Ranak Roy Chowdhury

Portfolio | LinkedIn | Google Scholar | ranakrc@gmail.com | (858) 247-9435

SUMMARY

Researcher working on self-supervised learning for sensory data in Human Motion, Healthcare, Audio & Speech.

WORK EXPERIENCE

Amazon Web Services, Inc. **Applied Scientist II Intern** **Jun 2023 – Sep 2023**
- Developed an LLM with music integration that generates text responses, including music genre, instruments used, mood, and theme, based on music files. Used Encodec audio features in conjunction with FLAN-T5 LLM. [Link]

Qualcomm, Inc **Research Fellow** **Oct 2022 – Sep 2023**
- Developed physics-informed generation model with real-time development on edge devices and text-based contextual knowledge driven framework to enhance zero-shot learning in Human Activity Recognition. [Link]

Amazon Web Services, Inc. **Applied Scientist II Intern** **Jun 2022 – Sep 2022**
- Built an accent-robust speech pre-trained model, improving Speech Recognition by 20.4% and Speaker Verification by 6.3%**,** across 12 minority accents**.** Used Domain Adversarial Training with Contrastive Learning on HuBERT. [Link]

Nokia Bell Labs **Data Science Intern** **Jun 2021 – Aug 2021**
- Developed an ML pipeline to automate ticket resolution. Conducted data cleaning, preprocessing, visualization on time-series semi-structured system-level log corpus, followed by statistical feature extraction and classification. [Link]

Amazon Web Services, Inc. **Software Development Engineer Intern** **Jun 2020 – Sep 2020**
- Built a SHAP-based ML Interpretability framework for AWS Redshift, enabling users to write SQL queries to introspect ML model predictions. Improved query execution speed by 2x and memory footprint by 90%. [Link]

EDUCATION

PhD in CS - University of California San Diego **Sep 2019 – Jun 2024 (Expected)**
Thesis: Robust and Data-Efficient Learning for Time-series
Research Interests: Time-series, Speech, Music, Healthcare, IoT, Sensor Fusion, Spatio-temporal data

MS in CS - University of California San Diego **Sep 2019 – Jun 2022**

BSc in CSE - Bangladesh University of Engineering and Technology **Jul 2014 – Oct 2018**

SELECTED PUBLICATIONS

- Xiyuan Zhang, **Ranak Roy Chowdhury**, Rajesh K. Gupta, Jingbo Shang. Large Language Models for Time Series: A Survey. *Under Submission*. [Link]
- **Ranak Roy Chowdhury**, R. Kapila, A. Panse, X. Zhang, D. Teng, R. Kulkarni, D. Hong, R. Gupta, J. Shang. ZeroHAR: Contextual Knowledge Augments Zero-Shot Wearable Human Activity Recognition. *Under Submission*.
- H. Guo, R. Hosseini, R. Zhang, SA Somayajula, **Ranak Roy Chowdhury**, R. Gupta, P. Xie. MLO-MAE: Downstream Task Guided Masking Learning in Masked Autoencoders Using Multi-Level Optimization. *Under Submission*. [Link]
- Xiyuan Zhang**, Ranak Roy Chowdhury**, Dezhi Hong, Rajesh K. Gupta, Jingbo Shang. SHARE: Unleashing the Power of Shared Label Structures for Human Activity Recognition. **CIKM** 2023. [Link]
- **Ranak Roy Chowdhury,** Jiacheng Li, Xiyuan Zhang**,** Dezhi Hong, Jingbo Shang, Rajesh K. Gupta. PrimeNet: Pre-training for Irregular Multivariate Time-Series. **AAAI** 2023. [Link]
- X. Zhang, X. Fu, D. Teng, C. Dong, K. Vijayakumar, J. Zhang, **Ranak Roy Chowdhury**, J. Han, D. Hong, R. Kulkarni, J. Shang, R. Gupta. PILOT: Physics-Informed Data Denoising for Real-Life Sensing Systems. **SenSys** 2023. [Link]
- Xiyuan Zhang**, Ranak Roy Chowdhury**, Jingbo Shang, Rajesh K. Gupta, Dezhi Hong. STAug: Towards Diverse and Coherent Augmentation for Time-Series Forecasting. **ICASSP** 2023. [Link]
- **Ranak Roy Chowdhury**, Xiyuan Zhang**,** Jingbo Shang, Rajesh K. Gupta, Dezhi Hong. TARNet: Task-Aware Reconstruction for Time-Series Transformer. **KDD** 2022. [Link]
- Xiyuan Zhang**, Ranak Roy Chowdhury**, Dezhi Hong, Jingbo Shang, Rajesh K. Gupta. ESC-GAN: Extending Spatial Coverage of Physical Sensors. **WSDM** 2022. [Link]
- Shuheng Li, **Ranak Roy Chowdhury**, Jingbo Shang, Rajesh K. Gupta, Dezhi Hong. UniTS: Short-Time Fourier Inspired Neural Networks for Sensory Time Series Classification. **SenSys** 2021. [Link]
- **Ranak Roy Chowdhury**, Muhammad Abdullah Adnan, Rajesh K. Gupta. Real Time Principal Component Analysis. **TDS** 2020 [Link], **ICDE** 2019. [Link]

HONORS and AWARDS

- Invited keynote speaker at SIGKDD 2023 Workshop on Machine Learning in Finance. [Link]
- Qualcomm Innovation Fellowship 2022. One of the *19 winners among 132 participants* across North America. [Link]
- Halıcıoglu Data Science Institute Graduate Fellowship 2019. One of the *10 winners among 3906 applicants*. [Link]

SOFTWARE PROFICIENCIES

Python, Linux, Git, PyTorch, Keras, Tensorflow, fairseq, Hugging Face, NumPy, pandas, SciPy, Matplotlib, Seaborn, scikit-learn, statsmodels, Pillow, OpenCV, NLTK, CoreNLP, Gensim, spaCy, C, C++, Java, Matlab, SQL, PostgreSQL