Xu **Xie**

Artifical Intelligence · Robotics · Virtual Reality

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Education

University of California, Los Angeles — *Los Angeles, CA*

Ph.D. in Statistics, Center of Vision, Cognition, Learning, and Autonomy (VCLA); Advisor: Prof. Song-Chun Zhu — *Sep 2017 - Dec 2020*

University of California, Los Angeles — *Los Angeles, CA*

M.S. in Electrical Engineering; Advisor: Prof. Cheewei Wong — *Sep 2015 - Jun 2017*

University of Science and Technology of China (USTC) — *Hefei, China*

B.S. in Electronic Information Engineering; School for the Gifted Young — *Aug 2011 - Jul 2015*

Research Interests

Robotics	Robot learning through simulation environment
(Inverse) Reinforcement Learning	Learning from demonstration and robot skill learning
Intention Prediction	Modeling agent intention in driving scenario
Virtual Reality	Autonomous agent training in virtual reality

Publications

[11] M. Edmonds*, F. Gao*, H. Liu*, **X. Xie***, S. Qi, B. Rothrock, Y. Zhu, Y. Wu, H. Lu, S.C. Zhu.
"A Tale of Two Explanations: Enhancing Human Trust by Explaining Robot Behavior," *Science Robotics 2019.*

[10] **X. Xie***, C. Li*, C. Zhang, Y. Zhu, S.C. Zhu. ***Oral Pres.***
"Learning Virtual Grasp with Failed Demonstrations via Bayesian Inverse Reinforcement Learning," *IROS 2019.*

[9] **X. Xie***, H. Liu*, Z. Zhang, Y. Qiu, F. Gao, S. Qi, Y. Zhu, S.C. Zhu. ***Oral Pres.***
"VRGym: A Virtual Testbed for Physical and Interactive AI (**Best Paper**)," *ACM TURC 2019.*

[8] X. Gao, R. Gong, T. Shu, **X. Xie**, S. Wang, S.C. Zhu.
"VRKitchen: an Interactive 3D Environment for Learning Real Life Cooking Tasks," *ICML Workshop 2019.*

[7] H. Liu*, Z. Zhang*, **X. Xie**, Y. Zhu, Y. Liu, Y. Wang, S.C. Zhu.
"High-Fidelity Grasping in Virtual Reality using a Glove-based System," *ICRA 2019.*

[6] F. Hung*, **X. Xie***, A. Fuchs*, M. Walton, S. Qi, Y. Zhu, D.Lange, S.C. Zhu.
"Intention-based Behavioral Anomaly Detection," *AAAI Workshop 2019.*

[5] **X. Xie***, H. Liu*, M. Edmonds, F. Gao, S. Qi, Y. Zhu, B. Rothrock, S.C. Zhu.
"Unsupervised Learning using Hierarchical Models for Hand-Object Interactions," *ICRA 2018.*

[4] H. Liu*, Y. Zhang*, W. Si, **X. Xie**, Y. Zhu, S.C. Zhu.
"Interactive Robot Knowledge Patching using Augmented Reality," *ICRA 2018.*

[3] M. Edmonds*, F. Gao*, **X. Xie**, H. Liu, S. Qi, Y. Zhu, B. Rothrock, S.C. Zhu. ***Oral Pres.***
"Feeling the Force: Integrating Force and Pose for Fluent Discovery through Imitation Learning to Open Medicine Bottles," *IROS 2017.*

[2] H. Liu*, **X. Xie***, M. Millar, M. Edmonds, F. Gao, Y. Zhu, V. Santos, B. Rothrock, S.C. Zhu. ***Oral Pres.***
"A Glove-based System for Studying Hand-Object Manipulation via Joint Pose and Force Sensing," *IROS 2017.*

[1] **X. Xie***, W. Zhou, H. Li, Q. Tian ***Oral Pres.***
"Rank-Aware Graph Fusion with Contextual Dissimilarity Measurement for Image Retrieval," *ICIP 2015.*

(* indicates equal contribution)

Research

Virtual Reality Testbed for Physical and Interactive AI — *Los Angeles, CA*

Graduate Student Researcher; Center for Vision, Cognition, Learning, and Autonomy (VCLA) — *Sep 2017 - Present*

- A comprehensive VR platform -- VRGym: ingetrates 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 PhysX, various autonomy levels of tasks could be performed such as path planning and compositional tasks.
- VRGym provides a ROS-UE4 communication bridge such that popular robotics framework is compatible with virtual environment and human is to able to interact with robots inside virtual scene.

