Jannat Ara Meem

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Education

Ph.D. in Computer Science, *University of California, Riverside* (Graduate Year Fellow) *May 2026 (Exp)*

- **Research Focus:** Information Retrieval (IR), Generative AI, Agentic AI, LLMs Reasoning and Question-Answering
- Advisor: Vagelis Hristidis

M.Sc. in Computer Science, *University of California, Riverside* *December 2024*

B.Sc. in Computer Science, *Bangladesh University of Engineering and Technology* *April 2019*

Technical Skills

Languages: Python, C/C++, Java, Bash, SQL, JavaScript, SPARQL, Scala, HTML/CSS, XML
Frameworks/ Libraries: PyTorch, Tensorflow, HuggingFace, PEFT, LangChain, Pandas, NumPy, Scikit-learn, NLTK, Lucene, CUDA, Hadoop, Spark, Django

Research Experience

Advanced Intelligence Lab, Samsung Research America, Mountain View, CA

Summer Research Intern *June 2025 - September 2025*

- Worked on agentic orchestration workflows for voice assistant solutions
- Designed LLM-driven agents for multi-step reasoning
- Built specialized domain agents using Reinforcement Learning

Department of Computer Science, University of California, Riverside

Graduate Student Researcher *September 2021 - Present*

Leading independent research projects focused on developing domain and modality-specialized ranker models, exploring gaps in question-answering and reasoning with LLMs, and optimizing resource-efficient ML algorithms and LLM usage

- Domain-specialized retriever-ranker agentic pipeline (current)
  - Developing a time-aware ranker model and LLM and RLHF-powered workflows for subjective and temporal question-answering
  - Structured vs Unstructured Rankers, exploring GraphRAG and Agentic DeepResearch approaches
  - Exploring the gaps in Multimodal Information Retrievers and unifying modalities in retrieval
- Present-anchored Temporal Question-answering in LLMs and RALMs (ACL 2024)
  - Published the PATQA benchmark for time-sensitive, present-anchored questions and evaluated LLMs and retrieval-augmented methods, revealing significant performance gaps, especially in multi-hop reasoning (accuracy <15%)
  - Designed a self-updating system for answering present-anchored questions in real-time
- Budget-efficient Text Re-ranking Using LLMs (ACL 2024)
  - Developed a cascading LLM pipeline with optimized prompts for budget-efficient text re-ranking
  - Co-led the project, and achieved a gain of 14% on MRR and R@1 ranking accuracy on four popular QA datasets
- Performance Gaps in Out-of-schema Question-Answering in Dialog Systems (ECML-PKDD 2023)
  - Formulated the Out-of-schema Question Detection and Selection problem to identify critical questions for maximizing system success rates.
  - Developed a two-stage pipeline with an in-context learning framework and novel statistical algorithms, achieving 42% improvement in detection and 78% in selection accuracy over state-of-the-art methods.
- Context-Aware Open Retrieval Answer Generation (ICSC 2022)
  - Built a conversational QA agent using the Retrieval-Augmented Generation (RAG) transformer, integrating conversation history modeling to improve response accuracy
  - Implemented key-phrase extraction and co-reference resolution to optimize conversational history and response generation.

North America Bixby Lab, Samsung Research America, Mountain View, CA

NLP Intern June 2024 - September 2024**;** July 2023 - September 2023

- Designed LLM-powered program synthesis methods to translate natural language into code
- Fine-tuned open-source LLMs for enhanced user understanding, temporal and factual reasoning, planning, and accurate response generation

PUBLICATIONS

1. ***Jannat Ara Meem****, Muhammad Shihab Rashid, Yue Dong, and Vagelis Hristidis.*
   PAT-Questions: A Self-Updating Benchmark for Present-Anchored Temporal Question-Answering, Findings of the Association for Computational Linguistics (ACL '24)
2. *Muhammad Shihab Rashid,* ***Jannat Ara Meem****, Yue Dong, and Vagelis Hristidis.*
   EcoRank: Budget-Constrained Text Re-ranking Using Large Language Models, Findings of the Association for Computational Linguistics (ACL '24)
3. ***Jannat Ara Meem****, Muhammad Shihab Rashid, and Vagelis Hristidis.*
   Modeling the Impact of Out-of-schema Questions in Task-Oriented Dialog Systems**,** ECML PKDD '24 in collaboration with Data Mining and Knowledge Discovery Journal
4. *Muhammad Shihab Rashid,* ***Jannat Ara Meem****, and Vagelis Hristidis.*
   NORMY: Non-Uniform History Modeling for Open Retrieval Conversational Question Answering, 18th IEEE International Conference on Semantic Computing (ICSC '24)
5. ***Jannat Ara Meem****, Farzana Y. Ahmad, and Muhammad Abdullah Adnan.*
   Distributed Principal Component Analysis for Real-time Big Data Processing, 7th International Conference on Networking, Systems and Security (NSysS-2020)
6. *Muhammad Shihab Rashid,* ***Jannat Ara Meem****, Yue Dong, and Vagelis Hristidis.*
   Progressive Query Expansion for Retrieval Over Cost-constrained Data Sources, arXiv preprint arXiv:2406.07136
7. *Zabir Al Nazi, Vagelis Hristidis, Aaron Lawson McLean,* ***Jannat Ara Meem****, and Md Taukir Azam Chowdhury.*
   Ontology-Guided Query Expansion for Biomedical Document Retrieval using Large Language Models, arXiv preprint arXiv:2508.11784

COURSE PROJECTS

- Wiki Search Engine for Texts & Images (2022) | *Lucene, Java, Hadoop, MongoDB*
  Built a search engine to optimize document retrieval over crawled 3GB Wikipedia data
  Used Lucene indexing and MapReduce for indexing and document ranking
- Textual Entailment Recognition between Sentence Pairs (2022) | *Python, PyTorch, Transformers*
  Identified directional relation i.e. textual entailment (positive, negative, and neutral) between given sentence pairs
  Fine-tuned BERT, the deep neural networks (DNN) model and evaluated different metrics
- Prediction-based Analysis of StackOverflow data (2022) | *Python, Numpy, Scikit-learn, Scala, JavaScript, Spark, MLlib*
  Extended a state-of-the-art response time prediction model using SparkSQL to filter and query StackOverflow XML data, identifying popular trends and skills while mapping their location-based distribution.

TEACHING EXPERIENCE & SERVICES

Department of Computer Science, University of California, Riverside

Graduate Teaching Assistant *September 2022 - Present*

Courses: Intro to NLP, Information Retrieval & Web Search, Data Analytics & Exploration, Spatial Computing

ACL, ACM SIGSPATIAL, ACM SIGMOD, EDBT, DMAH *July 2022 - Present*

Peer Reviewer

Department of Computer Science, United International University, Dhaka, Bangladesh

Lecturer *July 2019 – May 2021*

Courses: Structured Programming Language, Object-oriented Programming Language, Data Structures & Algorithms, Machine Learning