Anastasia Razdaibiedina

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EDUCATION

University of Toronto / Vector Institute 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)

EXPERIENCE

Amazon Research, New York, US (remote) May - Oct 2021
Applied Scientist Intern, Natural Language Processing

- Developed a representation consistency method for pre-trained language models fine-tuning, which avoids representation collapse and matches or exceeds performance of existing approaches across 13 NLP tasks.
- Helped to develop a set of metrics to quantify the degradation of representations through geometric diversity.
- Submitted paper to ACL 2022.
  Technologies: tensorflow, pytorch, huggingface, matplotlib, pandas, bash, aws cloud computing.

Recursion Pharmaceuticals, Salt Lake City, US (remote) Summer 2020
Data Science Research Intern

- Developed computer vision algorithms for drug discovery. Improved existing CNN pipeline accuracy by 8% via data augmentation techniques (CutMix and MixUp). Proposed and developed a workflow for downstream embeddings analysis.
  Technologies: pytorch, determined, scikit-learn, numpy, seaborn, jupyter notebook, pandas, bash, git, google cloud.

University of Toronto / Vector Institute, Toronto, Canada 2018 - Present
PhD Researcher

- Developed a self-supervised approach for predicting proteins' functional profiles from microscopy image data that achieved +0.29 F-score improvement over state-of-the-art supervised method. Validated the approach on a novel dataset of 10,000,000 live-cell images, characterized 7 previously unknown proteins, discovered whole-proteome subcellular morphology. To be submitted to Nature Methods in December 2021.
- Developed a microscopy image restoration method using GAN (generative adversarial network) coupled with CIN (conditional instance normalization) layers, effective in limited data conditions. Published in NeurIPS 2019 medical imaging workshop.
  Technologies: tensorflow, keras, numpy, matplotlib, plotly, scipy, scikit-learn, bash, cuda.

National Academy of Sciences of Ukraine, Kyiv, Ukraine 2016 - 2017
Bioinformatics Research Intern

- Identified two single-nucleotide polymorphisms responsible for the development of miscarriage by performing statistical analysis of SNPs in three gene families. Published findings in Obstetrics and Gynecology International journal.

PUBLICATIONS

1. A. Razdaibiedina et al. PIFiA: a self-supervised approach for discovery of protein functional fingerprints from single-cell imaging data. To be submitted to ***Nature Methods*** in December 2021.
2. A. Razdaibiedina et al. Improving language models fine-tuning with representation consistency targets. Submitted to ***ACL***, 2022.
3. A. Razdaibiedina et al. Multi-defect microscopy image restoration under limited data conditions. ***NeurIPS***, 2019, Medical Imaging workshop (rated in top-15).
4. 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.
5. A. Razdaibiedina et al. Biomolecular modeling on iOS devices: review and software comparison. In ***RJBCS***, 2016.

INVITED TALKS

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

TEACHING EXPERIENCE

CSC384: Intro to Artificial Intelligence (2021W), DL2: Deep Learning 2 (2020F), CSC311: Intro to Machine Learning (2019F)

HONORS AND AWARDS

Ontario Graduate Scholarship 2021 (15,000$); Vector Institute PGA Fellowship (6,000$ × 3) 2021, 2020, 2019; NeurIPS travel award (500$) 2019; School of Graduate Studies travel award (1000$) 2019; NVIDIA GPU grant program 2018, PhD Merit entrance scholarship (2000$) 2017; Augmented academic merit scholarship (top-10% of the class) 2015-17. Total: 40,000$