# Md Kaykobad Reza

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## Education

**Doctor of Philosophy (Ph.D)**
University of California, Riverside
Computer Science and Engineering
Spetember 2022 – Present
Research Topics: Multimodal Machine Learning, Computer Vision, NLP
Supervisor: Dr. M. Salman Asif

**Master of Science (M.Sc.)**
University of California, Riverside
Computer Science and Engineering
Spetember 2022 – December 2024

**Bachelor of Science (with Honors)**
Bangladesh University of Engineering & Technology (BUET)
Computer Science and Engineering
February 2015 - April 2019
Research Topics: Natural Language Processing
Supervisor: Dr. M. Sohel Rahman

## Research Interests and Publications

**Research Interests**

My interests broadly span the area of Multimodal ML, Computer Vision and NLP. Currently I am working on:

- Multimodal data fusion which is robust to missing, noisy, occluded and unaligned modalities
- Incorporating new modalities to existing models without increasing computational overhead significantly
- Methods for extracting information from noisy/unaligned/low-resolution data & test time model adaptation

**Robust Multimodal Learning with Missing Modalities via Parameter-Efficient Adaptation**    IEEE TPAMI
Md Kaykobad Reza, Ashley Prater-Bennette, M. Salman Asif    arXiv | Webpage
Proposed a parameter efficient adaptation method for multimodal models that can enhance missing modality performance by up to 31.46% and applicable to diverse modality combinations, datasets and tasks.

**MMSFormer: Multimodal Transformer for Material and Semantic Segmentation**    IEEE OJSP
Md Kaykobad Reza, Ashley Prater-Bennette, M. Salman Asif    arXiv | Webpage | Code
Proposed a novel fusion strategy and model for multimodal material and semantic segmentation that outperforms current state of the art models for all modality combinations.

**Model, Analyze, and Comprehend User Interactions within a Social Media Platform**    ICCIT 2024
Md Kaykobad Reza, S M Maksudul Alam, Yiran Luo, Youzhe Liu, Md Siam    arXiv
Developed a graph-based approach to model and analyze social media user interactions, revealing key insights into community dynamics, user behavior, and content preferences.

**MMP: Towards Robust Multi-Modal Learning with Masked Modality Projection**
Niki Nezakati, Md Kaykobad Reza, Ameya Patil, Mashhour Solh, M. Salman Asif    arXiv | Webpage
Masked Modality Projection (MMP) trains a single model to handle missing modalities by learning to project available inputs, improving robustness across various missing modality scenarios.

**Robust Multimodal Learning via Cross-Modal Proxy Tokens**    Under Review
Md Kaykobad Reza, Ameya Patil, Mashhour Solh, M. Salman Asif    arXiv
We propose Cross-Modal Proxy Tokens (CMPTs) with low-rank adapters to enhance missing modality robustness of multimodal models, outperforming state-of-the-art baselines across five datasets.

**Basin-wide groundwater level forecasting in Kumamoto, Japan: integrating transfer learning with Long Short-term Memory Network**    Hydrological Sciences Journal
A. T. M. Sakiur Rahman, Shahriar M Sakib, Md Kaykobad Reza, Amiya Basak, Khandaker Nusaiba Hafiz, Md Shazid Islam, Takahiro Hosono
We introduces a basin-wide groundwater level forecasting model that combines transfer learning with LSTM to improve predictive performance across diverse hydrogeological regions.

**Automatic Summarization of Scientific Articles from Biomedical Domain**    IJCCI 2019
Md Kaykobad Reza, Rifat Rubayatul Islam, Sadik Siddique, Md. Mostofa Akbar, M. Sohel Rahman
Proposed an algorithm for generating summaries automatically that outperforms traditional methods.

## Tutorials and Talks

**Foundations and Recent Trends in Robust Multimodal Learning**  ICIP 2025
M. Salman Asif, Md Kaykobad Reza
This tutorial provides a comprehensive overview of multimodal learning, covering fundamentals, challenges, recent advances, and future directions, with a focus on robustness and real-world applications.

## Work Experience

**Applied Scientist Intern (L5)**  January 2025 – June 2025
Amazon Lab 126  Sunnyvale, California, USA
Topic: Multimodal Machine Learning, Generative AI

**Graduate Student Researcher**  September 2022 – Present
University of California, Riverside  California, USA

- Proposed a parameter efficient adaptation technique for multimodal models that can enhance missing modality performance and applicable to diverse modality combinations, datasets and tasks.
- Designed a novel fusion strategy and model named MMSFormer for multimodal material and semantic segmentation that outperforms current state of the art models in all modality combinations.
- Proposed Masked Modality Projection (MMP) to train a single model to handle missing modalities by learning to project available inputs, improving robustness across various missing modality scenarios.
- Designed Cross-Modal Proxy Tokens (CMPTs) with low-rank adapters to enhance missing modality robustness of multimodal models, outperforming state-of-the-art baselines across five datasets.

