Syed Asad Rizvi

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RESEARCH INTERESTS

Machine Learning, Graph Neural Networks, Explainable AI (XAI), Self-supervised Learning

EDUCATION

College of Natural Science and Mathematics, University of Houston, TX
Bachelor of Science in Computer Science **August 2019 - December 2022**
Cumulative GPA: 3.93

Relevant Coursework: Fundamentals of Medical Imaging, Digital Image Processing, Artificial Intelligence, Data Science, Multivariable Calculus, Statistics, Linear Algebra, Software Design, Algorithms.

RESEARCH EXPERIENCE

Yale University, New Haven, Connecticut **June 2022 – Present**
Visiting Research Student (van Dijk Lab)
- Advised by Dr. David van Dijk, Department of Computer Science and Internal Medicine
- Feature-level interaction between nodes using novel attention-based message-passing framework for Graph Neural Networks

Rice University, Houston, TX **August 2022 – Present**
Undergraduate Research Student
- Advised by Dr. Xia Hu, Department of Computer Science, and Dr. Xiaoqian Jiang, UT Health
- Vision-language representation learning on radiology images and clinical report data

Houston Methodist, Houston, TX **December 2021 – August 2022**
Undergraduate Research Student
- Advised by Dr. Vittorio Cristini and Dr. Prashant Dogra, Department of Mathematics in Medicine
- Spatiotemporal Graph Neural Network architecture for COVID-19 pandemic forecasting on dynamic infection and international flight data
- Perturbation-based explainability framework for sensitivity analysis in spatiotemporal GNNs

Taipei Medical University, Taipei, Taiwan **March 2021 – April 2021**
Data Analyst Intern
- Advised by Dr. Syed Abdul-Shabbir, Graduate Institute of Biomedical Informatics
- Data processing, correlation analysis, and visualization on wearable device data measurements taken from 18 Taiwanese patients

University of Houston, Houston, TX **September 2020 – May 2022**
Undergraduate Research Student (HULA Lab)
- Advised by Dr. Hien V. Nguyen, Department of Electrical and Computer Engineering
- Label-efficient frameworks for case-level classification on histopathology data
- Computationally efficient semi-supervised medical image generation and segmentation

INDUSTRY EXPERIENCE

Amazon, Austin, TX **May 2022 – Present**
Software Development Engineer Intern
- Developed an independent launcher application for starting customer support screen

sharing sessions on Amazon-built devices using the Spring Java framework

Phillips 66, Houston, TX **May 2021 – August 2021**

IT Intern (Natural Language Processing)

- Trained domain-specific entity recognition models on land exchange agreements, identifying 6 contract entities within unstructured text and reaching 87% overall model precision
- Deployed models to AzureML Cloud Platform and developed an automated Azure Function App to run preprocessing and inference on contract documents at test time within 12 seconds

PUBLICATIONS

Cicalese, P.A., **Rizvi, S.A.**, Wang, V., Patibandla, S., Yuan, P., Zare, S., Moos, K., Batal, I., Clahsen-van Groningen, M., Roufosse, C. and Becker, J. U. "MorphSet: Improving Renal Histopathology Case Assessment Through Learned Prognostic Vectors." *International Conference on Medical Image Computing and Computer-Assisted Intervention* (**MICCAI**). Springer, Cham, 2021.

PREPRINTS

Rizvi, S. A., Nguyen, N., Lyu, H., Christensen, B., Caro, J. O., Zappala, E., Brbic, M., Dhodapkar, R. M., Dijk, D. V. "AMPNet: Attention as Message Passing for Graph Neural Networks." *arXiv preprint arXiv:2210.09475* (2022).

Rizvi, S. A., Awasthi, A., Peláez, M. J., Wang, Z., Cristini, V., Nguyen, H. V., Dogra, P. "Deep Learning-Derived Optimal Aviation Strategies to Control Pandemics." *arXiv preprint arXiv:2210.10888* (2022).

Rizvi, S. A., Cicalese, P. A., Seshan, S. V., Sciascia, S., Becker, J. U., Nguyen, H. V. "Histopathology DatasetGAN: Synthesizing Large-Resolution Histopathology Datasets." *arXiv preprint arXiv:2207.02712* (2022). [Accepted to IEEE SPMB as poster]

Awasthi, A., **Rizvi, S. A.** "Regional analysis of ESM models using Bias Corrected spatial disaggregated super-resolution convolutional neural networks". *EarthArXiv preprint* (2021).

WORKING PAPERS

Rizvi, S. A., Dun, C., Kyrillidis, A. "Variance Reduction Through Periodic Centralized Training in Distributed Subnetwork Training of Residual Networks". Manuscript in preparation.

PRESENTATIONS

- Attention as Message-Passing for Graph Neural Networks, Yale University
- Mayday Screen Sharing Application, Amazon
- COVID-19 Forecasting with Explainable Spatiotemporal GNNs, University of Houston
- Regularization techniques in Convolutional Neural Networks, University of Houston
- MorphSet Project Oral Abstract, 2021 AI in Nephropathology Workshop in Amsterdam
- Natural Language Processing and Entity Recognition Models, Phillips 66
- Custom Image Annotation Interfaces using LabelBox, University of Buffalo Computer Vision Group

AWARDS AND RECOGNITIONS

- Full-time offer as a Software Development Engineer at Amazon
- Provost's Undergraduate Research Scholarship ($1000), University of Houston, Spring 2022
- Dean's Distinguished Scholar's List, University of Houston
- First prize in the 2021 HP & AWS Bot-a-thon
- Third prize ($3000) in the 2020 AWS & NVIDIA Environmental Hackathon

MENTORSHIP EXPERIENCE

Co-advised with Dr. Hien van Nguyen

- Sai Patibandla, University of Houston
- Aneesh Vathul, High School Intern at HULA

INDEPENDENT PROJECTS

Node Classification Using Graph Neural Networks **March 2022**

- Implemented prominent GNN architectures for node classification and edge importance analysis on the Cora citation network
- Developed in Pytorch and Pytorch Geometric for CS 4337

AWS Lex Bot Generation Pipeline **January 2021**

- 1st place finish among 20+ teams at the 2021 HP & AWS Bot-a-thon competition
- Wrote chatbot configuration files and led presentation development

Autoencoder Anomaly Detection **August 2020**

- 3rd place finish in the AWS & NVIDIA Environmental Hackathon ($3000 award)
- Trained an unsupervised autoencoder machine learning model on environmental sensor data taken from Amazon's Seattle Sphere conservatories

NutrientView Mobile App **July 2020**

- Nutrient logging mobile app utilizing image recognition services to track consumed meals
- Integrated an Azure Q&A chatbot to provide interactive feedback about different nutrients
- Developed using React Native, IBM Watson image recognition, Azure bot service, Firebase, and the Edamam Nutrition Analysis API

SKILLS

Programming Languages:	Python, C++, Java, R, MATLAB, SQL, JavaScript
Libraries:	Pytorch, Pytorch Geometric, Tensorflow, Scikit-learn, Pandas, Numpy
Tools:	Parallel programming, Distributed training, HPC job scheduling, Git

ACTIVITIES

Management Information Systems Student Organization **January 2020 – Present**

Professional Development Committee Member

- Worked with teams of 20+ committee members to perform 60+ resume reviews per semester
- Delivered a presentation on IT candidate profile development at the MISSO professional development workshop to over 80 students