Rachit Bansal

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RESEARCH INTERESTS	Computational Linguistics, Neural Machine Translation, Unsupervised and Semi-Supervised Learning, Representation Learning, Interpretability

TECHNICAL SKILLS

Languages: Python, C++, C, JavaScript, MATLAB, HTML/CSS, Unix Shell Scripting
Frameworks: PyTorch, Tensorflow, HuggingFace, FairSeq, Flask, Node.js
Miscellaneous: Selenium, Seaborn, Material Design, Bootstrap, jQuery, MongoDB

EDUCATION

Delhi Technological University   New Delhi, India
Bachelor of Technology (**B.Tech**) in Electrical Engineering   July 2022 (expected)
CPI: 8.62/10

RESEARCH EXPERIENCE

Laboratory for Computational Social Systems (LCS2)   **IIIT Delhi**, New Delhi
Undergraduate Student Researcher   May 2020 – Present

- **Advisor:** Dr. Tanmoy Chakraborty
- **Project:** Retrieving and detecting closed-domain misinformation across social networks.
- Extracted more than 45M domain specific Tweets and labelled a part of them by modelling it as an NLI task between known facts and the query text, used BERT Sentence Embeddings and RoBERTa fine-tuned on the SNLI Corpus.
- 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.

Cuneiform Digital Library Initiative (CDLI)   **University of Oxford**, UK
Research Intern & Open-Source Contributor   June 2020 – September 2020

- **Advisors:** Dr. Jacob Dahl and Dr. Niko Schenk
- **Project:** Investigating machine translation techniques for low-resource cuneiform languages.
- Curated, implemented and adapted techniques for Sumerian-English Translation under the three broad categories of Data Augmentation, Knowledge Transfer and Self-supervised Pre-training.[1]
- Leveraged University of Oxford's Advanced Research Computing Cluster (ARC) to run the compute-expensive Transformer models, specially for pre-training. Used gradient and perturbation-based methods to interpret and evaluate the results across the various learning paradigms.
- Worked as a part of the MTAAC team to curate an end-to-end information extraction pipeline for Sumerian by integrating NER and POS Tagging models with the Semi-Supervised models.[2]

Samsung Research Lab   **DTU**, New Delhi
Undergraduate Student Researcher   October 2019 – May 2020

- **Advisor:** Dr. Divyashikha Sethia
- **Project:** Using Gaze Localisation to Study Sustained Attention on a Mobile Device.
- Experimented across various methodologies to curate an image processing module for analyzing a person's attention using relative positioning of the target and gaze points.
- Worked in collaboration with Samsung R&D Lab, Noida, for deployment of the model on an Android Application and tested it to measure sustained attention of the subjects.

PUBLICATIONS

- Danish Pruthi, **Rachit Bansal**, Bhuvam Dhingra, Livio Baldini Soares, Michael Collins, Zachary C. Lipton, Graham Neubig and William W. Cohen. **"Evaluating Explanations: How much do explanations from the teacher aid students?"** Transactions of the Association for Computational Linguistics (**TACL**) (under review)
- **Rachit Bansal**, Himanshu Choudhary, Ravneet Punia, Niko Schenk, Jacob L Dahl and Émilie Pagé-Perron **"How Low is Too Low? A Computational Perspective on Extremely Low-Resource Languages"** North American Chapter of the Association for Computational Linguistics Student Research Workshop (**NAACL SRW 2021**) (under review)

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

- **Rachit Bansal**, William Scott, Nidhi Sultan and Tanmoy Chakraborty **"Combining exogenous and endogenous signals with a co-attention network for early fake news detection"** The 25th Pacific-Asia Conference on Knowledge Discovery and Data Mining (**PAKDD 2021**) (under review)
- William Scott, **Rachit Bansal**, Abhay Kaushik, Tanmoy Chakraborty and Shubhashis Sengupta **"Cross-SEAN: A Cross-Stitch Semi-Supervised Neural Attention Model for COVID-19 Fake News Detection"** The 37th IEEE International Conference on Data Engineering (**ICDE 2021**) (under review)

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 Explanations for Machine Translation
- Worked with Danish Pruthi to empirically investigate Saliency explanations for Machine Translation. Established a student-teacher communication paradigm for automatic evaluation of source-side attributions, without the need of human intervention and judgment.
- Evaluated techniques like Attention, Integrated Gradients, LRP, and DeepLift on the WMT En-Fr Dataset across Transformer-based Encoder-Decoder architectures.

Chrome-SEAN: A Browser Extension to Detect Fake News[3]
- Curated an easy to use chrome extension based on our research work of detecting misinformation, Cross-SEAN, to predict the possibility of a tweet status being fake with an accuracy of 95.4%.
- Integrated the functionality of Online Learning by taking real-time user feedback on the prediction and using it conditionally to improve model's performance.

Power Forecasting using User Behaviour Learning[4]
- Experimented across models like Vanilla LSTMs, CNN-LSTMs, ARIMA, AR-Net and an Ensemble with XG-Boost, in order to forecast power and efficient energy utilisation in a household.
- Worked under the supervision of Dr. Kapil Sharma to integrate parallel functionalities including GHI Prediction, Appliance Scheduling, and Smart Plugs.

AWARDS & HONOURS

- **Winner at HackData, IGDTUW**, 2019
  Held the 3rd Position at the Nationwide Data Science Hackathon. Made an OCR system for medical prescriptions using CNN-Bi-LSTMs to auto-set health records and reminders in an allied application.
- **Academic Proficiency Award**, 2016
- **Literary Prodigy Award**, 2015
  Awarded by The Young Poets Network, UK, for my endeavours in the field of English Literature.[5]

RELEVANT SERVICE & POSITIONS

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

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[3] ChromeStore/Chrome-SEAN
[4] RachitBansal/Power-Forecasting
[5] Check out some of my **poetry**