

Curriculum Vitae

Xu Xie

➤ Contact Information

9434, Boelter Hall, University of California, Los Angeles

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➤ Education

- **Sep. 2016– Now**, Graduate with major of Statistics, UCLA
- **Sep. 2015 – Now**, Graduate with major of Electrical Engineering, UCLA
- **Sep. 2011 – Jun.2015**, Undergraduate with major of Computer Engineering, School for the Gifted Young, University of Science and Technology of China(USTC), China

➤ Research Interests

- Virtual Reality based Robot Learning
- Game Engine Simulation
- Reinforcement Learning
- Robot Visual Perception

➤ Honors & Awards

- The **Best Paper** Award for VRGym: A Virtual Testbed for Physical and Interactive AI, Association for Computing Machinery Turing Celebration Conference (ACM TURC), 2019
- Nvidia GPU Donation Program for Researchers, 2018
- The Young Fellow Scholarship Award for Excellent Undergraduate Students of MS-IEEE, Microsoft Research Asia (MSRA), 2015
- Honorable Title of Excellent Graduated Student of USTC, selected among All undergraduate students, Less than 10%, USTC, 2015
- The 1st Place of the Robot Game competition, USTC, 2013

➤ Working Experiences

- **Sep.2016 – Now**, Center for Vision, Cognition, Learning and Autonomy (VCLA), Stats & CS department, University of California, Los Angeles
- **Sep.2015 – Aug.2016**, Quantum Optics and Computation Research, supervised by Prof. Cheewei Wong, Mesoscopic Optics and Quantum Electronics Laboratory, EE department, University of California, Los Angeles
- **Jun.2014 – Sep.2014**, Summer Internship Project of Unmanned Autonomous UAVs, supervised by Dr. Ashutosh Natraj & Prof. Daniel Kroening, CS department, Oxford University, UK
- **Oct.2013 – Mar.2015**, Multimedia Retrieval and Machine Learning Research, supervised by Prof. Wengang Zhou & Prof. Houqiang Li, Information Processing Laboratory, University of Science and Technology of China, collaborate with Multimedia Search and Mining Group, Microsoft Research Asia (MSRA)

➤ **Publications**

X. Xie*, H. Liu, Z. Zhang, Y. Qiu, F. Gao, S. Qi, Y. Zhu, and S.-C. Zhu

VRGym: A Virtual Reality Testbed for Physical and Interactive AI.

1st Association for Computing Machinery Turing Celebration Conference (ACM TURC), 2019

H. Liu*, Z. Zhang*, **X. Xie**, Y. Zhu, Y. Liu, Y. Wang, and S.-C. Zhu

High-Fidelity Grasping in Virtual Reality using a Glove-based System

36th International Conference on Robotics and Automation (ICRA), 2019

X. Xie*, H. Liu*, M. Edmonds, F. Gao, S. Qi, Y. Zhu, B. Rothrock, and S.-C. Zhu

Unsupervised Learning of Hierarchical Models for Hand-Object Interactions using Tactile Glove.

35th International Conference on Robotics and Automation (ICRA), 2018

H. Liu*, Y. Zhang*, W. Si, **X. Xie**, Y. Zhu, and S.-C. Zhu

Interactive Robot Knowledge Patching using Augmented Reality.

35th International Conference on Robotics and Automation (ICRA), 2018

M. Edmonds*, F. Gao*, **X. Xie**, H. Liu, Y. Zhu, B. Rothrock, and S.-C. Zhu

Feeling the Force: Integrating Force and Pose for Fluent Discovery through Imitation

Learning to Open Medicine Bottles.

30th International Conference on Intelligent Robots and Systems (IROS), 2017

H. Liu*, **X. Xie***, M. Millar*, M. Edmonds, F. Gao, Y. Zhu, V. J. Santos, B. Rothrock, and S.-C. Zhu

A Glove-based System for Studying Hand-Object Manipulation via Pose and Force Sensing.

30th International Conference on Intelligent Robots and Systems (IROS), 2017

X. Xie*, W. Zhou (USTC), H. Li (USTC), Q. Tian (UTSA)

Rank-aware Graph Fusion with Contextual Dissimilarity Measurement for Image Retrieval.

