

MOHAMMAD JUNAYED HASAN

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 Personal Website  Google Scholar  GitHub  LinkedIn

RESEARCH SUMMARY

Efficiency-focused NLP and ML researcher aiming to develop robust methods for reasoning, multimodal learning, and multilingual processing under compute, memory, and data constraints. Track record includes 8+ peer-reviewed publications, a \$35K research grant for women's health in South Asia, and multiple merit scholarships. NeurIPS workshop and IEEE ICDM oral+poster presenter with 4+ years of RA/TA and US industry research experience.

EDUCATION

Expected December 2025

Master of Science in Engineering in Computer Science
Johns Hopkins University, Baltimore, MD
GPA: 3.83/4.00

- *Thesis:* “ParaCycle: Reinforcement Learning with Bidirectional Paraphrase Consensus for Reference-Free Translation”
- *Research Advisor:* Prof. Philipp Koehn [[Profile](#)], *Academic Advisor:* Prof. Anjalie Field [[Profile](#)]
- *Relevant Coursework:* Natural Language Processing, Advanced NLP, Machine Translation, Human Language Technology, Machine Learning, Computer Vision, Cloud Computing

December 2023

Bachelor of Science in Computer Science and Engineering
North South University, Dhaka, Bangladesh
GPA: 3.95/4.00 (4.00/4.00 in CS), *Summa Cum Laude*, Top 0.4% of Class

- *Thesis:* “Bridging classical and quantum machine learning: Knowledge transfer from classical to quantum neural networks using knowledge distillation”
- *Advisor:* Prof. Mahdy Rahman Chowdhury [[Profile](#)]

RESEARCH EXPERIENCE

January 2025 to Present

Graduate Researcher
Center for Language and Speech Processing (CLSP), Johns Hopkins University, Baltimore, MD

- Developed **ParaCycle**, a novel reinforcement learning framework for low-resource machine translation using bidirectional paraphrase consensus, eliminating dependency on parallel corpora while improving translation quality on four English↔X language pairs using FLORES-200 benchmark
- Designed and implemented semantic consistency rewards and customized RL objectives for unsupervised quality estimation, formulating translation quality optimization as a reinforcement learning problem
- Architected **HadaSmileNet**, a Hadamard-fusion framework integrating handcrafted and deep-learning features for genuine smile recognition, accepted at *IEEE ICDM 2025* with oral+poster presentation
- Achieved 26% reduction in parameters, training time, and inference latency while maintaining superior accuracy compared to multi-task learning baselines in facial emotion recognition
- Collaborated with domain experts and previous authors to ensure reproducibility and clinical relevance across both NLP and computer vision research directions

May 2025 to Present

Research Intern
Mayo Clinic, Rochester, MN

- Extended HER2 biomarker detection across 7 cancer types via domain adaptation techniques; formulated cross-cancer generalization as transfer learning problem; achieved >90% accuracy across all classes

- Developed and evaluated ML models (LGB, XGB, LSTM, Transformers) for blood utilization prediction; engineered features from multi-modal clinical time-series data; reduced forecast error by 3.8% vs. baselines
- Collaborated with pathologists to formalize blood transfusion assessment as computational problem; reduced manual analysis time by >75% through automated pipeline design
- Designed and implemented end-to-end analytics platform serving real-time predictions to 500+ clinicians; optimized model serving latency to sub-200 ms for clinical workflow integration

January 2024 to
Present

AI Research Assistant

Mahdy Research Academy, North South University (Remote)

- Conceptualized 15+ research projects across NLP, computer vision, and quantum machine learning; co-authored 12 high-quality manuscripts with research groups, submitting 9 to Q1 journals
- Created and managed research infrastructure and educational materials used by 150+ students across groups
- Developed **CLKD-MED** and **TransMed**, the first interpretable cross-lingual frameworks for clinical outcome prediction in low-resource languages using multi-strategy back-translation and distillation; now under review at *Expert Systems with Applications* and *CMPB* respectively
- Led the design of **TabFusion**, a multimodal framework with lightweight early fusion of tabular & image data using GCNs for skin cancer detection, now conditionally accepted at *Knowledge-Based Systems*
- Supervised research on developing **Distill-FusionNet**, a lightweight and interpretable architecture for cross-domain lung cancer diagnosis, now under review at *Knowledge-Based Systems*
- Pioneered hybrid quantum-classical frameworks including **CQ-CNN** (achieving 1300 \times compression for Alzheimer's detection) and **QuantumMedKD**, with manuscripts published in *PLOS ONE* and under review in *Alexandria Engineering Journal*, respectively
- Directed research on **QSiamNet**, the first hybrid quantum-classical siamese network for enhanced similarity-based learning, resulting in manuscript now under review at *Neurocomputing*

