Rachit Bansal

rachitbansal2500@gmail.com • https://rachitbansal.github.io • +91-9205677801

EDUCATION

Delhi Technological University — New Delhi, India
B.Tech. in Electrical Engineering — 2022

- Received the **Research Excellence Award** for my bachelor's thesis work at the Technion. The only undergraduate student to receive the award. One of the highest honors for research at the university.

EXPERIENCE

Google Research
Pre-doctoral Researcher (Advisor: Dr. Partha Talukdar) — July 2022–Present

Studying composition of language models as a means to augment new knowledge.

- Led a large cross-team collaboration to introduce a new paradigm of composition of language models: Using knowledge-specific models to augment new knowledge in a large language model.
- Submitted our work to ICLR. Exploring integration efforts for (i) Parameter-efficient Tuning (PET) with Google DeepMind and (ii) Serving custom models for downstream users with the Bard team.

Technion – Israel Institute of Technology
Research Intern (Advisor: Prof. Yonatan Belinkov) — Sept 2021–July 2022

Establishing relationship between intrinsic neuron activations and model behavior.

- For the first time, we showed that intrinsic properties of a neural network, such as the information distribution across neurons, strongly correlate with its generalization behavior.
- Presented this bachelor's thesis work at NeurIPS 2022 and received lauding feedback.

Adobe Research
Research Intern (Host: Balaji Krishnamurthy) — Jan 2021–Sept 2021

Towards grounding language model generations to factual and commonsense knowledge.

- Theorised and established task-agnostic frameworks to augment language model inputs with factual and commonsense knowledge on the fly.
- Received a full-time offer post a celebrated internship: Publishing 2 papers at NAACL and 2 US patents.

IIIT Delhi
Research Intern (Advisor: Prof. Tanmoy Chakraborty) — May 2020–April 2021

Retrieving and detecting closed-domain misinformation across social networks.

PUBLICATIONS

[1] *LLM Augmented LLMs: Expanding Capabilities through Composition*
Rachit Bansal, Bidisha Samanta, Siddharth Dalmia, Nitish Gupta, Shikhar Vashishth, Sriram Ganapathy, Abhishek Bapna, Prateek Jain, Partha Talukdar.
International Conference on Learning Representations (**ICLR**) 2024 (under review) [Preprint]

[2] *Linear Connectivity Reveals Generalization Strategies*
Jeevesh Juneja, Rachit Bansal, Kyunghyun Cho, João Sedoc, Naomi Saphra.
– International Conference on Learning Representations (**ICLR**) 2023
– Workshop on Spurious correlations, Invariance, and Stability (SCIS) at **ICML** 2022 [Print, Code]

[3] *Measures of Information Reflect Memorization Patterns*
Rachit Bansal, Danish Pruthi, Yonatan Belinkov.
Conference on Neural Information Processing Systems (**NeurIPS**) 2022 [Print, Website]

[4] *Evaluating Explanations: How much do explanations from the teacher aid students?*
Danish Pruthi, Rachit Bansal, Bhuvan Dhingra, Livio Baldini Soares, Michael Collins, Zachary C. Lipton, Graham Neubig, William W. Cohen.
Transactions of the Association for Computational Linguistics (**TACL**) [Print, Code]

[5] *CoSe-Co: Text Conditioned Generative CommonSense Contextualizer*
Rachit Bansal, Milan Aggarwal, Sumit Bhatia, Jivat Kaur, Balaji Krishnamurthy.
– North American Chapter of the Association for Computational Linguistics (**NAACL**) 2022
– Workshop on Commonsense Reasoning and Knowledge Bases at **AKBC** 2021 [Print, Video]

[6] *LM-CORE: Language Models with Contextually Relevant External Knowledge*
Jivat Kaur, Sumit Bhatia, Milan Aggarwal, Rachit Bansal, Balaji Krishnamurthy.
– North American Chapter of the Association for Computational Linguistics (**NAACL**) Findings 2022
– Workshop on Commonsense Reasoning and Knowledge Bases at **AKBC** 2021 [Print, Video]

