Amirreza Asadzadeh

Email: amirreza.asadzadeh@mail.utoronto.ca
LinkedIn: www.linkedin.com/in/amirreza-asadzadeh/ Phone Number: +1-4372462086

Education

- **University of Toronto** Toronto, Canada
  Master of Applied Science - Electrical and Computer Engineering; GPA: 4.0/4.0 Sep 2020 - Nov 2022
  Thesis: Approximate and Randomized ADMM-LP Decoding Using Geometric Information of the Parity Polytope
  Courses: Deep Learning: Data Science and Theory (A+), Detection and Estimation Theory (A+), Convex Optimization (A), Information Theory (A), Error Correction Codes (A)
  Online Courses: Generative Adversarial Networks (Courses 1, 2, 3), Natural Language Processing (Courses 1, 2, 3, 4)
- **Sharif University of Technology** Tehran, Iran
  Bachelor of Science - Electrical Engineering (Minor: Mathematics); GPA: 17.52/20.0 Sep 2014 - Sep 2019
  Courses: Statistical Learning Theory, Machine Learning, Graphical Models and Monte Carlo Methods, Stochastic Processes, Probability and Statistics, Graph Theory, Network Coding, Linear Algebra, Digital Signal Processing, Cryptography, Blockchain and Cryptocurrency
- **Young Scholars Club**, National Olypmiad of Astronomy and Astrophysics Sep 2013 - Sep 2014

Honors and Awards

- Recipient of the **Rogers scholarship**: 34,838 CAD, University of Toronto, Toronto, Canada, 2020 & 2021.
- Recipient of grant for **Summer Research Internship**, **Technical University of Berlin**, Berlin, Germany, 2018.
- Recipient of grant for **Summer Research Internship**, **Chinese University of Hong Kong**, Hong Kong, 2017.
- Recipient of **Undergraduate Scholarship**, National Elites Foundation, Tehran, Iran, 2014.
- **Silver medal** in the International Olympiad of Astronomy and Astrophysics, Succeava, Romany, 2014.
- **Gold** and **bronze medals** in the National Olympiad of Astronomy and Astrophysics, Tehran, Iran, 2013 & 2012.

Technical Skills

- **Programming Languages**: Python, Julia, MATLAB, SQL/MySQL, R, JAVA, C/C++
- **Libraries/Frameworks**: NumPy, Pandas, SciPy, Scikit-learn, Keras, PyTorch, TensorFlow, NLTK, Trax, JAX

Experience

- **Information Processing Lab, University of Toronto** Toronto, Canada
  Research Assistant (Full-time) Sep 2020 - Nov 2022
  Developed distributed frameworks for message-passing decoders in Julia Programming Language in collaboration with HUAWEI technologies Canada, Ottawa R&D center. Reduced the complexity of a distributed optimization-based decoding algorithm by a factor of 2.5 by implementing an approximate sub-routine and developing a semi-randomized scheduling routine. Presented the results in two top information theory conferences, IEEE CWIT & ITW, and submitted to IEEE TCOM journal.
- **Decentralized Systems and Blockchain Research Lab, Sharif University of Technology** Tehran, Iran
  Research Assistant Oct 2018 - Sep 2019
  Implemented an advanced statistical estimator in stochastic gradient descent to boost the distributed learning algorithms.
- **Communications and Information Theory Lab, Technical University of Berlin** Berlin, Germany
  Research Intern Jul 2018 - Sep 2018
  Designed and implemented a novel coded caching scheme for large networks of arrayed relays. Published the results in the most prestigious conference of Information Theory, the International Symposium on Information Theory (ISIT), 2019.
- **Optical Networks Research Lab, Sharif University of Technology** Tehran, Iran
  Research Intern Feb 2018 - Jun 2018
  Implemented a robust machine learning algorithm for classifying a multi-source data using the advanced techniques in error-correction output-codes in the multi-source transfer learning framework.
- **Institute of Network Coding, Chinese University of Hong Kong** Hong Kong
  Research Intern Jul 2017 - Sep 2017
  Performed research on the security of distributed storage systems for big data and designed a memory-efficient scheme for verifiable and robust secret sharing protocols based on the mathematical tools in the coding theory.

Course Projects

- **Deep Learning: Data Science and Theory**: Tuned the non-linear effects of activation functions on information compression vs. target prediction accuracy in different layers of the deep neural networks.
- **Convex Optimization**: Implemented difference-of-convex method to solve distributed optimization problems.
- **Statistical Learning Theory**: Improved the generalization error of machine learning algorithms by data manipulation.
- **Detection and Estimation Theory**: Exploited constrained Cramér-Rao bound for sparse signal estimation problem.
- **Error Control Codes**: Analyzed suitable representation of polar codes to decode via belief propagation algorithm.
- **Intro to Machine Learning**: Implemented decision trees with different complexities on a Kaggle dataset and analyzing the performance based on the confusion matrix-driven scores and receiving operating characteristics plot.

Publications

- Exploiting parity-polytope geometry in approximate and randomized scheduled ADMM-LP decoding, IEEE Transactions on Communications, 2022 (submitted)
- Randomized scheduling of ADMM-LP decoding based on geometric priors, IEEE ITW, 2022
- SAPA: sparse affine projection algorithm in ADMM-LP decoding of LDPC Codes, IEEE CWIT, 2022
- Coded caching with small subpacketization via spatial reuse and content base replication, IEEE ISIT, 2019