November 2023 to
July 2024

AI Research Engineer

Apurba Technologies Ltd., Dhaka, Bangladesh

- Designed **DeepMarkerNet**, a novel multi-task transformer framework for genuine smile detection via auxiliary supervision from handcrafted features to automatic transformer features
- Improved state-of-the-art accuracy by 1-3% across all CNN, RNN, and transformer-based methods on 4 benchmark datasets; first-authored research published in *Pattern Recognition Letters*
- Secured \$35K research funding through proposal development and presentation at a national conference

January 2023 to
November 2023

Undergraduate Research Assistant

Apurba NSU R&D Lab, North South University, Dhaka, Bangladesh

- Developed **OptimCLM**, a compression pipeline combining ensemble distillation, pruning, and quantization, achieving 22.9 \times compression and 28.7 \times latency reduction while retaining 98% performance
- First-authored publication in *International Journal of Medical Informatics*; achieved state-of-the-art on 4 clinical NLP tasks fine-tuning 32 clinical LLMs on EHR data using the proposed method

May 2022 to
December 2023

Undergraduate Researcher

North South University, Dhaka, Bangladesh

- Developed first hybrid quantum-classical framework via logit distillation, bridging classical networks with quantum circuits; manuscript under review in *IEEE Transactions in Quantum Engineering* with 12 preprint citations; advised by Dr. Mahdy Rahman Chowdhury, **ICO Galileo Galilei Medal Award winner, 2023**
- Co-first authored **Shadow Loss**, reducing memory complexity from O(N²) to O(N) for deep metric learning while accelerating convergence 1.5-2 \times ; validated on CUB-200, CARS-196, and large-scale retrieval datasets; under review at *CVPR 2026*
- Engineered feature learning and LLM-based approaches for life satisfaction prediction from tabular data, achieving 93.8% accuracy; published in *Heliyon* (May 2024) with deployed public model

PEER-REVIEWED PUBLICATIONS

*: Equal contributions

2025

Mohammad Junayed Hasan*, Suhra Noor*, and Sifat Momen. “A novel framework for detection of noncommunicable diseases via prompt engineering and domain knowledge integration” (2025), *Alexandria Engineering Journal (AEJ)*, vol. 133, pp. 586–614. [\[Presentation\]](#) [\[Paper\]](#)

Mohammad Junayed Hasan, Nabeel Mohammed, Shafin Rahman, and Philipp Koehn. “HadaSmileNet: Hadamard fusion of handcrafted and deep-learning features for enhancing facial emotion recognition of genuine smiles” (2025), *IEEE International Conference on Data Mining (ICDM)*. Presented (oral + poster) November 15, 2025. [\[Paper\]](#) [\[Code\]](#) [\[Poster\]](#) [\[Presentation\]](#)

Mohammad Junayed Hasan, Jannat Sultana, Silvia Ahmed, and Sifat Momen. “Early detection of occupational stress: Enhancing workplace safety with machine learning and large language models” (2025), **PLOS ONE**, 20(6), e0323265. Accepted to *Women in Machine Learning Workshop@ NeurIPS 2025*. [\[Abstract\]](#) [\[Paper\]](#) [\[Code\]](#)

Mohammad Junayed Hasan, Fuad Rahman, and Nabeel Mohammed. “OptimCLM: Optimizing clinical language models for predicting patient outcomes via knowledge distillation, pruning and quantization” (2025), *International Journal of Medical Informatics (IJMEDI)*, 195, 105764. [\[Paper\]](#) [\[Code\]](#)

Mohammad Junayed Hasan, Suvodeep Mazumdar, and Sifat Momen. “Deployable deep learning for cross-domain plant leaf disease detection via ensemble learning, knowledge distillation, and quantization” (2025), *IEEE Access*, vol. 13, pp. 140313-140336. [\[Paper\]](#) [\[Code\]](#)

Mominul Islam, **Mohammad Junayed Hasan**, and M.R.C. Mahdy. “CQ-CNN: A lightweight hybrid classical-quantum convolutional neural network for Alzheimer’s disease detection using 3D structural brain MRI” (2025), **PLOS ONE**, 20(9), e0331870. [\[Paper\]](#) [\[Code\]](#)

