Soo Min Kwon

Contact Information

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Research Interests

Convex and non-convex optimization, high-dimensional statistics, tensor data analysis, differential privacy, distributed learning

Education

Rutgers University — New Brunswick, NJ
M.S., Electrical and Computer Engineering — Sept. 2020 – May 2022 (Expected)

- Thesis: Optimization Problems with Low-Dimensional Tensor Structure
- Advisor: Prof. Anand D. Sarwate

Rutgers University — New Brunswick, NJ
B.S., Electrical and Computer Engineering (High Honors) — Sept. 2016 – May 2020

- Minor: Mathematics
- Thesis: Learning Predictors from Multidimensional Data with Tensor Factorizations
- Advisor: Prof. Anand D. Sarwate

Relevant Coursework

Graduate: Optimization for Machine Learning, Probability Theory, Convex Optimization, Detection & Estimation Theory, Stochastic Signals & Systems, Machine Vision, Information Theory

Undergraduate: Linear Algebra, Machine Learning for Engineers, Linear Systems & Signals, Digital Signals Processing, Linear Optimization, Discrete Mathematics

Academic Experience

Teaching Assistant — Jan. 2020 – Present
Rutgers University — New Brunswick, NJ

- Currently a Teaching Assistant for Introduction to Computers for Engineers (MATLAB) with approximately 500 students
- Served as a Teaching Assistant for Digital Signal Processing for Prof. Waheed Bajwa with approximately 100 students, with materials available online (Link)
- Served as a Teaching Assistant for Linear Systems and Signals with approximately 50 students

Graduate Research Assistant — May 2020 – Present
Rutgers University — New Brunswick, NJ

- Currently conducting research in exploiting low-dimensional tensor structures on different types of optimization problems
- Previously researched in distributed differential privacy – a private framework in which multiple sites can collaborate to learn under sensitive data

Undergraduate Tutor — Sept. 2019 – May 2020
Rutgers University — New Brunswick, NJ

- Previously a Fish-Bowl Tutor for the Electrical and Computer Engineering Department
- Tutored advanced ECE courses such as Linear Systems & Signals, Digital Signal Processing, and Discrete Mathematics

Research Intern May 2019 – Sept. 2019

Wireless Information Network Laboratory North Brunswick, NJ

- Performed data collection and pre-processed millimeter-wave sensor data for Convolutional Neural Networks to infer the type of activity performed
- Results were presented in the WINLAB Symposium, MIT Undergraduate Research Conference, IEEE DySPAN 2019, and ECE Research Day 2019
- Lead author to publication for demonstration at an IEEE conference

Publications

* **S. Kwon**, X. Yang, A. D. Sarwate. "Low-Rank Phase Retrieval with Structured Tensor Models." In International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2022. (Link)
* D. K. Saha, V. D. Calhoun, Y. Du, Z. Fu, R. Panta, **S. Kwon**, A. D. Sarwate, S. M. Plis. "Privacy-preserving quality control of neuroimaging datasets in federated environments". In Organization for Human Brain Mapping (OHBM), 2021. (Link)
* **S. Kwon**, A. D. Sarwate. "Learning Predictors from Multidimensional Data with Tensor Factorizations". In Rutgers University Aresty Undergraduate Research Journal, 2021. (Link)
* **S. Kwon**, S. Yang, J. Liu, X. Yang, W. Saleh, S. Patel, C. Mathews, Y. Chen. "Demo: Hands-Free Human Activity Recognition Using Millimeter-Wave Sensors". In IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN), 2019. (Link)

Poster Presentations

* D. K. Saha, V. D. Calhoun, Y. Du, Z. Fu, R. Panta, **S. Kwon**, A. D. Sarwate, S. M. Plis. "Visualizing Neuroimaging Data Located at Different Sites with Privacy Guarantees". Presented in Organization for Human Brain Mapping (OHBM), 2021. (Link)
* **S. Kwon**, A. D. Sarwate. "Learning Predictors from Multidimensional Data with Tensor Factorizations". Presented in J.J. Slade Honors Research Presentation, 2020. (Link)
* **S. Kwon**, A. D. Sarwate. "Tensor Regression with Applications in Neuroimaging Data Analysis". Presented in ECE Research Day, 2019. (Link)
* **S. Kwon**, S. Yang, X.Yang. "Hands-Free Human Activity Recognition Using Millimeter-Wave Sensors". Presented in MIT Undergraduate Research Technology Conference, 2019. (Link)
* **S. Kwon**, S. Yang, J. Liu, X. Yang, W. Saleh, S. Patel, C. Mathews, Y. Chen. "mmWave-based Human Activity Recognition". Presented in IEEE International Symposium on Dynamic Spectrum Access Networks, 2019. (Link)

Work Experience

Data Science Intern May 2020 – Aug. 2020

WellCare Health Plans Remote

- Automated the process of detecting expedition phrases in healthcare forms using Restricted Boltzmann Machines in Tensorflow
- Designed and optimized several machine learning algorithms (Support Vector Machines, Logistic Regression, XGBoost) for statistical inference on diseases given pharmacy data

Awards & Honors

* Rutgers ECE Outstanding Teaching Assistant Award 2021
* Rutgers ECE Departmental Leadership & Service Award 2020
* Rutgers WINLAB GA/TA Grant 2020 – 2020
* James J. Slade Honors Scholar 2019 – 2020
* Rutgers University Dean's List 2018 – 2020

Technical Skills

* **Programming Languages:** Python, MATLAB, SQL, C++

* **Libraries:** Tensorflow, Scikit-learn, NumPy, SciPy, Pandas, Matplotlib
* **Software:** Git, Visual Studio, Tableau, Jupyter Notebook, Microsoft Office, LaTeX

CERTIFICATES **Neural Networks and Deep Learning** (License #M6TYH2SFB6QV, by Andrew Ng, Coursera)