S M (Rifat) Rafiuddin

Machine Learning & Natural Language Processing Researcher

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RESEARCH SUMMARY

Machine-learning researcher and Ph.D. candidate focused on efficient, interpretable, and controllable language models. Develops representation-guided adaptation, dynamic LoRA rank routing, symbolic planning, and causal/counterfactual interventions. Builds reproducible PyTorch and Hugging Face systems for parameter-efficient learning, representation analysis, and multimodal modeling.

EDUCATION

Oklahoma State University — Stillwater, OK
Ph.D. in Computer Science; Advisor: Dr. Atriya Sen — *Aug. 2022 – Expected July 2027*
Dissertation: Efficient, Interpretable, and Controllable Language Models through Representation-Guided Adaptation and Intervention

Rajshahi University of Engineering and Technology — Rajshahi, Bangladesh
B.Sc. in Computer Science and Engineering — *Jan. 2012 – Oct. 2016*

RESEARCH EXPERIENCE

Graduate Research Assistant – rAIson Lab — Summers 2025 and 2026
Oklahoma State University; Advisor: Dr. Atriya Sen

- Developed **MaskLoRA**, a representation-guided token-retention method delivering 1.3–2.6× end-to-end speedups on encoder benchmarks and 1.5–3.6× on long-context tasks while preserving near-baseline quality (Findings of EACL 2026).
- Co-developed **CCM-LoRA**, an input-conditioned rank-routing method that matched or improved static LoRA with 61% fewer adapter FLOPs and approximately 8% higher training throughput (Findings of ACL 2026).
- Developed symbolic-planning and causal-reasoning methods in transformers, resulting in main-conference papers at ICLR 2026 and EMNLP 2026.

Graduate Research Assistant – Complex Systems Lab — Summers 2023 and 2024
Oklahoma State University; Advisor: Dr. Arunkumar Bagavathi

- Developed and evaluated adaptive contextual masking for aspect-based sentiment analysis (PAKDD 2024).
- Built reproducible pipelines for multimodal fusion, text–image alignment, and robustness evaluation (ASONAM 2025).

SELECTED FIRST-AUTHOR PUBLICATIONS

- **C^{3}T: Counterfactual Causal Reasoning for Sentiment Shifts in Social-Media Conversation Trees.** *EMNLP 2026 Main Conference (accepted).*
- **Context-Conditioned Masked LoRA: Dynamic Rank Routing for Compute-Efficient Parameter-Efficient Fine-Tuning.** *ACL Findings 2026.*
- **Emergent Discrete Controller Modules for Symbolic Planning in Transformers.** *ICLR 2026.*
- **MaskLoRA: Low-Rank Subspace–Induced Token Masking for Efficient and Faithful Language Models.** *EACL Findings 2026.*
- **A Formal Analysis of Chain-of-Thought Prompting via Turing Reductions.** *IJCNLP-AACL 2025.*
- **AdaptiSent: Context-Aware Adaptive Attention for Multimodal Aspect-Based Sentiment Analysis.** *ASONAM 2025.*
- **Exploiting Adaptive Contextual Masking for Aspect-Based Sentiment Analysis.** *PAKDD 2024.*

TEACHING AND ACADEMIC EXPERIENCE

Graduate Teaching Assistant, Oklahoma State University — Stillwater, OK
Computer Science — *Aug. 2022 – Present*
Led laboratories and discussions, assessed programming work and examinations, and supported courses in security, operating systems, data structures, discrete mathematics, social issues in computing, and databases.

Lecturer, University of Asia Pacific and Uttara University — Dhaka, Bangladesh
Computer Science and Engineering — *Feb. 2017 – July 2022*
Instructor of record for machine learning, pattern recognition, algorithms, operating systems, compilers, and programming; mentored undergraduate research that resulted in peer-reviewed publications.

TECHNICAL SKILLS

Research: Language models, NLP, parameter-efficient fine-tuning, LoRA, mechanistic interpretability, causal and counterfactual reasoning, multimodal learning.
ML Software: Python, PyTorch, Hugging Face Transformers, TensorFlow, Scikit-learn, NumPy, and pandas.
Development Tools: Linux, Git, Docker, AWS, and Jupyter.
Systems: GPU-accelerated experimentation, memory profiling, and training/inference throughput benchmarking.

SELECTED AWARDS

ICLR 2026 Financial Assistance Award (registration and $1,600 travel support) | AIRS Travel Fund (2025) | GPSGA Travel and Research Award ($900 total, 2024–2025)