Dhruv Kumar

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EDUCATION

University of Waterloo, School of Computer Science, Waterloo, Canada　　　　　　**Sep 2018 - Aug 2020**
Master of Mathematics (Thesis), Computer Science　　　　　　**GPA: 86.75/100 (3.88/4)**
Thesis: Iterative Edit-based Unsupervised Sentence Simplification

Indian Institute of Information Technology, Allahabad, India　　　　　　**Jul 2012 - Jun 2016**
Bachelor of Technology (Hons.), Information Technology　　　　　　**GPA – 8.68/10 (9.07 - Last 2 years)**
Thesis: Compressed Knowledge transfer via Factorization Models in Recommender Systems

SKILLS

- **Relevant Coursework (Graduate and Undergraduate)**: Deep Learning, Trust Modeling and Online Social Networks, Privacy and Fairness in Data Science, Information Retrieval, Artificial Intelligence, Natural Language Processing, Cognitive Process Modelling, Optimization Techniques, Data Mining, Probability & Statistics, Mathematics(I, II, III).
- **Languages and Frameworks**: Python, Pytorch, Keras, Java, SQL, C/C++
- **Interests**: Natural Language Processing, Machine Learning

SELECTED PUBLICATIONS

- O. Vechtomova, G. Sahu, **D. Kumar**, LyricJam: A system for generating lyrics for live instrumental music, International Conference on Computational Creativity (ICCC), 2021 - Full Paper
- P. Xu, **D. Kumar**, W. Yang, W. Zi, K. Tang, C. Huang, J.C.K. Cheung, S.J.D. Prince, Y. Cao, Optimizing Deeper Transformers on Small Datasets, Joint Conference of the 59th Annual Meeting of the Association for Computational Linguistics and the 11th International Joint Conference on Natural Language Processing (ACL-IJCNLP 2021) - Long Paper
- S. Gehrmann et al., The GEM Benchmark: Natural Language Generation, its Evaluation and Metrics, ArXiv 2021.
- O. Vechtomova, G. Sahu, **D. Kumar**, Generation of lyrics lines conditioned on music audio clips, In Workshop on NLP for Music and Audio (NLP4MusA) at ISMIR 2020.
- **D. Kumar**, L. Mou, L. Golab, O. Vechtomova, Iterative Edit-based Unsupervised Sentence Simplification, In Proceedings of the 58th annual meeting of the Association for Computational Linguistics (ACL 2020) - Long Paper
- R. Agarwal*, **D. Kumar***, L. Golab, S. Keshav, Consentio: Managing Consent to Data Access using Permissioned Blockchains, IEEE International Conference on Blockchain and Cryptocurrency (ICBC) 2020 - Full Paper
- **D. Kumar**, R. Cohen, L. Golab, Online abuse detection: the value of preprocessing and neural attention models, In 10th workshop on Computational Approaches to Subjectivity, Sentiment & Social Media Analysis at NAACL-HLT 2019

INDUSTRY EXPERIENCE

Borealis AI, Toronto, Canada
Machine Learning Research Intern, Alan Research　　　　　　**Sep 2020 - Dec 2020**
- Worked on explicit schema linking and regularization techniques to improve cross-domain generalizability and performance of a state-of-the-art semantic parser on the Spider dataset.
- Showed the efficacy of data-dependent initialization for transformers in improving generalization and for training deeper models on small datasets.

Arcesium (DE Shaw Group), Hyderabad, India
Software Engineer, Fund and Investor Accounting　　　　　　**Jul 2016 - May 2018**
- Worked as a full-stack engineer to enhance and maintain the post-trade automation platform (written in Java) for funds operated by J.P. Morgan and D.E. Shaw.

Citigroup, Pune, India
Software Engineering Intern, Equities　　　　　　**May 2015 - Jul 2015**
- Designed and implemented the first prototype (using MEAN stack) of the Trading Controls application. Declined the full-time offer.

