Masum Hasan

AI Research Scientist (LLMs, Alignment, Human-AI Interaction)
PhD Candidate, University of Rochester (May 2026)

https://masumhasan.com | masum6 | masum06 | Scholar

Research Focus

I design and evaluate large language models that behave more human-like in high-stakes interactions. My work spans LLM alignment (DPO/RLHF), human-AI evaluation, synthetic data generation, and applied ML for healthcare and code intelligence, with deployments in virtual agents and communication training systems.

Education

University of Rochester — Rochester, NY
Ph.D. Candidate (5^{th} year), Computer Science — *Aug 2021 - May 2026*

University of Rochester — Rochester, NY
M.Sc. Computer Science — *Aug 2021 - Aug 2023*

Bangladesh University of Engineering and Technology (BUET) — Dhaka, Bangladesh
B.Sc. Computer Science & Engineering — *Feb 2013 - Oct 2018*

Professional Experience

University of Rochester — Rochester, NY
Graduate Research Assistant, ROC-HCI Lab, Supervised by Prof. Ehsan Hoque — *Aug 2021 – Present*

- **Research Contributions**
  - **Human-likeness in LLMs with alignment:** Designed a preference-based alignment method (DPO) to induce subtle conversational traits such as human-likeness in LLMs, outperforming open-source and commercial models in large-scale Chatbot Arena-style human evaluations across 1B–72B parameter models [1].
  - **Virtual Humans:** Developed LLM-driven virtual agents for medical communication, role-play, and training scenarios, with a focus on human-centered design & evaluation [2,3,4,5].
  - **Synthetic Data for Computer Vision:** Built a scalable synthetic data pipeline for 2D hand pose estimation using Unity, that achieves competitive performance with *zero* human annotation [7].
  - **ML for Healthcare:** Developed ML models for healthcare applications, including video-based ataxia risk prediction and a safety-constrained medical chatbot for Parkinson's Disease education.
- **Leadership & Execution**
  - Led and mentored a research team of 10+ researchers across 5 projects, spanning idea formation, research direction, system building, human evaluation, and publication within tight deadlines. Two undergraduate mentees received outstanding researcher awards.
  - Coordinated cross-disciplinary collaboration across HCI, ML, healthcare, and clinical stakeholders while maintaining IRB, HIPAA compliance.

Bangladesh University of Engineering and Technology (BUET) — Dhaka, Bangladesh
Research Assistant, Applied Machine Learning Lab
Supervised by Prof. Rifat Shahriyar and Prof. Anindya Iqbal — *Nov 2018 – Jun 2021*

- **Research Contributions**
  - Conducted NLP-for-code research across source code summarization, refactoring, synthesis, and semantic search, contributing to multiple peer-reviewed publications [9,10,11,12].
  - Developed Bengali-GPT-2 (2020) and state-of-the-art Bengali–English machine translation systems, including low-resource MT for the endangered Chakma language [13,14,15,16].
- **Leadership & Execution:** As one of the first hires at Applied ML Lab, I led multiple projects involving 9 researchers and helped establish a culture of high-quality ML publications that continues to this day.

Publications

LLMs, Alignment, and Human-Like AI

[1] **HAL: Inducing Human-likeness in LLMs with Alignment** - **Masum Hasan**, Junjie Zhao, Ehsan Hoque (Under review, ACL 2026)

[2] **SAPIEN: Affective Virtual Agents Powered by Large Language Models** – **Masum Hasan**, Cengiz Ozel, Sammy Potter, Ehsan Hoque. (ACIIW 2023)

[3] **Poker with Play Money: Exploring The Perceived Humanness of AI Virtual Patients for Psychotherapist Training Role-Play** - Cynthia Baseman, **Masum Hasan**, Nathaniel Swinger, Sheila Rauch, Ehsan Hoque, Rosa Arriaga (CSCW 2025)

Human-Centered AI and Healthcare

[4] **AI Standardized Patient Improves Human Conversations in Advanced Cancer Care** – Kurtis Haut **Masum Hasan**, Thomas Carroll, Ronald Epstein, Taylan Sen, Ehsan Hoque (Under review, JMIR 2026)

[5] **A User-Centered Framework to Empower People with Parkinson's Disease** – Wasifur Rahman, Abdelrahman Abdelkader, Sangwu Lee, Phillip Yang, Md Saiful Islam, Tariq Adnan, **Masum Hasan**, Ellen Wagner, Sooyong Park, E. Ray Dorsey, Catherine Schwartz, Karen Jaffe, Ehsan Hoque. (IMWUT, UbiComp 2024)