2024

Mohammad Junayed Hasan, Kazi Rafat, Fuad Rahman, Nabeel Mohammed, and Shafin Rahman. “DeepMarkerNet: Leveraging supervision from the Duchenne Marker for spontaneous smile recognition” (2024), *Pattern Recognition Letters (PRL)*, 186, 148-155. [\[Paper\]](#) [\[Code\]](#)

Alif Elham Khan*, **Mohammad Junayed Hasan***, Humayra Anjum, Nabeel Mohammed, and Sifat Momen. “Predicting life satisfaction using machine learning and explainable AI” (2024), *Heliyon*, 10(10). [\[Paper\]](#) [\[Code\]](#)

PREPRINTS & SUBMISSIONS (SELECTED)

Under Review

Alif Elham Khan*, **Mohammad Junayed Hasan***, Humayra Anjum*, and Nabeel Mohammed. “Shadow loss: Memory-linear deep metric learning for efficient training”, *CVPR 2026*. [\[Preprint\]](#) [\[Status\]](#)

Mohammad Junayed Hasan, and M.R.C. Mahdy. “Bridging classical and quantum machine learning: Knowledge transfer from classical to quantum neural networks using knowledge distillation”, *IEEE Transactions on Quantum Engineering (IEEE TQE)*. (Under Review). [\[Preprint\]](#) [\[Code\]](#) [\[Poster\]](#) [\[Presentation\]](#) [\[Status\]](#)

Mahir Afser Pavel, Raful Islam, **Mohammad Junayed Hasan**, and M.R.C. Mahdy. “CLKD-MED: A novel cross-lingual knowledge distillation framework for multilingual clinical outcome prediction”, *Expert Systems with Applications (ESWA)*. [\[Status\]](#)

Md. Talat Mahmud Tomal, Zahrul Jannat Peya, Nurzahan Akter Joly, **Mohammad Junayed Hasan**, and M.R.C. Mahdy. “Distill-FusionNet: Lightweight and interpretable deep learning for cross-domain lung cancer diagnosis”, *Knowledge-Based Systems (KBS)*. [\[Status\]](#)

Waqilur Rahman Chowdhury, Urmi Sen, **Mohammad Junayed Hasan**, and M.R.C. Mahdy. “QSiamNet: A hybrid quantum-classical siamese network for enhanced similarity-based learning”, *Neurocomputing*. [\[Status\]](#)

Conditional
Accept

Rashik Iram Chowdhury, Nusrat Kabir Nuha, Muhtasimul Hasan, **Mohammad Junayed Hasan**, and M.R.C. Mahdy. “TabFusion: Lightweight early fusion of tabular and image data with graph-convolutional neural networks for skin cancer detection”, *Knowledge-Based Systems (KBS)*. [\[Status\]](#)

1st Revision MD Nahid Hassan Nishan*, **Mohammad Junayed Hasan***, and M.R.C. Mahdy. “QuantumMedKD: A hybrid quantum-classical knowledge distillation framework for medical image analysis”, *Alexandria Engineering Journal (AEJ)*. [\[Status\]](#)

With Editor Rakib Ullah, Mimjamam Ul Haque Monmoy, Syed Nadim Mehdi, **Mohammad Junayed Hasan**, and M.R.C. Mahdy. “TransMed: A cross-lingual framework for clinical outcome prediction in low-resource healthcare settings,” *PLOS Digital Health (PDIG)*. [\[Status\]](#)

FELLOWSHIPS, GRANTS & AWARDS

2024	Summa Cum Laude Honors North South University, Dhaka, Bangladesh Highest academic distinction; CGPA 3.95/4.00, ranked 2nd (top 0.4%) in class
2023	Research Grant – “Best Innovation Idea” AdSEARCH, icddr,b, Dhaka, Bangladesh \$35,000 awarded for research proposal on “Meno-Chat: An Assistive Chatbot Against Menstrual Problems and Menopause Health for Women” addressing Sexual and Reproductive Health and Rights in Bangladesh [Proposal] [Poster]
2022	Full-Merit Scholarship North South University, Dhaka, Bangladesh Awarded for academic excellence, consistently ranked within top 1% of class
2017	Two-Year Talentpool Scholarship Dhaka Education Board, Bangladesh Government National standing of 124 out of 1,651,523 students in the Secondary School Certificate (SSC) board examination

