Mark Mazumder

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Research Objective

My research interests involve machine learning for perception with limited data, including few-shot classification and object detection, and resilient visual navigation in challenging environmental conditions.

Education

- **Harvard University**, Cambridge, MA. *PhD Candidate in Electrical Engineering.* 2020-Present
  Advisor: Professor Vijay Janapa Reddi, Edge Computing Lab https://edge.seas.harvard.edu/
  My current research explores data engineering and automatic dataset generation, with a focus on multilingual, multi-speaker keyword spotting models for low-resource languages.
- **Harvard University**, Cambridge, MA. *Bachelor of Arts in Computer Science.* 2009
- *Relevant Coursework:* CS249r Tiny Machine Learning, CS181 Intelligent Machines, MIT 6.869 Advances in Computer Vision

Selected Publications

- Towards an Autonomous Aerial Survey and Planning System for Humanitarian Aid and Disaster Response. Ross Allen, Mark Mazumder. IEEE Aerospace Conference 2020. [doi:10.1109/AERO47225.2020.9172766]
- Active Rendezvous for Multi-Robot Pose Graph Optimization using Sensing over Wi-Fi. Weiying Wang, Ninad Jadhav, Paul Vohs, Nathan Hughes, Mark Mazumder, Stephanie Gil. International Symposium on Robotics Research (ISRR) 2019. [arXiv:1907.05538]
- Guaranteeing Spoof-Resilient Multi-Robot Networks. Stephanie Gil, Swarun Kumar, Mark Mazumder, Dina Katabi, Daniela Rus. Autonomous Robots 2017. [Journal Article] [MIT News] (subsumes our RSS 2015 paper)

Work Experience

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.
- *Languages:* Python, Haskell, C++, C, Scala, JavaScript, Java. *Technologies:* TensorFlow, PyTorch, ORB-SLAM2, GTSAM, AWS, Docker, Flask, ZeroMQ.

Teaching Activities

- *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

Workshop Activities

- *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.