Rachit Bansal

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RESEARCH INTERESTS

Computational Linguistics, Neural Machine Translation, Unsupervised and Semi-Supervised Learning, Representation Learning, Bayesian Machine Learning, Graphical Models

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, India
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 and Open-Source Contributor — June 2020 – September 2020

- **Advisors:** Dr. Jacob Dahl and Dr. Niko Schenk
- **Project:** Neural Machine Translation of Extremely 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, India
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

- **R. Bansal**, H. Choudhary, R. Punia, N. Schenk, J. Dahl, É. Pagé-Perron
  How Low is Too Low? A Computational Perspective on Extremely Low-Resource Languages (under review)
- W. Scott, **R. Bansal**, A. Kaushik, T. Chakraborty
  Cross-SEAN: A Cross-Stitch Semi-Supervised Neural Attention Model for COVID-19 Fake News Detection (under review)

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

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

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.

FEATURED COURSEWORK

- MIT RES-6-012, Introduction to Probability, MIT OCW (Online)
- MIT 18-065, Matrix Methods in Signal Processing, and Machine Learning, MIT OCW (Online)
- Probabilistic Graphical Models, Stanford University (Online)
- Bayesian Methods for Machine Learning, National Research University, Russia (Online)
- Machine Learning with Deep Learning, Coding Blocks (Online)
- Numerical and Engineering Optimization Methods, DTU (B.Tech, 3rd Semester)

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**, Association for Computional Lingustics (ACL), 2020
- **Volunteer**, International Conference on Machine Learning (ICML), 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

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