25th IEEE International Conference on Image Processing (ICIP), 2015

➤ Projects

1. Aug 2017 - Now, VRGym: A Virtual Reality Testbed for Physical and Interactive AI

- ◆ A comprehensive VR platform -- VRGym: integrates various VR hardware and ever-rich virtual scenes to emulate human-object interactions which achieve ever-realistic level
- ◆ VRGym creates task-rich and data-rich environments, with underlying physics simulation powered by UE4, various autonomy levels of tasks could be performed such as path planning and coffee making
- ◆ VRGym provides a ROS-UE4 communication bridge such that popular robotics framework is compatible with virtual environment and human is able to interact with robots inside virtual scene

2. Mar 2018 - Now, GTA VP²: A Dataset for Multi-Agent Path Prediction under Safety-Critical Scenarios

- ◆ Design a new dataset that targets on highly interactive urban environments for safety-critical scenarios involving multiple pedestrians and other vehicles
- ◆ The dataset is built on GTA game engine and contains thousands of agents' trajectories can be trained for autonomous agents to learn to safely drive in complex environments with multiple agents of different intentions
- ◆ Develop a modding toolkit for further crafting the dataset. It enables scalability to generate large volume of data for road conditions rarely captured in existing datasets
- ◆ Propose a new multi-agent path prediction model that achieves comparably better performance on this dataset than previous methods

3. Mar 2017- Aug 2017, Unsupervised Learning of Hierarchical Models for Hand-Object Interactions using Tactile Glove

- ◆ Present a general approach for unsupervisedly learn a stochastic grammar of hand-object interaction tasks
- ◆ Hand manipulating data are captured by a senso tactile glove by using Vicon Motion Capture system
- ◆ The Hierarchical Clustering algorithm is applied to obtain motion primitives and followed by Clustering Analysis refinement process
- ◆ Sequence of atomic actions are then composed into a temporal frame of knowledge(T-AOG) with respect to grammar induction to generalize the structure of hand-object task realization

4. Mar 2014 - Dec 2014, Rank-aware Graph Fusion with Contextual Dissimilarity Measurement for Image Retrieval

- ◆ Effectively combine the advantages of different types of features to remarkably enhance the retrieval precision by fusing on ranking-graphs
- ◆ Individual graph like structure is expanded according to ranking results. The whole framework could be executed efficiently in unsupervised manner
- ◆ Performance on two different datasets: N-S=3.85(ukbench), mAP=83.15%(Holidays) which are notably higher than prevalent retrieval methods

5. Feb 2018 - Now, Game Engine Study in Grand Theft Auto (GTA) Environment

- ◆ Authentic outdoor scenes and environment are suitable for large scale virtual simulation tasks, with agent behaves way natural during interaction
- ◆ OPENIV and SCRIPTHOOK provide interfaces to statically or dynamically parsing the game progress, the customized SDK built under Visual Studio increases extendibility
- ◆ Implemented the initial version of plugin to record on scene 4DHOI pose dataset
- ◆ Implemented the initial intention prediction trial with real-time heatmap effect and automobile driving

6. Oct 2017 - Now, Reinforcement Learning Methods Library

- ◆ Implement state-of-art RL method in a consistent architecture so that common modules are handy to be integrated
- ◆ Both discrete/continuous action space are considered as well as the RL worker cases including single GPU or multi-process asynchronous methods
- ◆ Already applied on several OpenAI Gym environment such as Cartpole, Pixel Atari and Roboschool

7. Mar 2016 - Jun 2016, Work on Quantum Computing Tool — LiQui|>

Advisor: Prof. Cheewei Wong(UCLA)

- ◆ LiQui|> translates a quantum algorithm written in form of a high-level program into the low-level machine instructions for a quantum device
- ◆ Successfully simulate on generating 23-qubit entangled states written in Microsoft F# language, illustrated by the corresponding quantum circuit
- ◆ Explore the feasibility of bridging quantum Fourier transforms with classical convolution operation such that qubits operation accelerates the CNN training process.

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9. June 2014 - Sep 2014, Internship of Autonomous Mapping with Quad-rotor UAVs

Advisor: Dr. Ashutosh Natraj, Prof. Daniel Kroening(Oxford University)

- ◆ Developed the software on ROS platform to learn a map using a vision-based quadrotor UAV with a focus on indoor use-case
- ◆ The indoor map is implemented by using the strategy of reinforcement learning. EKF (Extended-Kalman Filter) assists with the map computation, followed by a planning algorithm to navigate in the environment
- ◆ The task fulfilled by the AR drone aims to detect one specific pattern (red rectangular paper stucked on one's back), simple neural network is trained to determine whether the pattern is inside the frame