HARVARD
John A. Paulson
School of Engineering
and Applied Sciences

Course Offering: Fall 2019
Instructor: Prof. Vijay Janapa Reddi
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(Tentative) Research Paper List

Papers for Domain Specific Accelerators

1. M 9/16:
    a. Research Infrastructures for Hardware Accelerators Chapters 1,2,3,5,6
2. W 9/18:
    a. Darwin: A Genomics Co-processor Provides up to 15,000× acceleration on long read assembly: http://bejerano.stanford.edu/papers/p199-turakhia.pdf
    b. Q100: The Architecture and Design of a Database Processing Unit: http://arcade.cs.columbia.edu/q100-asplos14.pdf

Papers for End to End (E2E) Learning

1. W 10/9
    a. Air Learning: An AI Research Platform for Algorithm-Hardware Benchmarking of Autonomous Aerial Robots https://arxiv.org/abs/1906.00421
    b. DroNet: Learning to Fly by Driving: http://rpg.ifi.uzh.ch/docs/RAL18_Loquercio.pdf
2. M 10/14
    a. End to End Learning for Self Driving Cars https://arxiv.org/abs/1604.07316
    b. Autonomous inverted helicopter flight via reinforcement learning http://www.robotics.stanford.edu/~ang/papers/iser04-invertedflight.pdf
3. W 10/16
    a. Learning Dexterity: training a robot hand to manipulate physical objects https://openai.com/blog/learning-dexterity/ https://arxiv.org/abs/1808.00177
    b. Learning Hand-Eye Coordination for Robotic Grasping with Deep Learning and Large-Scale Data Collection https://arxiv.org/abs/1603.02199 https://ai.googleblog.com/2016/03/deep-learning-for-robots-learning-from.html
4. M 10/21
    a. DeepMimic: Example-Guided Deep Reinforcement Learning of Physics-Based Character Skills https://xbpeng.github.io/projects/DeepMimic/index.html
    b. Imitation Learning for Agile Autonomous Driving https://arxiv.org/abs/1709.07174

Papers for Perception/Mapping/Localization

1. M 10/28
    a. Movidius Chip for Computer Vision (MobileEye's chip): https://ieeexplore.ieee.org/abstract/document/7006377, https://ieeexplore.ieee.org/abstract/document/7478823
    b. Point Cloud Acceleration in Hardware for real time analysis https://www.cs.rochester.edu/horizon/pubs/micro19-tigris.pdf
2. W 10/30
    a. Learning to Fly by Crashing: https://arxiv.org/abs/1704.05588
    b. You Only Look Once (YOLO): State of the Art Object Detector https://arxiv.org/abs/1506.02640

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3. M 11/4
    a. SLAM Part 1 (background): https://ieeexplore.ieee.org/document/1638022
    b. SLAMBench: http://apt.cs.manchester.ac.uk/projects/PAMELA/tools/SLAMBench/
    c. OCTOMAP a state of the art mapping algorithm: https://link.springer.com/article/10.1007/s10514-012-9321-0
4. W 11/6
    a. FastDepth: Fast Monocular Depth Estimation on Embedded Systems and Navion: A 2mW Fully Integrated Real-Time Visual-Inertial Odometry Accelerator for Autonomous Navigation of Nano Drones http://navion.mit.edu/
    b. High-throughput Computation of Shannon Mutual Information on Chip and FSMI: Fast computation of Shannon Mutual Information for information-theoretic mapping http://navion.mit.edu/

Papers for Planning/Control

1. M 11/11
    a. Realtime Robotics: leveraging hardware acceleration for realtime PRM http://cs.brown.edu/people/gdk/pubs/plan_chip_micro.pdf http://people.ee.duke.edu/~sorin/papers/rss16_chip.pdf
    b. A Programmable Architecture for Robot Motion Planning Acceleration http://irl.cs.brown.edu/pubs/planchip_programmable.pdf
2. W 11/13
    a. PRM-RL: Combining Reinforcement Learning and Sampling-based Planning https://arxiv.org/abs/1710.03937
    b. Aggressive Deep Driving: Combining CNNs and MPC (note: we will discuss MPC during the Planning/Control Lectures) http://proceedings.mlr.press/v78/drews17a/drews17a.pdf
3. M 11/18
    a. RoboX: Codegeneration for fast embedded linear MPC: https://www.cc.gatech.edu/~hadi/doc/paper/2018-isca-robox.pdf
    b. Differentiable Physics and Stable Modes for Tool-Use and Manipulation Planning: http://www.roboticsproceedings.org/rss14/p44.pdf
4. W 11/20
    a. Optimization-based Locomotion Planning: Estimation, and Control Design for the Atlas Humanoid Robot: http://scottk.seas.harvard.edu/files/scottk/files/atlas-control.pdf

Papers for Simulated Conference Review Session

1. Autoware on Board: Enabling Autonomous Vehicles with Embedded Systems https://ieeexplore.ieee.org/document/8443742
2. A 64mW DNN-based Visual Navigation Engine for Autonomous Nano-Drones https://arxiv.org/abs/1805.01831
3. Adversarial Examples (for NN) Are Not Easily Detected: Bypassing Ten Detection Methods https://dl.acm.org/citation.cfm?Id=3140444
4. DeepPicar: DNN Autonomous Car with a Pi3: https://arxiv.org/pdf/1712.08644.pdf