Kyle Vedder

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Education

- PhD in Computer Science, University of Pennsylvania (in progress) (2019 – Present)
  - Advisors: Eric Eaton, Dinesh Jayaraman, *GRASP Lab*
- BS in Computer Science, University of Massachusetts (2015 – 2019)
  - Advisor: Joydeep Biswas, *Autonomous Mobile Robotics Lab (AMRL)*

Research Interests

I believe the shortest path to getting robust, generally capable robots in the real world is though the construction of systems whose performance scales with compute and data, *without* requiring human annotations. The world is fundamentally 3D, but currently most vision systems focus on 2D data simply due to general availability of RGB images and strong hardware acceleration for standard processing methods (e.g. 2D convolutions). I am interested in building such scalable vision systems on top of 3D sensor data (e.g. LiDAR, Stereo) that reasons natively in 3D, in the hope that these 3D representations are more useful for quickly and robustly learning downstream behavioral tasks compared to their 2D counterparts.

Publications

Conferences/Journals

- **Kyle Vedder**, Eric Eaton. *Sparse PointPillars: Maintaining and Exploiting Input Sparsity to Improve Runtime on Embedded Systems.* Proceedings of the International Conference on Intelligent Robots and Systems (IROS), 2022. [website] [pdf]
- **Kyle Vedder**, Joydeep Biswas. *X*: Anytime Multi-Agent Path Finding For Sparse Domains Using Window-Based Iterative Repairs.* Artificial Intelligence (AIJ), 2021. [website] [pdf]
- **Kyle Vedder**, Joydeep Biswas. *X*: Anytime Multiagent Path Planning With Bounded Search.* Proceedings of the 18th International Conference on Autonomous Agents and MultiAgent Systems (AAMAS), 2019. [website] [pdf]

Workshops

- **Kyle Vedder**, Eric Eaton. *Sparse PointPillars: Exploiting Sparsity on Birds-Eye-View Object Detection.* Sparsity in Neural Networks Workshop (SNN), 2021. [poster]
- Spencer Lane, **Kyle Vedder**, Joydeep Biswas. *Augmenting Planning Graphs in 2-Dimensional Dynamic Environments With Obstacle Scaffolds.* Proceedings of the 5th Workshop on Planning and Robotics (ICAPS PlanRob), 2017. [pdf]

Tech Reports

- **Kyle Vedder**. *Current Approaches and Future Directions for Point Cloud Object Detection in Intelligent Agents.* 2021. [pdf] [slides] [video]
- **Kyle Vedder**. *An Overview of SHAP-based Feature Importance Measures and Their Applications To Classification.* 2020. [pdf] [slides] [video]
- **Kyle Vedder**, Edward Schneeweiss, Sadegh Rabiee, Samer Nashed, Spencer Lane, Jarrett Holtz, Joydeep Biswas, David Balaban. *UMass MinuteBots 2018 Team Description Paper.* 2018. [pdf]
- **Kyle Vedder**, Edward Schneeweiss, Sadegh Rabiee, Samer Nashed, Spencer Lane, Jarrett Holtz, Joydeep Biswas, David Balaban. *UMass MinuteBots 2017 Team Description Paper.* 2017. [pdf]

Academic Experience

- *Academic Reviewer* (2019 – Present)
  - AAAI 2020 – 2022, AAMAS 2021, JMLR (Secondary) 2021, ICRA 2022, JSA 2022, ICLR 2023

Industry Experience

- *Argo AI – Research Intern* (Summer / Fall 2022)

  - Exploring 2D and 3D methods for generalizing object detectors to the long tail of objects
- *Amazon Lab126 – Software Development Intern* (Summer 2019)
  - Worked on Amazon Astro, a small mobile service robot, doing novel classical multi-modal IR camera and ToF sensor fusion for detecting small obstacles such as wires or boxes to avoid collisions
- *Google – Software Engineering Intern* (Summer 2017)
  - Worked on Ads Quality Metrics team to deliver statistics about bad ads. Developed information theoretic optimization approach to aquire maximally diverse training data for automated detectors
- *Google – Software Engineering Intern* (Summer 2016)
  - Worked on AdWords Next Overview, the homepage of redesigned AdWords. Developed offline pipelines to do statistical analysis over entire customer dataset to provide automated insights
- *Unidesk Corporation – C++ Development Intern* (Summer 2015)
  - Designed and implemented testing framework for proprietary Windows registry manipulation APIs, ensuring bug-for-bug compatibility with Windows' implementation of fixed width UTF-16
- *Unidesk Corporation – Robotics Intern* (Summer 2014)
  - Worked with CTO and CMO to implement a trade show display using a 6DOF robot arm controlled via high level pick-and-place commands. Wrote Java backend to maintain world state and dynamically generate FORTH written over a serial bus to execute robot trajectories requested from high level RESTful API