Anirudh Buvanesh

Pre-doctoral Research Fellow, Microsoft Research India   🎓 Google Scholar   ✉ Mail   🏠 Website   🐙 Github

EDUCATION

Birla Institute of Technology and Science (BITS), Pilani   *2016 - 2021*
M.Sc. Mathematics and B.E. Computer Science   GPA: 9.36/10.00 | *Distinction*
Advisors: Dr. Soumendu Sinha & Prof. Pratik Narang

WORK EXPERIENCE

Microsoft Research   Bangalore, India
Pre-doctoral Research Fellow in Extreme Classification Group   *2022 - present*
Developing algorithms to tackle long-tail and zero-shot classification in large-scale retrieval systems.
Advisors: Dr. Yashoteja Prabhu, Dr. Manish Gupta, Dr. Manik Varma

Salesforce   Bangalore, India
Software Engineer in Consumer Goods Cloud | Supervisor: Mr. Abhinav Kumar   *2021-2022*
Worked on integrating the Trade Promotion Management product from the Accenture acquisition into Salesforce ecosystem.

Central Electronics Engineering Research Institute (CEERI)   Pilani, India
Research Intern | Advisors: Dr. Soumendu Sinha & Prof. Pratik Narang   *Jan-Jul 2021*
Worked on segmenting aerial imagery of farmlands into crops and weeds using computer vision techniques.

Amazon   Bangalore, India
Software Engineer Intern in Supply Quality Team | Supervisor: Mr. Nishanth Ramaprakash   *Aug-Dec 2020*
Improved advertisement brand safety campaigns by integrating 3rd party signals into Amazon's brand safety engine.

Tata Institute of Fundamental Research   Mumbai, India
Software Engineer Intern in Gnowledge Lab | Advisor: Prof. Gadiraju Nagarjuna   *May-Jul 2018*
Developed data curation and analysis pipeline for gstudio-hosted NROER website, which housed study material.

PAPERS UNDER REVIEW

Enhancing Tail Performance in Extreme Classifiers by Label Variance Reduction.   * Equal Contribution
Anirudh Buvanesh*, Rahul Chand(, Yashoteja Prabhu, Manish Gupta, & Manik Varma et al.

Improved Retrieval of Novel Keywords for Sponsored Search.
Sachin Yadav*, Deepak Saini*, Anirudh Buvanesh, Bhawna Paliwal, Kunal Dahiya, Jian Jiao & Manik Varma.

PUBLICATIONS

[Re] AdaBelief Optimizer: Adapting Stepsizes by the Belief in Observed Gradients.
Anirudh Buvanesh*, Madhur Panwar*
ReScience C, vol. 8, no. 2, 2022 (accepted under ML Reproducibility Challenge 2021).
NeurIPS 2022 Journal Track (Spotlight.)

Modelling War Phenomena with an emphasis on Operations Research.
Anirudh Buvanesh, Sumanta Pasari.
IEEE ICCCNT 2021

THESIS

Deep Learning Based Architecture for Agriculture Vision
Anirudh Buvanesh, Soumendu Sinha & Pratik Narang.
Undergraduate Thesis, Computer Science and Information Systems, BITS Pilani, 2021.

SELECTED AWARDS AND HONORS

- **BITS Merit Scholarship** (2017-21) Awarded 40% tuition fee waiver for being in the top 2% students.
- **Menezes Scholarship** (2016-20) Awarded Rs. 600,000 during the course of undergraduate degree.
- **INSPIRE Scholarship** (2016-20) Awarded Rs. 320,000 from the Government of India for securing a top 1% rank in Class XII examinations conducted by MSBSHE.
- **JEE Mains** (2016) Secured All India Rank 780 amongst 150,000 candidates.

Selected Projects

Zero Shot Classification in Retrieval Systems *2023*
Advisor: Dr. Manik Varma, *Microsoft Research India*
- Proposed an architecture that enhanced text representations for unseen classes by incorporating similar one-versus-all (OvA) classifiers, resulting in a 4% improvement in Recall@100 compared to previous state-of-the-art methods.
- Implemented an efficient version of the algorithm, which allowed scaling to 100 million classes by training on 5 million classes. The algorithm is currently deployed into Microsoft's retrieval systems.

Improving Tail Label Performance in Retrieval Systems *2022-23*
Advisors: Dr. Yashoteja Prabhu, Dr. Manish Gupta, Dr. Manik Varma, *Microsoft Research India*
- Identified limitations of existing approaches in modeling label correlations to address the overfitting issue of tail classifiers.
- Proposed a Siamese model that was accurate on tail classes. Leveraging this model as a teacher resulted in a 5% enhancement in the tail performance of OvA classifiers without compromising head label performance.

Agriculture Vision *2021*
Advisors: Dr. Soumendu Sinha & Prof. Pratik Narang, *CEERI Pilani*
- Developed a deep learning architecture based on graph convolutions that used features from multiple colour spaces to improve the accuracy of semantic segmentation architecture of farmland images [leaderboard][report].

Modeling War Phenomena with an Emphasis on Operations Research *2021*
Advisor: Prof. Sumanta Pasari, *BITS Pilani*
- Developed war trajectory prediction models and devised an optimal food stocking inventory plan for military applications. The work resulted in a publication at IEEE ICCCNT 2021 [paper].

Toy Compiler *2020*
Advisor: Prof. Vandana Agarwal, *BITS Pilani*
- Designed a compiler in C for a custom language. Implemented all the modules, including lexer, parser, semantic analyzer, and code generator [code].

Statistical Tests for Pseudo Random Number Generators (PRNG) *2019*
Advisor: Prof. Ashutosh Bhatia, *BITS Pilani*
- Designed a deep learning test for PRNGs using LSTM networks, achieving 49.86% and 62.55% next-bit prediction accuracy for AES and English text, respectively, confirming English text predictability [report].

Leadership Roles, Teaching and Services

QBOX (2017-19): Core member at QBOX, a startup that aims to transform the writing domain with a competitive e-learning approach. I enhanced online visibility through SEO, elevating our website to 2nd search result for the query "competitive writing" website rankings on Google search. Additionally, I organized writing competitions at Birla Balika Vidyapeeth and managed technical team recruitment.

Teaching Assistant, Dept. of Computer Science and Information Systems (2018): Assisted professors in designing course material, evaluating assignments, & supporting students' learning objectives. *Course: Logic In Computer Science*

Volunteer: COLT 2023

Skills and Courses

Programming Languages: JavaScript, Python, Java, C/C++, Prolog.

Libraries and Software: PyTorch, Tensorflow, AWS, Azure.

Relevant Courses: Data Mining, Data Structures & Algorithms, Object Oriented Programming, Database Systems, Linear Algebra, Probability & Statistics, MOOCs: Machine Learning Specialization, CS231n: Deep Learning for Computer Vision.