[6] **Auto-Gait: Automatic Ataxia Risk Assessment with Computer Vision on Gait Task Videos** – Wasifur Rahman, **Masum Hasan**, Md Saiful Islam, Titilayo Olubajo, Jeet Thaker, Abdelrahman Abdelkader, Phillip Yang, Tetsuo Ashizawa, Ehsan Hoque. (UbiComp 2023)

Synthetic Data and Computer Vision

[7] **Hi5 ✋: Synthetic Data for Inclusive, Robust, Hand Pose Estimation** - **Masum Hasan**, Cengiz Ozel, Nina Long, Alexander Martin, Samuel Potter, Tariq Adnan, Sangwu Lee, Amir Zadeh, Ehsan Hoque (ACII 2025)

[8] **Hitting your MARQ: Multimodal ARgument Quality Assessment** – Md Kamrul Hasan, James Spann, **Masum Hasan**, Md. Saiful Islam, Kurtis Haut, Rada Mihalcea, Ehsan Hoque. (EMNLP 2021)

NLP for Code and Software Engineering

[9] **CoDesc: A Large Code–Description Parallel Dataset** – **Masum Hasan**, Tanveer Muttaqeen, Ishtiaq Niloy, Kazi Mehrab, Tahmid Hasan, Mahim Pantho, Wasi Ahmad, Rifat Shahriyar, Anindya Iqbal. (ACL Findings 2021)

[10] **Text2App: A Framework for Creating Android Apps from Text Descriptions** – **Masum Hasan**, Kazi Sajeed Mehrab, Wasi Uddin Ahmad, Rifat Shahriyar. (NLP4Prog, ACL-IJCNLP 2021)

[11] **Review4Repair: Code Review Aided Automatic Program Repairing** – Faria Huq, **Masum Hasan**, Mahim Pantho, Sazan Mahbub, Anindya Iqbal, Toufique Ahmed. (IST Journal)

[12] **Using a Balanced Scorecard to Identify Opportunities to Improve Code Review Effectiveness: An Industrial Experience Report** – **Masum Hasan**, Anindya Iqbal, Amiangshu Bosu, Mohammad Rafid Ul Islam, A.J.M. Imtiajur Rahman. (EMSE Journal)

Low-Resource NLP

[13] **ChakmaNMT: A Low-resource Machine Translation On Chakma Language** - Aunabil Chakma, Aditya Chakma, Soham Khisa, Chumui Tripura, **Masum Hasan**, Rifat Shahriyar. (Under review, ACL 2026)

[14] **LowResource at BLP-2023 Task 2: Leveraging BanglaBert for Low Resource Sentiment Analysis of Bangla Language** – Aunabil Chakma, **Masum Hasan**. (EMNLP 2023, BLP Workshop)

[15] **Not Low-Resource Anymore: Aligner Ensembling, Batch Filtering, and New Datasets for Bengali-English Machine Translation** – Tahmid Hasan, Abhik Bhattacharjee, Kazi Samin, **Masum Hasan**, Madhusudan Basak, M. Sohel Rahman, Rifat Shahriyar. (EMNLP 2020)

[16] **Recognition of Bengali Handwritten Digits Using Convolutional Neural Network Architectures** – **Md Mahmudul Hasan**, Md Rafid Ul Islam, Md Tareq Mahmood. (ICBSLP 2018, **Best Student paper award**)

Invited Talks

- **University of Rochester (ROC Talks)** — "Rethinking Capitalism in the Age of AGI," April 2024. Video
- **New York Academy of Sciences** — "Future of Interactive Education with Generative AI," February 2024.
- **University of Rochester** — "Privacy, Security, and Ethics of Generative AI," February 2024.
- **WXXI News (NPR Affiliate)** — Radio appearance on "Connections with Evan Dawson" discussing the future of human-AI interaction, December 2023.
- **FlowerCity.AI Conference** — Invited speaker, December 2023.
- **University of Rochester** — Speaker, 4-part workshop series on Generative AI, Fall 2023.
- **University of Rochester** — "Introduction to ChatGPT" workshop, Spring 2023.

Technical Skills

Core ML: LLM alignment (DPO, RLHF), transformers, multimodal models, diffusion, ViT, Machine Translation, LLM-Agents

Evaluation & Data: Large-scale human evaluation, synthetic data generation, annotation pipelines

Systems & Tooling: PyTorch, HuggingFace, AWS, LangGraph, CrewAI, SQL, Java, C/C++