

# SAMAR ABU HEGLY

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## EDUCATION

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### M.Eng. Computation and Cognition - Massachusetts Institute of Technology (MIT)

Jan 2024 - Sep 2025 | Cambridge, MA

- Thesis: Blocks Without Barriers: Making Blockly Accessible for Blind and Visually Impaired Students - [\[link\]](#)
- Advisor: Eric Klopfer.

### B.Sc. Computation and Cognition - Massachusetts Institute of Technology (MIT)

Sep 2018 - Jun 2023 | Cambridge, MA

## SKILLS

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**Programming Languages:** Python, TypeScript/JavaScript, R, Clojure, Java, C++, C#, WebPPL.

**ML/DS:** PyTorch, TensorFlow/Keras, Pandas; predictive modeling, deep learning, transfer learning, large language models (LLMs), computer vision, model evaluation.

**HCI:** User-centered design, accessibility (WCAG/UDL), IRB protocols, co-design, experimental design, data collection/analysis, survey design, usability testing.

## RESEARCH EXPERIENCE

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### Artificial Intelligence, Race and Evaluation (AIRE) Lab

Apr 2025 - Present | Remote

*Research Assistant*

- Contributed to the evaluation of a patented LLM-integrated assignment methodology designed to preserve students' higher-order and critical thinking skills; analysis-informed assessment design and implementation insights.
- Developed a qualitative codebook and conducted thematic coding of 100+ student artifacts; supported inter-rater reliability checks in collaboration with the research team.

### MIT Responsible AI for Computational Action (RAICA) Lab

Jan 2024 - Aug 2025 | Cambridge, MA

*Graduate Research Assistant*

- Designed and shipped two open-source Blockly accessibility plugins ([GitHub](#)), enabling independent programming for blind and low-vision students: a Web Speech API screen-reader plugin, a keyboard navigation plugin, and an event-driven coordination layer minimizing announcement latency and focus conflicts.
- Led an IRB-approved iterative co-design study across two phases; participants progressed from being unable to use the platform independently to successfully completing core Blockly navigation tasks without assistance.
- Standardized pilot study data across projects into a reusable dataset schema; automated data logging with Python scripts.

### MIT McGovern Institute for Brain Research

Jan 2020 - Feb 2021 | Cambridge, MA

*Undergraduate Research Assistant*

- Prototyped a Python-based image-analysis tool to automate stained-cell counting in confocal microscope brain scans, reducing manual counting effort for the research team.

## PUBLICATIONS

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- Bosch, C. A., Gustafson-Quiett, M. C., **Abu Hegly, S.**, Wharton, S., Masla, J., Guterman, L., Macatantan, C., Klopfer, E., Abelson, H., & Breazeal, C. (2025). Advancing Research on Equitable AI Education Through a Focus on Implementation: Insights from a Middle School Computer Vision Module Beta-Test. In Proceedings of the AAAI Conference on Artificial Intelligence, 39(28), 29120–29127.
- Masla, J., Bosch, C., Ravi, P., Guterman, L., Wharton, S., Gustafson-Quiett, M. C., **Abu Hegly, S.**, Macatantan, C., Klopfer, E., Breazeal, C., & Abelson, H. (2025). Supporting AI Literacy Teaching Through the Development of Assessments for Classroom Use. In Proceedings of the AAAI Conference on Artificial Intelligence, 39(28), 29178–29185.

## INDUSTRY EXPERIENCE

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### Inspirit AI

Mar 2021 - Present | Remote

*Instructor → Weekend Lead Program & Curriculum Manager*

- Taught foundational AI/ML concepts to 320+ students across 32+ cohorts; mentored student projects spanning object/cancer detection, distracted-driver analysis, and voice interfaces, guiding the full ML pipeline from data preparation and modeling through responsible-AI evaluation (bias, explainability).

- Maintained and redesigned portions of the AI/ML curriculum across cohorts; reviewed and debugged course materials and prepared instructor-facing resources, consistently receiving highly positive feedback from students and instructors.
- Progressed from Instructor to Program Manager, Curriculum Manager, and ultimately Weekend Lead roles; managed cohorts of 250+ students and led scheduling, onboarding, and coordination efforts to improve course delivery and student outcomes.
- Provided personalized 1:1 instruction to individual students, adapting AI/ML concepts to each learner's background and pace.

**Zaki**

Jun 2020 - Feb 2021 | Remote

*Software Developer Intern*

- Collaborated with the CTO to prototype a donation platform backend in Clojure; implemented and documented RESTful APIs supporting core platform functionality.

**Checkpoint**

Jun 2019 - Aug 2019 | Tel Aviv, Israel

*Software Developer Intern*

- Tested new software images; extended tests for new Wi-Fi features; wrote a script to automate a rotating lab plate used in testing.

## PROJECTS

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### Exploring Practical Applications for LLM-Generated Synthetic Data

- Designed and evaluated an LLM-based synthetic data pipeline across two use cases: tabular augmentation and human-behavior simulation, and proposed a reusable workflow and practical guidelines.
- Engineered prompt templates (zero-shot, few-shot, CoT) and ran ablation studies across prompt styles and context lengths; automated experiment tracking and visualization.
- Built an evaluation framework measuring synthetic data fidelity and utility via statistical distribution comparison, feature attribution stability, and downstream model performance against real-data baselines.

### Ethical AI in College Essay Scoring

- Built an AI-powered essay evaluation tool using GPT and Gemini to score personal statements across five qualities; fine-tuned GPT, achieving up to 79% classification accuracy on select traits.
- Implemented chain-of-thought reasoning for interpretability and conducted fairness audits to surface and analyze bias risks in AI-assisted admissions contexts.

### Language understanding with probabilistic programs: Modeling Course Success

- Built a Bayesian generative model predicting student success from study behaviors; designed and ran a 36-participant survey comparing model predictions against human intuition, finding statistically significant alignment.
- Explored LLM-based translation of natural-language observations into probabilistic programming code to improve model scalability.

### Computer-Aided Diagnosis: Advancing Diabetic Retinopathy Detection

- Developed a ResNet50-ViT hybrid model achieving 97% accuracy on the APTOS 2019 benchmark dataset.
- Designed a custom GradCAM-enhanced loss function and applied class-reweighting techniques to reduce model bias and improve sensitivity on underrepresented severity classes; implemented as a working end-to-end demo.

## TEACHING EXPERIENCE

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**Lab Assistant/Grader:** Introduction to Computer Science and Programming (6.00); Introduction to Neural Computation (9.40); Modeling with Machine Learning (6.C01).