Chittesh Thavamani

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EDUCATION

Pittsburgh, PA Aug 2022, GPA 4.0/4.0	**Carnegie Mellon University — Master of Science in Computer Science** *Selected Activities:* Head Teaching Assistant for Math Foundations for CS *Selected Coursework:* Learning for Embodied Action and Perception, Graduate AI, Theorist's Toolkit
Pittsburgh, PA May 2021, GPA 4.0/4.0	**Carnegie Mellon University — Bachelor of Science in Computer Science** *Selected Activities:* Teaching Assistant, Mayur SASA (Philanthropy Chair), Dancer's Symposium *Selected Coursework:* Visual Learning and Recognition, Computer Vision, Intro to Machine Learning, Robot Localization and Mapping, Algorithm Design and Analysis, Distributed Systems

RESEARCH EXPERIENCE

Researcher
Pittsburgh, PA
Dec 2020 — Aug 2022

CMU Argo AI Center for Autonomous Vehicle Research
- Developed a non-uniform subsampling method that exploits spatial and temporal priors to increase object detection performance in latency intensive settings like robotics and AV [2].
- Generalized the previous method to all tasks with 2D spatial input and all models with spatial features. Demonstrated accuracy-latency benefits empirically on object detection, semantic segmentation, and monocular 3D object detection [1].

Researcher
Pittsburgh, PA
Oct 2019 — Jan 2020

Robotics Institute Biorobotics Lab
- Developed and optimized a variant of the rapidly exploring random tree (RRT) path planning algorithm for use in tight constricted spaces with high degree of freedom robot systems.
- Implemented simulations and analyzed results in MATLAB.

Researcher
Rochester, MI
Aug 2015 — Dec 2017

Oakland University Mathematics Department
- Solved the strong matching preclusion problem for the Folded Petersen Cube in the context of its application to the vulnerability of interconnection networks [3].
- Presented at the 1126th American Mathematical Society Conference.

INDUSTRY EXPERIENCE

Perception SWE
San Francisco, CA
Apr 2023 — Present

Zipline International Inc.
- Deployed a semantic segmentation solution for package placement and obstacle avoidance. Built and maintained its modeling pipeline from data collection, annotation, ingestion, ontology evolution, training, model optimization, onboard deployment, to system validation and triage.
- Collaborated on a 3D data pipeline with stages for imu-camera calibration, lidar calibration, visual-inertial odometry, and 3D point cloud annotation.
- Helped improve the planner to 5x horizon lengths while maintaining runtime constraints.
- Developing an end-to-end perception model with directly-learned voxel occupancy, ESDF fields, temporal fusion, and intermediate semseg and stereo supervision.
- Revive and helped maintain a biweekly autonomy paper reading club.

Perception SWE
Mountain View, CA
Sep 2022 — Nov 2022

Nuro Inc.
- Developed an offline platform to simulate our tracker's post-processing heuristics. Used this to tune motion model hyperparameters and significantly improve velocity prediction.
- Implemented concurrency for the onboard tracker to reduce end-to-end latency.
- Started a project to integrate our track understanding and tracker models.

Algo Developer Intern
New York City, NY
June 2021 — Aug 2021

Hudson River Trading LLC
- Designed a cryptocurrency trading bot by discovering market signals and writing a robust order execution system. Traded $1M notional and made $500 with $35K capital over 5 days.
- Analyzed a news sentiment dataset, performed data cleaning and normalization, and found a profitable macroeconomic signal that trades forex and international equity index futures.

ML Intern
Pittsburgh, PA
June 2020 — Aug 2020

Zensors Inc.
- Improved multiple object tracking accuracy (MOTA) of our production model by 20% by implementing and tuning a maximum a posteriori estimator flow-based algorithm.
- Wrote a metrics, visualization, and logging Python library for all relevant ML tasks, including bounding box/keypoint detection, person re-identification, and tracking.

SWE Intern	**Google LLC**
New York City, NY	- Designed and implemented a full stack feature to expose a control center for a distributed caching server system on the Google Ads platform.
Jun 2019 — Aug 2019	- Reduced page loading time by 75% while streamlining the UI and preserving all functionality.
	- Unit tested new Java classes and Angular components; load tested new server.

TEACHING EXPERIENCE

Teaching Assistant	**Carnegie Mellon University School of Computer Science**
Pittsburgh, PA	- Responsible for teaching weekly recitations, grading homework assignments and exams, and hosting one-on-one office hours, for the following courses:
Aug 2019 — Dec 2021	- 15-151 Math Foundations for CS (Fall 2021, 2020, 2019)
	- 15-251 Great Ideas in Theoretical CS (Spring 2020)
	- Head Teaching Assistant for 15-151 in Fall 2021, for which I led staff meetings, wrote recitation content, and streamlined homework grading procedure for better consistency.

Teaching Assistant	**Art of Problem Solving Inc.**
San Diego, CA	- Fostered student mastery of concepts in Programming with Python and Number Theory by responding to questions and concerns through a live, online interface.
May 2018 — Aug 2019	- Evaluate solutions and provide constructive feedback on rigor and clarity.

PUBLICATIONS

[1] **Learning to Zoom and Unzoom**
IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2022.
Chittesh Thavamani, Mengtian Li, Francesco Ferroni, and Deva Ramanan.

[2] **FOVEA: Foveated Image Magnification for Autonomous Navigation**
IEEE/CVF International Conference on Computer Vision (ICCV) 2021.
Chittesh Thavamani, Mengtian Li, Nicolas Cebron, and Deva Ramanan.

[3] **Strong Matching Preclusion Problem of the Folded Petersen Cube**
International Journal of Computer Mathematics: Computer Systems Theory 2019.
Eddie Cheng, Spencer Liu, Chris Melekian, Karimah Sweet, Chittesh Thavamani, Freddie Zhao

SKILLS

- **Languages** | Python, Rust, C++, Java, Typescript, C, JavaScript, SML, MATLAB, HTML, CSS
- **Libraries** | PyTorch, Pandas, Jupyter, Symforce, Pytorch Lightning, Node.js, React.js, Express.js, jQuery, Flask
- **Tools** | Git, Unix, Bazel, AWS, Kubernetes, Docker, TensorRT, SQL, LaTeX

HONORS/AWARDS

- **Putnam Competition** | Top 500 in Nation | December 2018, 2019
- **USA Physics Olympiad** | Silver Medal | Top 100 in Nation | May 2018
- **USA Mathematics Olympiad** | Qualifier | Top 250 in Nation | April 2016, 2017
- **USA Computing Olympiad** | Gold Division | Top 1000 in Nation | December 2017
- **Siemens Competition** | Regional Finalist | Top 60 in Nation | December 2017