Rachit Bansal

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RESEARCH INTERESTS

Interpretability and Explainability, Robustness, Computional Linguistics, Neural Machine Translation, Transfer Learning, Representation Learning

EDUCATION

Delhi Technological University — New Delhi, India
Bachelor of Technology **(B.Tech)** in Electrical Engineering — July 2022 (expected)

EXPERIENCE

Adobe, Media and Data Science Research (MDSR)
Research Intern (Host: Balaji Krishnamurthy) — Jan 2021 - Sept 2021

Towards making language models factual and commonsense reasoning aware.

- Developed a mechanism of mapping paths from structured knowledge graphs to sentences from a text corpus. Using this we built the first large collection of path-sentence pairs.
- Theorised and implemented a task-agnostic framework to contextualise a given input text through commonsense inferences. Achieved state-of-the-art results across a variety of tasks.

University of Oxford, Cuneiform Digital Library Initiative (CDLI)
Research Intern (Advisors: Dr. Jacob Dahl and Dr. Niko Schenk) — Summer 2020

Investigating neural machine translation for low-resource cuneiform languages.

- Adapted NMT techniques from the three broad categories of data augmentation, knowledge transfer, and self-supervised pre-training for Sumerian-English translation.[1] Worked as a part of the MTAAC team to build an end-to-end information extraction pipeline for Sumerian.[2]
- Established a gradient and perturbation-based saliency framework to conduct thorough qualitative evaluations of various models along with human experts and assyriologists.

IIIT Delhi, Laboratory for Computational Social Systems (LCS2)
Research Intern (Advisor: Dr. Tanmoy Chakraborty) — May 2020 - April 2021

Retrieving and detecting closed-domain misinformation across social networks.

- Created the first labeled dataset for COVID-19 misinformation by extracting more than 45M domain-specific Tweets and labeling a large portion through a semi-automated approach.
- With Accenture Technology Labs, Bangalore, we introduced an end-to-end explainable neural model, trained using additional semi-supervised adversarial losses, to detect closed-domain misinformation early.

PUBLICATIONS

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

[2] *CoSe-Co: Text Conditioned Generative CommonSense Contextualizer*
Rachit Bansal, Milan Aggarwal, Sumit Bhatia, Jivat Kaur, Balaji Krishnamurthy.
– Workshop on Commonsense Reasoning and Knowledge Bases (**CSKB**) at **AKBC**, 2021 [Print]
– International Conference on Learning Representations (**ICLR**), 2022 (under review)

[3] *No Need to Know Everything! Efficiently Augmenting Language Models With External Knowledge*
Jivat Kaur, Sumit Bhatia, Milan Aggarwal, Rachit Bansal, Balaji Krishnamurthy.
Workshop on Commonsense Reasoning and Knowledge Bases (**CSKB**) at **AKBC**, 2021 [Print]

[4] *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.
ACL-IJCNLP Student Research Workshop (**SRW**), 2021 [Print, Slides, Video]

[5] *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 (**PA-KDD**), 2021 [arXiv, Slides]

[6] *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 [arXiv]

[1] Sumerian is the earliest documented language in Mesopotamia, and perhaps the world. Its traces date back to the end of 4th millennium BC from current-day southern Iraq. (Ref.)

[2] cdli-gh/Sumerian-Translation-Pipeline, cdli-gh/Semi-Supervised-NMT-for-Sumerian-English

TEACHING

Coding Blocks New Delhi, India

– Student Instructor- Reinforcement Learning (Online) March 2020 - May 2020

- 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 June 2019 - August 2019

- 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.

ACADEMIC PROJECTS

Evaluating Model Explanations
Worked with Danish Pruthi to establish a student-teacher communication paradigm for automatic evaluation of gradient-based saliency attribution methods. I led the development of the paradigm for generative tasks, and enhanced the paper by inculcating empirical findings over multiple thorough review cycles.

Chrome-SEAN: A Browser Extension to Detect Fake News
Built an easy-to-use chrome extension to predict the possibility of a live tweet status being fake. Based on our work at LCS2, IIIT-Delhi, we deployed a Flask-based API of our misinformation detection model.

Gaze localisation to Measure Sustained Attention
Worked in collaboration with Samsung R&D Lab, Noida, under the guidance of Dr. Divyashikha Sethia to curate an image processing module to analyze a person's attention. We engineered this using relative positioning of a person's gaze with respect to certain target regions on a mobile device.

AWARDS & HONOURS

Student- LxMLS, 2021
One of the selected students to attend the 11th Lisbon Machine Learning Summer School.

Fellow- Fatima Predoctoral Fellowship, 2021
One of the selected few fellows for the 9-month fellowship, aimed at research collaboration and mentorship for aspiring PhD students.

Literary Prodigy Award, 2015
Awarded by The Young Poets Network, UK, for my endeavours in the field of English Literature.[3]

RELEVANT SERVICE & POSITIONS

- **Volunteer:** NAACL 2021, ICLR 2021, EMNLP 2020, NeurIPS 2020, ICML 2020 & ACL 2020
- **Co-Founder**, Code to School: An initiative to collaborate with schools across the country and teach high school students programming languages and low-level concepts in computer science.
- **Mentor**, Tensorflow, Google Code-In
- **ML Lead**, Google Developer Student Club, DTU Chapter
- **Joint Secretary**, Sahitya, the Literary and Debating Society of DTU

FEATURED COURSEWORK

- ***Mathematics***:
  Advanced Linear Algebra (2^{nd} 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 (3^{rd} Sem., DTU)
  Swarm and Evolutionary Optimization (7^{th} 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)

[3] Check out some of my **poetry**