - "Generating Novel Leads for Drug Discovery Using LLMs for Logical Feedback", *Accepted at AAAI 2024 main track full-paper.*[**Link**]
2. **Shreyas Bhat Brahmavar**, Rohit Rajesh, Tirtharaj Dash, Lovekesh Vig, Tanmay Tulsidas Verlekar, Md Mahmudul Hasan, Tariq Khan, Erik Meijering, Ashwin Srinivasan - "IKD+: Reliable Low Complexity Deep Models for Retinopathy Classification", *Accepted at IEEE International Conference on Image Processing 2023 short paper.*[**Link**]
   * - Equal contribution.

Preprints and Workshop papers

1. "Dynamic Information Sub-Selection for Decision Support" - Hung-Tien Huang, Maxwell Lennon, **Shreyas Bhat Brahmavar**, Sean Sylvia, Junier B Oliva. *Under Review* [**Preprint**]
2. "Multimodal Deep Learning-Based Prediction of Immune Checkpoint Inhibitor Efficacy in Brain Metastases" - Tobias R. Bodenmann, Nelson Gil, Felix J. Dorfner, Mason C. Cleveland, Jay B. Patel, **Shreyas Bhat Brahmavar**, Melisa S. Guelen, Dagoberto Pulido-Arias, Jayashree Kalpathy-Cramer, Jean-Philippe Thiran, Bruce R. Rosen, Elizabeth Gerstner, Albert E. Kim & Christopher P. Bridge, Accepted at CaPTion workshop, MICCAI 2024. [**Link**]
3. "Deep Learning-based Non-Invasive Molecular Profiling of Brain Metastases from MR Imaging" - **Shreyas Bhat Brahmavar***, Tiago Goncalves*, Tobias R. Bodenmann, Syed Rakin Ahmed, Jay B. Patel, Praveer Singh, Katharina V. Hoebel, Mason C. Cleveland, Felix Dorfner, Dagoberto Pulido-Arias, Bruce R. Rosen, Jaime S. Cardoso, Jayashree Kalpathy-Cramer, Elizabeth Gerstner, Albert E. Kim, Christopher P. Bridge. *Accepted at ISBI 2024 abstract*
4. "Efficient Integration of Molecular Representation and Message-Passing Neural Networks for Predicting Small Molecule Drug-like Properties" - **Shreyas Bhat Brahmavar**, Mrunmay Mohan Shelar, Revanth Harinarthini, Hemanth Bandaru, Nahush Harihar Kumta, Ojas Wadhwani, and Raviprasad Aduri, *Accepted at International Conference on Drug Discovery 2022 abstract* [**Poster**][**Link**]
5. Syed Rakin Ahmed*, **Shreyas Bhat Brahmavar***, Christopher Bridge, Jay Patel, Ken Chang, Mishka Gidwani, Praveer Singh, Elizabeth Gerstner, Albert Kim, Priscilla Brastianos, Jayashree Kalpathy-Cramer -"A Deep Learning Framework Enables Non-Invasive detection of Tumor Mutational Burden in Brain Metastases". *Accepted abstract at RSNA 2023 abstract*

Projects

Neural Tangent Kernel | [GitHub]
- Implemented and reproduced results from the NTK paper and extended it to the momentum optimiser, and derived the math behind.

Compact Transformers - Paper Implementation | [GitHub]
- Implemented the paper 'Escaping The Big Data Paradigm With Compact Transformers' by Ali Hassani et al. which uses convolutions for tokenizing the input Experimented further by using MLP-mixer and using different positional embeddings.

Self-Supervised Barlow Twins on STL10 | [GitHub]
- Analyzed and compared learning methods such as pseudo-labelling for Barlow Twins for self-supervised on STL10 dataset. Additionally, working on combining other manifold spaces in the approach for better representation.

Other Roles

Reviewing and Teaching

- Reviewer at ICLR 2025
- First Degree Teaching Assistant **BITS F464 - Machine Learning**: Conducted labs and tutorials on Linear Regression, Bayes Nets, SVMs, Neural Nets, Decision Trees and clustering for 150 cross-disciplinary students.
- Lead Instructor for "Introduction to Machine Learning and Deep Learning" course: Delivered comprehensive lectures on ML/DL fundamentals to diverse student groups
- Co-Author of **Concepts of Deep Learning** website: Maintained an educational platform covering Python basics to advanced computer vision concepts.

Leadership

- Vice President, **Society for Artificial Intelligence and Deep Learning**: Led the BITS-Goa AI society to promote research and open source projects. Organized the annual **Symposium** event featuring industry and academic experts

Relevant Courses

Machine Learning, Optimization for Machine Learning and Data Science, Foundation of Data Science, Applied Statistics and Methods, Optimization, Artificial Intelligence, Digital Image Processing, Control Systems.

Technical Skills

Proficient: Python, C, C++, PyTorch, TensorFlow, Scikit-learn, Pandas, HuggingFace
Comfortable: Java, LATEX, Git, NLTK
Familiar: R, MySQL, HTML, CUDA