PRESENTATIONS & INVITED TALKS

2025	Conference: “Hadamard fusion for facial emotion recognition” <i>IEEE ICDM</i> (Oral+Poster) [Slides] [Poster] Conference: “Predictive blood utilization for transfusion operations” <i>VIBE Summit</i> , Mayo Clinic [Poster] NLP Reading Group: “Are Reasoning Capabilities Present in Base Models?” JHU CLSP [Slides] NLP Reading Group: “When (and why) RL is effective for reasoning problem?” JHU CLSP [Slides] Invited Talk: “Evaluating an ambient clinical scribe technology” Mayo Clinic Research Symposium [Slides] Course Research: “LifeEmbedding: Cloud-native human trajectory modeling” JHU Cloud Computing [Slides] Course Research: “ICL and CoT based efficient data annotation for low-resource texts” JHU NLP [Poster] Course Research: “Multi-modal lip reading enhancement with textual and visual cues” JHU CV [Slides]
2024	Course Research: “MT quality evaluation for low-resource clinical texts” JHU Machine Translation [Slides] Invited Talk: “Responsible AI practices in prompt engineering” BIGD, BRAC University [Slides]
2023	Conference: “Predicting risks of miscarriage with SNOMED CT” SNOMED CT Expo [Slides] [Poster]

TEACHING EXPERIENCE

January 2025 to May 2025	Graduate Teaching Assistant – Machine Learning Johns Hopkins University, Baltimore, MD
	<ul style="list-style-type: none">Instructed 200+ graduate students in advanced ML, prompt engineering, and AI agents for Big Data Machine Learning course; used coding assistants to boost coding efficiency by >40%Developed 6 project-based assignments solving real-world business problems with big data frameworksLed weekly lab sessions on Scikit-learn and PyTorch; provided debugging and technical mentorship, receiving 99% positive teaching evaluations for instructional support and assignment design

January 2024 to Present	AI Instructor & Research Mentor Mahdy Research Academy, North South University (Remote)
	<ul style="list-style-type: none"> Developed and delivered comprehensive fundamental and applied research curricula in deep learning, NLP, and quantum machine learning for 150+ students Ideated and supervised 15+ research projects in machine translation, medical imaging and clinical NLP, achieving >90% completion rate Mentored students through complete research lifecycle resulting in 12 manuscripts (9 submitted to Q1 journals); created open-source educational materials: [DL Course] [QML Course] Teaching slides: [NLP] [GANs] [Model Efficiency] [QML]
November 2023 to December 2023	Prompt Engineering Instructor BRAC Institute of Governance and Development (BIGD), Dhaka, Bangladesh
	<ul style="list-style-type: none"> Designed and delivered training course on prompt engineering for data analysis, web development, and app development to 50+ beginner and expert freelancers Improved productivity by 70% and monthly income by \$500/month on average; teaching slides: [Data Analysis] [Web Dev] [App Dev]
September 2020 to November 2023	Undergraduate Teaching Assistant North South University, Dhaka, Bangladesh
	<ul style="list-style-type: none"> Instructed 800+ undergraduate students across 3 departments in Python and Java fundamentals, Intro to Machine Learning, Neural Networks and Pattern Recognition, and Intro to NLP courses Designed lab materials and led weekly programming sessions, improving student performance by 10-15%; provided technical mentorship for end-to-end term projects with 100% on-time completion

SERVICE TO RESEARCH COMMUNITY

Served as reviewer for 10+ manuscripts across multiple academic Q1/Q2 journals (Scientific Reports, ESWA, BSPC, and others) in AI, ML, and NLP domains. 5+ reviews currently in progress. [\[Certificates\]](#)

TECHNICAL SKILLS

Programming Languages: Python, Java, C++, SQL, R, MATLAB

ML & Deep Learning: PyTorch, TensorFlow, Hugging Face Transformers, Scikit-learn, XGBoost

NLP: BERT variants, T5, GPT, spaCy, NLTK, Machine Translation, Prompt Engineering

Quantum Computing: Qiskit, PennyLane, TorchQuantum, Quantum Neural Networks

Research & Development: Git, Docker, AWS/GCP, Weights & Biases, TensorBoard, OpenCV, LaTeX

Languages: Bengali (Native), English (Fluent), Hindi (Conversational), Urdu (Conversational)

REFERENCES

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