[7] *How Low is Too Low? A Computational Perspective on Extremely Low-Resource Languages*
Rachit Bansal, Himanshu Choudhary, Ravneet Punia, Niko Schenk, Jacob L Dahl, Émilie Pagé-Perron.
Student Research Workshop (SRW) at **ACL** 2021 [Print, Slides, Code]

[8] *Combining exogenous and endogenous signals with a co-attention network for early fake news detection*
Rachit Bansal, William Scott, Nidhi Sultan, Tanmoy Chakraborty.
Pacific-Asia Conference on Knowledge Discovery and Data Mining (**PAKDD**) 2021 [Print, Slides]

[9] *Cross-SEAN: A Cross-Stitch Semi-Supervised Attention Model for COVID-19 Fake News Detection*
Rachit Bansal, William Scott, Abhay Kaushik, Tanmoy Chakraborty, Shubhashis Sengupta.
Journal of Applied Soft Computing [Print]

ACADEMIC COLLABORATIONS AND PROJECTS

Studying Linear Mode Connectivity
(w/ CILVR Lab at NYU: Dr. Naomi Saphra, Prof. Joao Sedoc, Prof. Kyunghyun Cho)
Studied linear model connectivity in loss surfaces of pre-trained language models. Observed unconventional clusters of models lying in separate loss basins showing characteristic out-of-domain properties. I executed the foundational implementations for studying mode connectivity and supported further analysis.

Evaluating Model Explanations
(w/ LTI CMU: Danish Pruthi, Prof. Zachary Lipton, Prof. Graham Neubig)
Established a student-teacher communication paradigm for automatic evaluation of saliency-based attribution methods. I led the development of the paradigm for generative tasks and enhanced our TACL paper by inculcating empirical findings over multiple review cycles.

Machine Translation for Sumerian
(as a part of *Google Summer of Code (GSoC)* 2020)
Sumerian is the earliest documented language in Mesopotamia, and perhaps the world—dating back to the end of 4th millennium BC from current-day southern Iraq. I led this collaboration with the Cuneiform Digital Library Initiative (CDLI) and University of Oxford to adapt a number of NMT techniques for Sumerian translation. We built an end-to-end information extraction pipeline for Sumerian [Code: 1, 2].

FEATURED TEACHING AND POSITIONS

Mentor: Google Summer of Code (GSoC) 2021
Cuneiform Digital Library Initiative (CDLI)

Student Instructor: Reinforcement Learning 2020
Coding Blocks
Recorded 10-hours worth of lectures and held a number of live webinars. Collaborated with course mentors to build project ideas, assignments, and quizzes.

Teaching Assistant: Machine Learning with Deep Learning 2019
Coding Blocks
Conducted classes and doubt sessions for a batch of 60 senior undergraduate students from all across the country. Built course quizzes and programming assignments in collaboration with other TAs.

Student: LxMLS 2021
11th Lisbon Machine Learning Summer School

FEATURED COURSEWORK

- ***Mathematics***:
  Advanced Linear Algebra (2nd Sem., DTU; *University Rank-1*)
  MIT RES-6-012: Introduction to Probability, MIT OCW
  Abstract Algebra, Group Theory, and Linear Algebra, IIT-KGP (NPTEL)
  Numerical and Engineering Optimization Methods (3rd Sem., DTU)
  Swarm and Evolutionary Optimization (7th Sem., DTU)
- ***Machine Learning***:
  IFT 6760A: Matrix and tensor factorization techniques for machine learning, University of Montreal
  MIT 18-065: Matrix Methods in Signal Processing, and Machine Learning, MIT OCW
  Probabilistic Graphical Models Specialization, Stanford University
  Bayesian Methods for Machine Learning, National Research University of Russia
- ***Natural Language Processing***:
  CS11-737: Multilingual NLP, CMU
  CS11-747: Neural Networks for NLP, CMU
  Natural Language Processing (6th Sem., DTU)