ACADEMIC EXPERIENCE

GEM Benchmark　　　　　　**Sep 2020 - Present**

- Working with Prof. Wei Xu, Sebastian Gehrmann, Mounica Maddela, Prof. Ondrej Dusek and many others on the GEM benchmark for natural language generation, evaluation, and metrics, to be held as a workshop at ACL 2021.

University of Waterloo, Waterloo, Canada

Music audio conditioned lyrics generation   **Sep 2019 - Present**
- Designed bimodal (text and audio) neural network models based on variational autoencoders (VAE) to generate lines of lyrics for instrumental pieces of music.
- Extended the above approach to align the learned latent spaces of audio and text representations using generative adversarial networks (GAN) and conditional variational autoencoders (CVAE). **Paper is under review at a conference.**

Iterative Edit-based Unsupervised Sentence Simplification   **Jul 2019 - June 2020**
- Designed an unsupervised algorithm building on edit-based text generation techniques for sentence simplification. The model is controllable and interpretable and achieves SARI scores competitive with supervised models.

Unsupervised neural models to anonymize personal attributes in text   **Oct 2019 - Dec 2019**
- Human written text contains implicit linguistic information that can be used to identify our attributes such as gender, age and political leanings. Built an unsupervised neural model for multi-attribute style transfer that uses a combination of denoising, cycle consistency and classification losses.

Consentio: Managing Consent to Data Access using Permissioned Blockchains   **Jan 2019 - Aug 2019**
- Designed a consent management system based on permissioned blockchains that can handle up to 6000 transactions per second.

Attention-based Text classification   **Dec 2018 - Jan 2019**
- Implemented various deep learning models (e.g. Co-attention, Self-attention, Hierarchical attention) for text classification. The models were inspired by research conducted for different tasks in NLP.

Detecting Incivility in online social networks   **Oct 2018 - Feb 2019**
- Proposed a co-attention-based neural model for online abuse detection. The model achieves F1 scores of 82.41, 77.75 and 76.07 for the minority abuse class on the Wikipedia toxicity/attack/aggression datasets respectively.

Universität Paderborn, Paderborn, Germany

Compressed Knowledge transfer via Factorization Models in Recommender Systems   **Jan 2016 - Jun 2016**
- Developed an algorithm to incorporate metadata in Factorization Machines, lowering RMSE value to 0.836 as compared to 0.853 when using a Joint Matrix Factorization method on the MovieLens 1M dataset.

Indian Institute of Information Technology, Allahabad, India

Analysis of Time-Aware and Semantic Feature-Based Music Recommender System   **Jul 2015 - Dec 2015**
- Proposed a Joint Matrix Factorization algorithm for Music Recommendation that utilizes geographical and time-based tagging information of artists, in addition to implicit user feedback (user clicks).

SERVICE
- Program Committee / Reviewer: NeurIPS 2019 AISG (AI for Social Good) Workshop
- Program Committee / Organizer: GEM: Natural Language Generation, Evaluation, and Metrics- ACL-IJCNLP 2021

TEACHING ASSISTANT EXPERIENCE
- CS 115: Introduction to Computer Science, Fall 18, University of Waterloo.
- CS 230: Introduction to Computers and Computer Systems, Winter 19, Spring 20, University of Waterloo.
- CS 231: Algorithmic Problem Solving, Spring 19, University of Waterloo.
- CS 241: Foundations of Sequential Programs, Fall 19, University of Waterloo.
- CS 489/698: Topics in Computer Science, Neural Networks, Winter 20, University of Waterloo.

ACHIEVEMENTS & EXTRA-CURRICULARS
- Received International Masters Student Award and University of Waterloo Entrance Scholarship for graduate studies.
- Got Graduate Studies Research Travel Assistantship to attend the NAACL-HLT Conference, 2019.
- Accepted in the Deep Learning and Reinforcement Learning Summer School, 2019 (less than 25% acceptance rate).
- Served as the Events Head of the annual cultural cum technical festival - Effervescence 2014.
- Represented the college band as a drummer.
- Stood in the top 0.5% in the All India Engineering Entrance Examination 2012.