Hamza Tahboub

B.S. Computer Science & Mathematics

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Education

2021 – 2025 (Aug. – Dec.) **B.S. in Computer Science and Mathematics**, *Northeastern University*, Boston

GPA: **3.96/4.0**, Dean's List

Core CS Coursework: Programming in C++, Advanced Programming with Data, Introduction to Data Management, Information Retrieval, Logic and Computation, Theory of Computation, Practical Neural Networks, OOP, Fundamentals of Software Engineering, Algorithms and Data

Core Math Coursework: Discrete Structures, Linear Algebra, Advanced Linear Algebra, Differential Equations and Linear Algebra, Probability and Statistics, Statistics and Stochastic Processes, Calculus 3, Number Theory, Group Theory, Matrix Methods in Machine Learning

Publications

[1] **Hamza Tahboub**, Weiyan Shi, Gang Hua, and Huaizu Jiang. SocialFusion: Addressing social degradation in pre-trained vision-language models. *Transactions on Machine Learning Research*, 2025. Accepted for publication (preprint: arXiv:2512.01148).

Experience

Research

2025 – (Feb. –) **SocialFusion: Unifying visual social interaction understanding**, *Advised by Professors Huaizu Jiang, Weiyan Shi, and Gang Hua*, Visual Intelligence Lab, NEU

- Led the project to unify different visual social interaction understanding tasks under one model that can leverage the social synergies between diverse tasks to achieve positive transfer and competitive performance overall.
- Outperformed three leading VLMs of similar capacity in the joint setting on four of the five considered tasks.
- Revealed that VLMs suffer from a "social degradation" that impairs their social understanding and leads to negative transfer when trained jointly.
- Diagnosed this social degradation phenomenon via representation probing and gradient conflict analysis, demonstrating that large-scale pre-training compresses visual features in ways that erode atomic social cues.
- Paper under review at TMLR.

2025 – (Jun. –) **OneGaze**, *Advised by Professor Huaizu Jiang*, Visual Intelligence Lab, NEU

- Ongoing project to unify scanpath prediction and video saliency prediction, which are traditionally modeled separately.
- These tasks are fundamentally very similar, as they both model how human attention shifts while observing different forms of visual media.
- By modeling them jointly, we hope to improve performance overall and ultimately better understand human attention.

2024 – 2025 (Jan. – Jan.) **Egocentric Werewolf strategy classification and utterance prediction**, *Advised by Professors Huaizu Jiang and Weiyan Shi*, Visual Intelligence Lab, NEU

- Led this project, which eventually evolved into the above SocialFusion project, to understand subtle social cues from an egocentric perspective.
- Significantly improved performance on the strategy prediction task over prior methods by taking advantage of the egocentric view, which gives us unique information about the camera-wearer's attention, while trying to mitigate disadvantages, like the instability of the viewpoint.

2023 Oct. – 2023 Dec. **Implementing state-of-the-art models for in-house nuclei segmentation tasks**, *Advised by Evan Liu*, Genentech Computer Vision R&D, San Francisco

- Conducted extensive literature review on existing methods, evaluating them for our in-house use cases in nuclei semantic segmentation.
- Implemented state-of-the-art methods and contributed to novel approaches.

2023 Jul. – 2023 Dec. **Medical QA fine-tuning**, *Advised by Dr. Michael Wu*, Genentech NLP R&D, San Francisco

- Fine-tuned ensembles of language models and named-entity recognition/relationship extraction models on large-scale in-house medical datasets.
- Designed and conducted extensive experiments to evaluate the performance of different methods in the literature and our own designs.
- Results of this project were deployed for use by scientists across the company for medical QA and retrieval.

2023 Sept. – 2023 Dec. **Long-form audio visual understanding**, *Advised by Professor Huaizu Jiang*, Visual Intelligence Lab, NEU

- Conducted extensive literature review to scope out future research directions.
- Reproduced SOTA results from scratch for papers like "Towards Long Form Audio-visual Video Understanding" in PyTorch (repo), identifying limitations of these approaches.

2022 Aug. – 2023 Aug. **Visual common sense understanding**, *Advised by Professors Byron Wallace and Huaizu Jiang*, Visual Intelligence Lab, NEU

- Focused first on visual question answering commonsense datasets and explored various approaches to solving the tasks.
- Pivoted to early concepts in reasoning like chain-of-thought (CoT) prompting, discovering that CoT prompting harmed the performance of smaller language models on these tasks, contrary to popular belief at the time. We documented our findings in a manuscript (link).

Teaching

2025 Aug. – 2025 Dec. **Teaching Assistant for Program Design and Implementation**, *Northeastern University*, Boston

- Northeastern University entirely overhauled the introductory CS course sequence this year. I decided to TA the second course in that sequence, which many take as their first, to help new students as the course learns to adapt and find its place.

2022 Jan. – 2022 Jul. **Teaching Assistant for Fundamentals of Computer Science I**, *Northeastern University*, Boston

- Mentored students for two semesters as a TA for this course taught in Racket (lisp dialect), helping them in office hours, grading their work, and co-leading labs.

Honors and Awards

2024 Jan. – 2024 May. **PEAK Summit Research Award**, pinnacle award for semester-long research in the Northeastern PEAK Fellowship program, including $3,000 of funding for my research.

2024 Aug. – 2024 Dec. **Full-Time Research Fellowship**, semester-long fully-funded research position at the Visual Intelligence Lab.

2021 Aug. – 2025 May. **Dean's List**, awarded all semesters at Northeastern University.

Skills

Languages Python, Java, C++, SQL, LaTeX, Lisp, MATLAB, C#

Tools PyTorch, TensorFlow, Git, Apache Hadoop, Apache Spark, WandB, NumPy, Pandas, Matplotlib, MongoDB, Scikit-learn, LangChain, Hugging Face, Azure, GCP, AWS