Mark Mazumder

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Research Objective

My research objective is to establish efficient learning strategies and feature representations for multimodal tasks, in settings with limited and noisy training data.

Education

- **Harvard University**, Cambridge, MA. *PhD Candidate in Electrical Engineering.* Fall 2020-Present
  Advisor: Professor Vijay Janapa Reddi, Edge Computing Lab [link] GPA: 4.0
- **Harvard University**, Cambridge, MA. *Bachelor of Arts in Computer Science.* 2009

Selected Publications

- *DataPerf: Benchmarks for Data-Centric AI Development*. **M. Mazumder**, C. Banbury, X. Yao, B. Karlaš, W. Rojas, S. Diamos, G. Diamos, L. He, D. Kiela, D. Jurado, D. Kanter, R. Mosquera, J. Ciro, L. Aroyo, B. Acun, S. Eyuboglu, A. Ghorbani, E. Goodman, T. Kane, C. Kirkpatrick, T. Kuo, J. Mueller, T. Thrush, J. Vanschoren, M. Warren, A. Williams, S. Yeung, N. Ardalani, P. Paritosh, C. Zhang, J. Zou, C. Wu, C. Coleman, A. Ng, P. Mattson, V. Janapa Reddi. [arXiv:2207.10062]
- *Multilingual Spoken Words Corpus*. **M. Mazumder**, S. Chitlangia, C. Banbury, Y. Kang, J. Ciro, K. Achorn, D. Galvez, M. Sabini, P. Mattson, D. Kanter, G. Diamos, P. Warden, J. Meyer, V. Janapa Reddi. NeurIPS 2021 Track on Datasets and Benchmarks. [NeurIPS Proceedings] [Harvard News] [Dataset Download]
- *Few-shot Keyword Spotting in Any Language*. **M. Mazumder**, C. Banbury, J. Meyer, P. Warden, V. Janapa Reddi. INTERSPEECH 2021. [arXiv:2104.01454]
- *Towards an Autonomous Aerial Survey and Planning System for Humanitarian Aid and Disaster Response*. R. Allen, **M. Mazumder**. IEEE Aerospace Conference 2020. [doi:10.1109/AERO47225.2020.9172766]
- *Active Rendezvous for Multi-Robot Pose Graph Optimization using Sensing over Wi-Fi*. W. Wang, N. Jadhav, P. Vohs, N. Hughes, **M. Mazumder**, S. Gil. International Symposium on Robotics Research (ISRR) 2019. [arXiv:1907.05538]
- *Guaranteeing Spoof-Resilient Multi-Robot Networks*. S. Gil, S. Kumar, **M. Mazumder**, D. Katabi, D. Rus. Autonomous Robots 2017. [Journal Article] [MIT News] (subsumes our RSS 2015 paper)

Work Experience

Apple, Seattle WA May 2022 - Present
AI/ML Intern, *Machine Intelligence: Sensing*
Researching novel learning methods for improving supervision on multimodal time-series data.
- Characterized the effects of feature noise, label noise, and fusion strategies on multimodal data
- Designed a framework for controlled experiments on unimodal and multimodal model accuracy as the signal-to-noise ratio varies
- Designed curriculum learning algorithms to improve model representations for higher-noise modalities

Landing AI, Palo Alto CA Summer 2021
Intern, *Continuous Learning Team*
Developed and prototyped novel anomaly detection methods for visual inspection.
- Collaborated cross-functionally to distill high-level customer needs into concrete engineering requirements
- Leveraged data-centric ML and error analysis to systematically innovate and improve model
- Kick-started integration and deployment of anomaly detection models into customer-facing product features

MIT Lincoln Laboratory, Lexington MA 2012-2020

Associate Staff, *Group 104: Artificial Intelligence Software Architecture and Algorithms.*

- Served as co-PI on two autonomous navigation research efforts:
  - *Transferring Multi-Robot Learning through Virtual and Augmented Reality for Rapid Disaster Response*. Deploying Sim2Real visual navigation reinforcement learning policies without domain randomization.
  - *Resilient Perception in Degraded Environments*. Multi-agent mapping utilizing outlier-robust pose graph optimization and the physics of wireless signals for efficient coordination.
- Prior engineering roles include SmallSat flight software development, test and evaluation engineering for a DARPA program, and high-scale network traffic generation.

Workshop Activities

- *Co-organizer:* DataPerf Workshop. ICML 2022. [link].
- *Co-organizer:* Data-Centric AI Workshop. NeurIPS 2021. [link].
- *Invited Talk* 1000 Words in 1000 Languages. MLPerf-Bench, HPCA 2021 [link].
- *Co-organizer:* Perception, Action, Learning: From Metric-Semantic Scene Understanding to High-Level Task Execution. IEEE International Conference on Robotics and Automation (ICRA) 2020. [link]
- *Tutorial* Safe Client/Server Web Development with Haskell. Mark Mazumder, Tim Braje. IEEE SecDev 2016.

Teaching Activities

- *Head TF*, **Harvard University CS249r: Tiny Machine Learning**, Prof. Vijay Janapa Reddi Fall 2022
- *Contributor*, **Applications of TinyML, EdX** [edx.org], Prof. Vijay Janapa Reddi Fall 2020
- *Instructor*, **MIT 6.A01 Autonomous Racecar Robotics Seminar**, Prof. Sertac Karaman Fall 2019
  Website: `https://markmaz.com/racecar_fall19/`
- *Instructor*, **MIT Beaver Works Summer Institute: Autonomous Air Vehicle Racing** 2018-2019
  Website: `https://bwsi-uav.github.io/website/index.html`
- *Instructor*, **MIT NEET-AM Machine Learning Labs**, Prof. Sertac Karaman Spring 2019
  News: `https://blogs.nvidia.com/blog/2019/11/21/mit-quadro-data-science-workstations/`
- *Instructor*, **MIT 6.S184/16.S685 RACECAR**, Independent Activities Period January 2019
- *Instructor*, **MIT 16.S688 Autonomous Machines Seminar**, Prof. Sertac Karaman Fall 2018
- *Lab Assistant*, **MIT 16.30/16.31 Feedback Control Systems**, Prof. Sertac Karaman Fall 2018
- *Instructor*, **MIT 6.A01 Autonomous Racecar Robotics Seminar**, Prof. Sertac Karaman Fall 2017
- *Lab Assistant*, **MIT 6.829 Computer Networks**, Prof. Dina Katabi Fall 2015
- *Teaching Fellow*, **Harvard University CS161: Operating Systems**, Prof. Margo Seltzer Spring 2011