

# Yang Yang

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☎ (651) 210-0440   ✉ [yang5276@umn.edu](mailto:yang5276@umn.edu)   🌐 [st2yang.github.io](https://st2yang.github.io)   🌐 [github.com/st2yang](https://github.com/st2yang)

## EDUCATION

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**Doctor of Philosophy, Computer Science** *Expected 05/2022*

University of Minnesota (UMN), Minneapolis

UMII-MnDRIVE Graduate Fellowship

Dissertation: Target-Driven Robotic Manipulation with Visual Attribute Reasoning

**Bachelor of Engineering, Energy and Power Engineering** *2011 - 2015*

Huazhong University of Science and Technology (HUST), Wuhan, China

## EXPERIENCE

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**Mitsubishi Electric Research Laboratories, Cambridge, MA** *05/2020 - 08/2020*

*Research Intern, Host: Dr. Siddarth Jain*

- Developed deep reinforcement learning (RL) algorithms for contact-rich robotic manipulation
- Built a hierarchical RL-based policy of deep Q-learning (DQN) and soft actor-critic (SAC) models
- Applied a graph neural network (GNN) based visual state encoder

**Google, Mountain View, CA** *07/2018 - 08/2018*

*Visual-Inertial System Engineer (contractor), Host: Dr. Stergios Roumeliotis*

- Initiated a visual tracking and mapping (SLAM) system for Phone-based AR
- Wrote a C++ visual RANSAC library for camera pose estimation
- Implemented an image selection algorithm based on multiple RANSAC's

## SELECTED PROJECTS

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### One-Shot Target Object Detection

- Adapted Mask R-CNN to perform category-agnostic instance segmentation on RGB-D images; achieving 0.763 AP (Fine-tuned Mask R-CNN baseline: 0.385 AP)
- Implemented a Siamese Network trained with triplet loss for target template matching
- Visualized activation maps and t-SNE clustering for analysis

### Referring Expression Comprehension and Generation

- Fine-tuned Visual-Linguistic BERT on RefCOCO dataset to localize a language-referred image region; achieving 0.874 accuracy (SOTA performance: 0.886)
- Trained a language generator to generate referring captions for the image region
- Experimented with different models (LSTM, GRU, and Transformer) for image captioning

## SKILLS & COURSES

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**Programming:** Python, Matlab, C/C++, CMake, Linux, Bash, Git, SQL, Docker,  $\LaTeX$

**Machine Learning:** PyTorch, Tensorflow, Keras, scikit-learn, PyTorch Geometric, Ray

**Robotics:** OpenCV, Open3D, PCL, ROS, Gym, MuJoCo, V-REP

**Courses:** Statistical and Deep Learning, Reinforcement Learning, Computer Vision, Natural Language Processing, Convex and Nonlinear Optimization, Operating Systems, Sensing and Estimation

## SELECTED PUBLICATIONS

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Yang et al., "Interactive Robotic Grasping with Attribute-Guided Disambiguation", IEEE International Conference on Robotics and Automation (ICRA), 2022 [[PDF](#), [website](#)]

Yang et al., "Attribute-Based Robotic Grasping with One-Grasp Adaptation", IEEE International Conference on Robotics and Automation (ICRA), 2021 [[PDF](#), [website](#)]

Yang et al., "A Deep Learning Approach to Grasping the Invisible", IEEE Robotics and Automation Letters (RA-L), 2020 [[PDF](#), [website](#), [code](#)]