Ranak Roy Chowdhury

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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.

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.

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.

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

Amazon Web Services, Inc. **Software Development Engineer Intern** **Jun 2020 – Sep 2020**
- Built a SHAP-based ML Interpretability framework from SQL surface 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%.

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 Human Activity Recognition Using IMUs. *Under Submission*.
- H. Guo, R. Hosseini, R. Zhang, SA Somayajula, **Ranak Roy Chowdhury**, R. Gupta, P. Xie. Downstream Task Guided Masking Learning in Masked Autoencoders Using Multi-Level Optimization. *Under Submission*.
- Xiyuan Zhang**, Ranak Roy Chowdhury**, Dezhi Hong, Rajesh K. Gupta, Jingbo Shang. 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. 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