Anastasia Razdaibiedina

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EDUCATION

University of Toronto 2018 - Present
Ph.D. Machine Learning & Computational Biology (GPA: 4.0)
Research areas: Representation Learning, Natural Language Processing, Biomedical Machine Learning, Continual Learning

Kyiv National University of Taras Shevchenko 2013 - 2017
B.S. Applied Mathematics with Honors (GPA: 4.0)

RESEARCH EXPERIENCE

Meta (Facebook) AI, Seattle, US Jun - Sep 2022
Research Intern, Natural Language Processing and Machine Learning
- Developed a continual learning method for language models based on prompt tuning, which trains $< 0.1\%$ of total parameters.
- Validated on T5 and BERT models, achieved +22% improvement over previous state-of-the-art on a standard NLP benchmark.
- Submitted a research paper to ICLR 2023, gave talk at FAIR.

Technologies: pytorch, huggingface, numpy, pandas, jupyter, matplotlib, bash, slurm, git

Amazon Research, remote May - Aug 2021
Applied Scientist Intern, Natural Language Processing
- Developed a regularization method for language models fine-tuning, which avoids representation collapse.
- Achieved +2.6 points improvement over standard fine-tuning on 13 NLP tasks with BERT model.
- Submitted a research paper to EACL 2023, gave talk at Amazon Science.

Technologies: tensorflow, huggingface, numpy, pandas, scikit learn, bash, aws cloud computing

Recursion Pharmaceuticals, remote May - Aug 2020
Data Science Intern
- Developed computer vision algorithms for drug discovery using ResNet and DenseNet architectures.
- Improved existing CNN pipeline accuracy by 8% via data augmentation techniques (CutMix and MixUp).

Technologies: pytorch, determined, scikit learn, numpy, pandas, seaborn, plotly, jupyter notebook, bash, git, google cloud

University of Toronto / Vector Institute Jan 2018 - Present
Graduate Student Researcher
- Developed a self-supervised method to predict protein function from microscopy data, and validated on a novel dataset of 3,000,000 single-cell images. Discovered aging-related functions of 7 previously unknown proteins.
- Developed an image restoration method for microscopy data using GANs (Generative Adversarial Networks), effective in few-shot conditions. Published in NeurIPS 2019 medical imaging workshop and rated in top-15 submissions.

National Academy of Sciences of Ukraine, Kyiv, Ukraine Nov 2016 - Mar 2017
Bioinformatics Research Intern
- Performed statistical analysis on patient data using R, identified 2 single-nucleotide polymorphisms associated with high miscarriage risk. Published findings in Obstetrics and Gynaecology International journal.

PUBLICATIONS

1. A. Razdaibiedina et al. Progressive Prompts: continual learning for language models without forgetting. Submitted to ***ICLR*, 2023**. OpenReview link
2. A. Razdaibiedina et al. PIFiA: a self-supervised approach for protein functional annotation from single-cell imaging data. In submission to ***Nature Methods***.
3. A. Razdaibiedina et al. Improving language models fine-tuning with representation consistency targets. Submitted to ***EACL***, 2022. https://arxiv.org/abs/2205.11603
4. A. Razdaibiedina et al. Learning multi-scale functional representations of proteins from single-cell microscopy data. In ***ICLR***, 2022, MLDD workshop. https://arxiv.org/abs/2205.11676
5. A. Razdaibiedina et al. Multi-defect microscopy image restoration under limited data conditions. In ***NeurIPS***, 2019, Medical Imaging workshop (rated in top-15). https://arxiv.org/abs/1910.14207
6. A. Razdaibiedina et al. Effects of single-nucleotide polymorphisms in cytokine, toll-like receptor, and progesterone receptor genes on risk of miscarriage. In ***Obstetrics and Gynecology International***, 2018. https://pubmed.ncbi.nlm.nih.gov/30116270/
7. A. Razdaibiedina et al. Biomolecular modeling on iOS devices: review and software comparison. In ***RJBCS***, 2016. ResearchGate Link

TEACHING EXPERIENCE

1. ***Bias and Fairness in Machine Learning, Vector Institute*** (Winter 2022). Developed and conducted two tutorials on bias and fairness in pre-trained language models (BERT, T5).
2. ***CSC384: Intro to Artificial Intelligence*** (Winter 2021). Developed 5 quizzes and conducted 3 tutorials on knowledge representation and deep learning fundamentals.

3. ***Deep Learning 2, Vector Institute*** (Fall 2020). Developed two machine learning assignments on computer vision (segmentation with UNET, object detection with YOLO) and interpretability (CNNs, Gradient Maps, SmoothGrad) in Google Colab.

4. ***CSC311: Intro to Machine Learning*** (Fall 2019) Developed and conducted two tutorials that cover linear algebra basics and singular value decomposition, corrected homeworks.

INVITED TALKS

Facebook AI Research talk — Sep 2022
Continual learning for language models without forgetting

Toronto Bioinformatics User Group — Mar 2022
Self-supervised approach for protein functional annotation from single-cell imaging data

Temerty Center for AI Research and Education in Medicine — Aug 2021
Discovering gene-disease relationships with Deep Learning

York University × Vector Institute invited panelist — Oct 2019
Panel discussion: AI in Healthcare and Future

HONORS AND AWARDS

School of Graduate Studies travel award (1000$)	2022
Ontario Graduate Scholarship (15,000$)	2021-2022
Vector Institute PGA Fellowship (6,000$ × 3)	2021, 2020, 2019
NeurIPS travel award (500$)	2019
School of Graduate Studies travel award (1000$)	2019
NVIDIA GPU grant program	2018
Ph.D. Merit entrance scholarship (2000$)	2017
Augmented academic merit scholarship (top-10% of the class)	2015-17

Total: 40,000$