

ANDREW T. HUNDT

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UNITED STATES CITIZEN

EDUCATION

Johns Hopkins University

Ph.D. Candidate, Computer Science with a focus on Robotics and Deep Learning

Johns Hopkins University

Masters of Science in Robotics

- Robot Devices, Kinematics, Dynamics, and Control (C++)
- Deep Learning TA (Python)
- Algorithms for Sensor Based Robotics (C++)
- Computer Vision (Python)
- Computer Integrated Surgery
- Augmented Reality

Carnegie Mellon University

B.S. School of Computer Science, Robotics Minor

Baltimore, MD

2014 - present

Baltimore, MD

2014 - 2018

Pittsburgh, PA

May 2009

RESEARCH

"Good Robot!": Efficient Reinforcement Learning for Multi-Step Visual Tasks with Sim to Real Transfer

The first instance of reinforcement learning with 100% successful sim to real transfer for long term multi-step tasks like block stacking and row making with consideration of progress reversal.

RA-L 2020

arxiv.org/abs/1909.11730

SharpDARTS: Faster and More Accurate Differentiable Architecture Search

Sets state of the art (SOTA) on the CIFAR-10 dataset and matches SOTA on ImageNet at mobile scale in March 2019. Proposes Differentiable Hyperparameter Search and Cosine Power Annealing.

Preprint

arxiv.org/abs/1903.09900

(under review)

The CoSTAR Block Stacking Dataset: Learning with Workspace Constraints

A dynamic robotics dataset which serves as a valuable resource to researchers across a broad range of topics. Proposes HyperTree Neural Architecture Search (NAS) for refining neural network models.

IROS 2019

arxiv.org/abs/1810.11714

CoSTAR: Instructing Collaborative Robots with Behavior Trees and Vision

Defines perception and spatial reasoning abstractions to enable end-users to create robust task plans.

ICRA 2017

arxiv.org/abs/1611.06145

Winner of the 2016 KUKA Innovation Award in a competition on flexible manufacturing.

User Experience of the CoSTAR System for Instruction of Collaborative Robots

A user study showing the CoSTAR flexible manufacturing system is effective for specifying task plans.

IROS 2017

arxiv.org/abs/1703.07890

EXPERIENCE

X, "The Moonshot Factory" and part of Alphabet, Google's parent company. [x.company](#)

Robotics Ph.D. Intern

Mtn. View, CA

Summer 2016

- Primarily worked on a confidential, undisclosed "moonshot" project aiming to change the world.
- Contributed to a deep learning grasping project, improving the runtime of TensorFlow based algorithms. Visit is.gd/armfarm and arxiv.org/abs/1603.02199 for a relevant blog post and their paper published prior to my internship.
- Independently stepped up to solve pressing needs articulated informally by coworkers on each separate project.

Carnegie Mellon University, Robotics Institute, National Robotics Engineering Center

Pittsburgh, PA

Robotics Engineer

2010 - 2014

- Researched, developed, and field tested autonomous tractors for John Deere in field and orchard environments.
- Improved feature map data structures and geometric features for use in SVM based obstacle and vegetation classifiers.
- Proposed, designed and implemented a prior maps system that uses Geographic Information System (GIS) data for on the fly perception algorithm parameter selection to tune detection of unknown obstacles.
- Designed and implemented multidimensional C++ iterator library, similar to TensorFlow tensors, for generic raster map processing algorithms. Extends GIL, a library in the Boost C++ Libraries, via C++ template metaprogramming for dimensional conversion. Integrated Boost Geometry for polygon support.
- Collaborated on design and implementation of a core algorithm to detect geometric slope in sensor data, which is subsequently used in SVM classifier to identify obstacles around a robot. It is designed to operate correctly on heterogeneous sensor data types including laser and stereo data. It is implemented with the iterator library above.
- C++ technical lead, collaborated with multiple project PIs on the widely used internal NREC CoreTech libraries.
- Designed and implemented autonomous tractor tele-supervision control, plus the project asynchronous C++ architecture with highly reusable abstractions for drivers, communication, logger, and algorithm interfaces.
- Redesigned a traveling salesman problem solver, then closely supervised an intern working on improvements to minimize the distance traveled for an autonomous tractor that must cover all rows of an orchard.
- Diagnosed difficult to detect hardware memory corruption of embedded controllers.
- Designed then collaborated on `static_vector`, a sequence container like `std::vector` that is allocated like `std::array`. Accepted to peer reviewed Boost C++ library. Visit: is.gd/BoostSV Ack: is.gd/geometryack is.gd/containerack

TerraSim, Inc.

Pittsburgh, PA

Software Engineer, hired after 2008 Summer Internship

2009 - 2010

- Led user interface development for TerraSim Xtract 1.0 and 1.1. Optimized geodatabase conversion by a factor of 10.

National Aeronautics and Space Administration (NASA)

Moffett Field, CA

Summer Intern

2006, 2007

- Designed and implemented a modular, multithreaded robotic arm control architecture in C++.
- Developed a robotic arm avionics system and a hot-swappable power source for the K10 mobile robot platform.