**Senior Engineer, Software Research & Engineering**  July 2019 – August 2022
bKash Limited (Joint venture of Money in Motion, Ant Group & SoftBank)  Dhaka, Bangladesh

- Developed a solution for receiving remittance to bKash digital wallet directly from popular platforms like **Payoneer**, **Wise** and **Remitly** resulting in **17%** increase in total number of active users.
- Worked with **bKash Customer App** team to link bKash digital wallet to **36** government and private banks for real time and secure money transfers.
- Worked with **bKash Merchant App** team to build a real-time dashboard for small to large businesses.
- Collaborated with **bKash Payment Gateway** team for implementing fast and secure payment solution resulting in a **23.2%** increase in user engagement and **12.6%** increase in total yearly revenue.
- Our team also implemented send money, mobile recharge, cash out and deposit pension scheme (DPS).

**Software Engineer, Mobile Application**  May 2019 – July 2019
Samsung Research & Development Institute, Bangladesh  Dhaka, Bangladesh

- I worked as an iOS application developer and worked in Mobile Application Group - 1.
- My primary responsibilities were to develop mobile applications, ensure code quality and fix critical bugs.

## Machine Learning Projects

**Language generation using RNNLM (NLP Project)**  Deep Learning, Keras | Github
Used Quora question pair dataset to generate sentences for gap filling & template-based sentence generation.

**Automated Lawn Mower (Hardware Project)**  Deep Learning, Computer Vision | Youtube
Automated device using computer vision, camera, sonar sensors to detect and cut grass, avoiding obstacles.

**Weather Station (Microcontroller Project)**  Machine Learning, Microcontroller | Youtube
A compact device that monitors current weather, stores data, conducts analysis and predicts future weather.

## Software Projects

**Dyne: Meet Your Friends Over Food (Social Media App)**    Flutter, Firebase, NodeJs, Geolocation | Details
Social app for instant food meetups, exploring restaurants, chatting, coupons, fostering connections & savings.

**Dorao: Your Running Companion (Fitness Tracker App)**    Flutter, Firebase, Django, Geolocation | Details
Track walks/runs, log time & distance, real-time stats, create group, complete daily challenges & earn rewards.

**Procurement Institute (Tender Management Solution)**    Flutter, Firebase, In-App Purchase | Details
Find out all the gazetted tenders, see details, search or filter, save for later, subscribe for alerts and reminders.

**Payvor: Pay & Get Paid for a Favor (Freelance Platform)**    Flutter, Firebase, C# .NET, Stripe | Details
Post job/apply for job, select preferred applicant, assign the job, get the work done, make payment or get paid.

**Tourist Guide App**    Flutter, Firebase, Geolocation, In-App Purchase | Details
Find out hotels, tourist spots, restaurants, transportation, events, adventures and everything at your fingertips.

**Pessa: Real-Time Financial Transaction (FinTech App)**    Flutter, Firebase, C# .NET | Details
All-in-one mobile wallet for seamless money management. Add money, send funds instantly, cash out, & more.

**Cherished Prayers (Social Media for the Pious)**    Flutter, Firebase, Django, Real-Time Chat | Details
Record, share, seek solutions, connect with others via chat, groups, and feedback for an enriched experience.

## Skills

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| **Soft Skills** | Communication, Collaboration, Problem Solving |
| **Programming Languages** | Python, Dart, Java, C/C++ |
| **Library/Frameworks** | PyTorch, TensorFlow, Huggingface, Scikit-learn, OpenCV, NumPy, Pandas, Matplotlib, Flutter, Django |
| **Database** | MySQL, PostgreSQL, HBase, Firebase Firestore, Firebase Realtime DB |
| **Software/Technologies** | Anaconda, PyCharm, Android Studio, VSCode, Firebase, RestAPI, GraphQL, FastAPI, Git |

## Services

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| **Reviewer** | The $39^{th}$ Annual Conference on Neural Information Processing Systems (NeurIPS) | 2025 |
| **Reviewer** | The $59^{th}$ Annual Asilomar Conference on Signals, Systems, and Computers | 2025 |
| **Reviewer** | International Conference on Computer Vision (ICCV) | 2025 |
| **Reviewer** | IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) | 2025 |
| **Reviewer** | IEEE Transactions on Computational Imaging (IEEE TCI) | 2025 |
| **Reviewer** | IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) | 2024 |

## Leadership

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| **Vice President** | Greater Rangpur Students' Welfare Association, BUET | Aug 2018 – May 2019 |
| **Class Representative** | Department of Computer Science & Engineering, BUET | April 2016 - April 2019 |

## Awards

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| **Dean's Distinguished Fellowship** | University of California, Riverside | Fall'22 - Spring'23 |
| **Department Dean's List Award** | Bangladesh University of Eng. & Tech. (BUET) | 2015 - 2019 |
| **University Merit Scholarship** | Bangladesh University of Eng. & Tech. (BUET) | 2015 - 2019 |
| **MetLife Pathways Scholarship** | MetLife Foundation | 2015 - 2018 |
| **Education Board Scholarship** | Bangladesh Education Board | 2012 - 2018 |