

Ranak Roy Chowdhury

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

SUMMARY

Machine Learning for time-series in Supply Chain, Forecasting, Wearable Motion, Speech, Audio & Music applications.

WORK EXPERIENCE

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|--|---|----------------------------|
| Amazon Web Services, Inc. | Applied Scientist II - L5 (Forecasting) | Sep 2024 – Present |
| Developed and launched a scalable Demand Forecasting toolkit for AWS Supply Chain, used by several B2B and B2C clients across Retail, CPG, and Manufacturing. Delivered significant accuracy gains through several key contributions: | | |
| <ul style="list-style-type: none">Designed a custom forecast evaluation metric that quantifies the business impact of forecast error by balancing overstock vs. stockout costs, providing clear monetary tradeoffs in terms of revenue, cash flow, and profitability.Engineered hierarchical forecasting across temporal, spatial, and product hierarchies using top-down, bottom-up and middle-out approaches, plus statistical and ML-based reconciliation, improving accuracy at all aggregation levels.Improved sparse-demand forecast accuracy with a split-peak attention model using holidays, pricing, and promotions, and reduced retraining churn through a custom validation framework incorporating seasonality and vendor lead times. | | |
| Amazon Web Services, Inc. | Applied Scientist II Intern (Audio, Music & LLM) | Jun 2023 – Sep 2023 |
| <ul style="list-style-type: none">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 (Wearable Sensing) | Oct 2022 – Sep 2023 |
| <ul style="list-style-type: none">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 (Speech, LLM) | Jun 2022 – Sep 2022 |
| <ul style="list-style-type: none">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 (Multimodal Time-series & Text Modeling) | Jun 2021 – Aug 2021 |
| <ul style="list-style-type: none">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 (Explainable AI) | Jun 2020 – Sep 2020 |
| <ul style="list-style-type: none">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

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|---|----------------------------|
| PhD in CS - University of California San Diego | Sep 2019 – Aug 2024 |
| <i>Thesis: Robust and Data-Efficient Learning for Time-series</i> | |
| 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

- Ranak Roy Chowdhury**, Ritvik Kapila, Ameya Panse, Xiyuan Zhang, Diyan Teng, Rashmi Kulkarni, Dezhi Hong, Rajesh Gupta. ZeroHAR: Contextual Knowledge Augments Zero-Shot Human Activity Recognition. **AAAI** 2025. [\[Link\]](#)
- 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. **TMLR** 2025. [\[Link\]](#)
- Xiyuan Zhang, Diyan Teng, **Ranak Roy Chowdhury**, Shuheng Li, Dezhi Hong, Rajesh Gupta, Jingbo Shang. UniMTS: Unified Pre-training for Motion Time Series. **NeurIPS** 2024. [\[Link\]](#)
- X Zhang, **RR Chowdhury**, R Gupta, J Shang. Large Language Models for Time Series: A Survey. **IJCAI** 2024. [\[Link\]](#)
- 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. [\[Link\]](#)
- X Zhang, **RR Chowdhury**, J Shang, R Gupta. 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**, M Adnan, R Gupta. Real Time Principal Component Analysis. **ICDE** 2019 [\[Link\]](#). **TDS** [\[Link\]](#)

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