# Rafid Ahmed

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## EDUCATION

• **University of Dhaka**                                                                     *Jan 2019 - Jan 2024*
*BSc in Computer Science & Engineering*                                                   Dhaka, Bangladesh
  ◦ CGPA: 3.54/4.00

## RESEARCH INTERESTS

**Natural Language Processing:** Low Resource Languages; Knowledge Distillation; LLM Reasoning & Concept Learning
**Large Language & Vision-Language Models:** Multimodal Adapters; Multimodal Self-Supervised Learning; Visual Question Answering; Medical AI (VQA, Linear Projection, Prompt Learning, Preference Optimization)

## RESEARCH EXPERIENCES

• **Multilingual Medical VQA and VLM Optimization**

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| **Objective:** | Collected and curated over 7,000 X-ray, CT, and MRI images, annotated by medical experts for normal and abnormal findings.We have introduced the first multilingual English and Bangla VQA dataset in the medical domain. Currently conducting research on Vision-Language Models (VLMs) for medical applications, focusing on VQA explanation, VLM fine-tuning, preference optimization, linear projection techniques, and medical prompt learning. |
| **Area:** | Medical AI, Visual Question Answering, Multimodal Learning, Low-resource NLP |
| **Publications:** | Submitted (2) – *LREC, IJCNLP BLP Workshop* |
| **Supervisor:** | Farhad Alam Bhuiyan & Md. Fahim |
| **Period:** | August 2025 – Present |

• **Improvised LoRA Finetuning for Domain-Specific Classification tasks in LLMs**

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|---|---|
| **Objective:** | Performed empirical analysis of Further Pretraining and Linear Probing of LoRA adapters to address traditional LoRA limitations in unknown domains, improving adaptability and performance in domain-specific classification and generation tasks |
| **Area:** | Large Language Models, Parameter-Efficient Finetuning, Domain Adaptation, NLP |
| **Publications:** | Submitted(1)- *LREC* |
| **Supervisor:** | Farhad Alam Bhuiyan & Md. Fahim |
| **Period:** | August 2025 – Present |

## WORK EXPERIENCE

• **Penta Global Limited [🌐]**                                                           *April 2025 - Present*
*AI Engineer*                                                                             Dhaka, Bangladesh
  ◦ **Current Project:** Working as an AI Engineer, focusing on developing scalable data manipulation and automation pipelines using AWS cloud services such as *Lambda, S3, Glue, EC2 & SageMaker*.Designed and developed intelligent AI agents and copilots powered by Generative AI, leveraging state-of-the-art large language models (LLMs).

• **Eximus Technologies [🌐]**                                                       *March 2024 - February 2025*
*Software Engineer*                                                                       Dhaka, Bangladesh
  ◦ **Working Project:** Built and optimized web applications using Laravel, Vue.js, React.js, and MySQL. Developed APIs, integrated payment and payroll modules, improved UI with Blade and Tailwind, and enhanced system efficiency.

**[C]** **Rafid Ahmed**, Mir Sazzat Hossain, Intesar Tahmid, Tasnimul Hossain Tomal, Md Fahim, Md Farhad Alam - **Evaluating Vision Language Models on Bangla Medical Visual Question Answering: Dataset and Benchmarking** [Manuscript]

**[C]** Tasnimul Hossain Tomal*, Intesar Tahmid*, **Rafid Ahmed***, Mir Sazzat Hossain, Md Fahim and Md Farhad Alam - **Decoupling Representation for Fine-tuning with Linear Probing and LoRA on Robust Downstream Adaptation** [Manuscript]

**[W]** **Rafid Ahmed**, Intesar Tahmid, Mir Sazzat Hossain, Tasnimul Hossain Tomal, Md Fahim, Md Farhad Alam - **How Good LLMs Are at Answering Bangla Medical Visual Questions?Dataset and Benchmarking**[Manuscript]

**[W]** Md Mahir Jawad*, **Rafid Ahmed***, Ishita Sur Apan*, Tasnimul Hossain Tomal, Fabiha Haider, Mir Sazzat Hossain, Md Farhad Alam Bhuiyan - **Benchmarking Large Language Models on Bangla Dialect Translation and Dialectal Sentiment Analysis** [Manuscript]

**[W]** Intesar Tahmid*, **Rafid Ahmed***, Md Mahir Jawad, Anam Borhan Uddin, Md Fahim, Md Farhad Alam Bhuiyan- **PentaML @BLP Shared Task 1: Linear Probing of Pre-trained Transformer based Models for Bangla Hate Speech Detection** [Manuscript]

## Projects

• **MATRIX**
*Tools: [ React.js, Node.js, Express.js, and MongoDB]*                              [⦿]
  ◦ Developed a full-stack personalized movie web application, featuring user authentication, movie search and recommendation, and secure data handling. Implemented load balancing to ensure high availability and optimized performance for concurrent users. Integrated modern security practices, including data validation and access control, to protect user information and application integrity.

• **Book Recommender System**
*Tools: [Pytorch, Python, Hugging Face models, LangChain, and Gradio]*                              [⦿]
  ◦ Developed a book recommendation system using transformer-based embeddings and sentiment analysis using 7K book dataset in Kaggle.

## Technical Skills

  ◦ **Programming Languages:** Python, C, C++ , JavaScript, Java, Kotlin, PHP
  ◦ **Deep Learning Tools:** Pytorch, Huggingface, Tensorflow, TIMM
  ◦ **Large Language Models:** RAG, GraphRAG, Multimodal RAG, LLM Agents, Web Agent
  ◦ **LLM Tools:** LangChain, LlamaIndex, Chroma, VLLM, OLLaMa, Faiss Vector Search
  ◦ **Other Tools:** Scikit-Learn, Numpy, SciPy, Pandas, NLTK, Plotly

## Machine Learning Achievements

• **Finalist in Robi Datathon 3.0**                              *May 2024*
*In the top 20 teams among 3,500+ participants at Robi Datathon 3.0, Bangladesh's largest datathon*

• **Finalist in Robi Datathon 2.0**                              *July 2022*
*In the top 20 teams at Robi Datathon 2.0 among 384+ teams*

## References

  ◦ **Md. Farhad Alam Bhuiyan**
  Head of R&D, Penta Global Limited
  Co-director, Center for Computational & Data Sciences, IUB
  Assistant Professor, CSE, Green University of Bangladesh
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  ◦ **Dr. Mosaddek Hossain Kamal**
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