

# Anirudh Buvanesh

Pre-doctoral Research Fellow, Microsoft Research India

 Google Scholar

 Mail

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 Github

## EDUCATION

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### Birla Institute of Technology and Science (BITS), Pilani

*M.Sc. Mathematics and B.E. Computer Science*

Advisors: Dr. Soumendu Sinha & Prof. Pratik Narang

2016 - 2021

GPA: 9.36/10 (Distinction)

Department Rank: 3 / 70

## WORK EXPERIENCE

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### Microsoft Research

*Pre-doctoral Research Fellow in Extreme Classification Group*

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

Bangalore, India

2022 - present

### Salesforce

*Software Engineer in Consumer Goods Cloud* | Supervisor: Mr. Abhinav Kumar

Worked on integrating the Trade Promotion Management product from the Accenture acquisition into the Salesforce ecosystem. Implemented multiple microservices and deployed them by setting up a Kubernetes cluster.

Bangalore, India

2021-2022

### Central Electronics Engineering Research Institute (CEERI)

*Research Intern* | Advisors: Dr. Soumendu Sinha & Prof. Pratik Narang

Worked on segmenting aerial imagery of farmlands into crops and weeds using computer vision techniques.

Pilani, India

Jan-Jul 2021

### Amazon

*Software Engineer Intern in Supply Quality Team* | Supervisor: Mr. Nishanth Ramaprakash

Improved advertisement brand safety campaigns by integrating 3rd party signals into Amazon's brand safety engine. Migrated hadoop jobs running on dedicated clusters to EMR, which resulted in cost savings for the team.

Bangalore, India

Aug-Dec 2020

### Salesforce

*Software Engineer Intern in Loyalty Cloud* | Supervisor: Mr. Ganesh Dendukuri

Worked on building a framework to define complex business rules without writing multiple nested if-else conditions. The framework could scale to a rule set with a 1 million size rule set. Received a pre-placement offer from the internship

Hyderabad, India

May-Jul 2020

### Tata Institute of Fundamental Research

*Research Intern in Knowledge Lab* | Advisor: Prof. Gadiraju Nagarjuna

Developed data curation and analysis pipeline for the gstudio-hosted NROER website, which housed study material for physics, chemistry and mathematics.

Mumbai, India

May-Jul 2018

## PAPERS UNDER SUBMISSION

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### Improved Retrieval of Novel Keywords for Sponsored Search.

\* Equal Contribution

Sachin Yadav\*, Deepak Saini\*, [Anirudh Buvanesh](#), Bhawna Paliwal, Kunal Dahiya, Jian Jiao and Manik Varma.

US Patent Application / Microsoft Under Filing

## PUBLICATIONS

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### Enhancing Tail Performance in Extreme Classifiers by Label Variance Reduction.

[Anirudh Buvanesh](#)\*, Rahul Chand\*, Jatin Prakash, Bhawna Paliwal, Mudit Dhawan, Neelabh Madan, Deepesh Hada, Vidit Jain, Sonu Mehta, Yashoteja Prabhu, Manish Gupta, Ramachandran Ramjee and Manik Varma

ICLR 2024

### [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 ICCNT 2021

## THESIS

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### 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

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- **BITS Merit Scholarship** (2017-21) Awarded 40% tuition fee waiver for being in the top 2% students in a batch of 950 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.
- **JEE Mains** (2016) Secured All India Rank 780 amongst 150,000 candidates.

## SELECTED PROJECTS

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### 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 tasks on 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-based statistical 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

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**Reading Group Organizer, Extreme Classification Group** (2022-Present) Organized weekly meet-ups discussing recent papers and trends in Information Retrieval and NLP and arranged invited talks in related areas.

**Core Member, QBOX** (2017-18): QBOX is 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 the second 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*

## SKILLS AND COURSES

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**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, Optimization, Numerical Analysis.