

YUNCHU ZHANG

Email: yunchuz@andrew.cmu.edu Mobile: +1 3109231784

Github : <https://github.com/YunchuZhang> ♦ Website : <https://yunchuzhang.github.io/>

EDUCATION

Carnegie Mellon University (CMU) School of Computer Science, Robotics Institute Master of Science Major : Robotics	Aug 2020 – 2022 GPA – 4.16/4.0
University of California, Los Angeles (UCLA) Master of Science Department of Mechanical & Aerospace Engineering Major : Robotics & Control	Sept 2017 – June 2019 GPA – 3.84/4.0
Dalian University of Technology (DUT) Bachelor of Science School of Electrical Engineering Major : Automation	Sept 2013 – June 2017 GPA – 3.81/4.0
School of Software Technology Major : Software Engineer	Sept 2014 – June 2017 Sept 2013 – June 2014

RESEARCH EXPERIENCE

Visually-Grounded Library of Behaviors for Generalizing Manipulation Across Objects and Views

Submitted and Under reviewed by ICRA 2021

Advisor : Katerina Fragkiadaki & Chris Atkeson (CMU) Nov 2019 – July 2020

- Build a behavior selector which conditions on the *invariant* object properties to select the behaviors that can successfully perform the desired tasks on the object in hand
- Generated and collected a library of behaviors each of which conditions on the *variable* object properties to predict the manipulation actions over time.
- Extracted semantically-rich and affordance-aware view-invariant 3D object feature representations through self-supervised geometry-aware 2D-to-3D neural networks.

Intelligent Aerial manipulator system

Advisor : Xiang Anthony Chen (UCLA) Oct 2018 – Mar 2019

- Based on 3D printed robot-arm and drone to build aerial manipulator system and make it hover with PID control and motion planning algorithms in ROS.
- Utilize deep neural network to train an offline grasps network for grasp position prediction.

Robotics research Intern at DMAI

Advisor : Yixin Zhu, Research Director(DMAI) June 2018 – Sept 2018

- Build red-ball tracking system with several motors, 3D-printed links, Raspberry Pi and Pi camera.
- Solved inverse kinematic problem for self-designed humanoid robot's neck in ROS and achieve real-time neck tracking with human's gaze info.
- Based on Monocular-ORB-Slam algorithm to scan current environment scene and build surrounding environment map for robots.

Control for Robotics system: Solving Rubik's Cube with robot arm and motor

Advisor : Veronica Santos (UCLA) April 2018 – June 2018

- Based on web-camera to detect randomly shuffled Rubik's cube and sent motion command's solution to robot arm.
- Generated trajectory and made position planning for robot arm's end effector and solved IK problem.
- Utilized PID position control to rotate Rubik's Cube and realized real-time Gripper's force control to grasp Rubik's Cube.

Artificial Intelligence Course Project: Reinforcement Learning method for locomotion

Advisor : Demetri Terzopoulos (UCLA) Jan 2018 – March 2018

- Implemented Asynchronous Advantage Actor-Critic (A3C) algorithm and evolution strategy in complex environment (a sequence of challenging terrain with rough ground, stumps, pitfalls, and stairs) with good results and satisfying accumulated rewards.
- Comparing these two algorithms and add LSTM to A3C algorithm to gain stable natural behavior in more complex environment where a sequence of terrain are random generated.

Image based Object Detection System for Self-driving Cars Application

Advisor : Si Yuan (Google)

Feb 2018 – March 2018

- Utilize Yolo algorithm to construct special neural network model (utilize Resnet to extract basic image information and then with new designed network frame) update a new loss function, train the network on GPU and tune parameters to converge and optimize the result.
- Optimize feedforward inference network and realize object detection and tracking in real time on Raspberry with its Pi camera.

RELEVANT COURSEWORK

Kinematics & Dynamics of Robotic Systems	Probability & Statistics	Machine Learning
Data Structure & Algorithms	Automotive Control	Single Chip Microcomputer

SKILLS

Algorithms: Machine Learning and Deep learning algorithm, Computer vision, Dynamic system control, Extended Kalman Filter, Motion Planning, Reinforcement learning

Software Skills: C/C++, Python, ROS, Matlab, Labview, Embedded programming, Tensorflow, Pytorch, OpenCV, Zeromq

Hardware Skills: PCB circuit design, embedded system designing

COMPETITIONS AND AWARDS

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- **Freescale Smartcar Competition**
Regional Second Prize **Sep.2014 — June 2015**
 Wrote the algorithms for different stages to identify the racing track from environment information, based on PID algorithm to control speed.
 Equipped the smart car with sensors such as accelerometer to avoid obstacles and pass over the ramp.
 - **Electronic Design Competition (Research on blind pendulum) DUT**
Nationwide Second Prize **July 2015 — Aug.2015**
 Research on blind pendulum, building model, and spatial 3-D analysis.
 Collected the attitude of wind pendulum, processed the data with SCM, and regulated wind force by position from PID closed-loop.