GTA VP^2: A Dataset for Multi-Agent Path Prediction under Safety-Critical Scenarios *Los Angeles, CA*

Graduate Student Researcher; Center for Vision, Cognition, Learning, and Autonomy (VCLA) *Mar 2018 - Present*

- Design a new dataset that targets on highly interactive urban simulation environments for safety-critical scenarios involving multiple vehicles and pedestrains.
- The dataset contains ground truth of 3D agents trajectories, along with real-time RGB, depth frames serves the purpose of agent intention prediction.
- Develop a modding toolkit to increase scalability by manipulating game agents.
- Propose a new path prediction model that achieves comparably better performance than previous methods.

Unsupervised Learning of Hierarchical Models for Hand-Object Interactions using Tactile Glove *Los Angeles, CA*

Graduate Student Researcher; Center for Vision, Cognition, Learning, and Autonomy (VCLA) *Sep 2016 - Sep 2017*

- Present a general approach for unsupervisedly learn a stochastic grammar of hand-object interaction tasks.
- Capture hand manipulating data by self-made tactile glove in Vicon Motion Capture system.
- Sequence of atomic actions are composed into a temporal frame of knowledge (T-AOG) by grammar induction to generalize the structure of hand-object task realization.

Reinforcement Learning Library *Los Angeles, CA*

Graduate Student Researcher; Center for Vision, Cognition, Learning, and Autonomy (VCLA) *Oct 2017 - Present*

- Implement state-of-art RL method in a consistent architecture so that common modules are handy to be integrated.
- Multi-GPU or multi-process asynchronous methods developed to support different training features.
- Can easily run on simulation environment such as VRGym, OpenAI Gym, Mujoco .etc.

Experience

International Center for AI and Robot Autonomy *Los Angeles, CA*

Robotics Research Engineer Intern *Mar 2018 - Present*

- Working on VRGym platform development for robotics research on physical and interactive AI.
- Working on Game Engine environment to study the autonomous driving topics.

Mesoscopic Optics and Quantum Electronics Laboratory *Los Angeles, CA*

Research Intern *Sep 2015 - Jun 2016*

- Worked on quantum computing algorithms in form of high-level program LiQui|>.
- Entangled quantum states simulation in Microsoft F#.

Computer Science Department, Oxford University *Oxford, UK*

Research Intern *Jun 2015 - Sep 2015*

- Developed the software on ROS platform to learn a map using a vision-based quadrotor UAV.
- Applied EKF assists with the map computation, followed by a planning algorithm to fulfill indoor navigation.

Skills

Programming C/C++, Python, Java, Shell, CUDA, LaTeX, Matlab, Javascript, HTML5, CSS

Topics Machine Learning, (Inverse) Reinforcement Learning, Statistical Modeling, Deep Learning

Honors & Awards

2019 **Student Best Paper Award**, ACM TURC *Chengdu, China*

2018 **GPU Donation Program for Researchers**, NVIDIA *Los Angeles, CA*

2018 **RAS Travel Grant**, ICRA *Brisbane, Australia*

2015 **Young Fellow Scholarship Award**, MS-IEEE, Microsoft Research Asia *Beijing, China*

2015 **Honorable Title of Excellent Undergraduate Students**, USTC *Hefei, China*

2013 **The 1st Place of Robot Game Competition**, USTC *Hefei, China*

Invited Talks

From Big Data to Big Task: VRGym, A Virtual Reality Testbed for Physical and Interactive AI *Long Beach, CA*

CVPR Workshop: 3D Scene Understanding for Vision, Graphics and Robotics *Jun 2019*

VRGym: A Virtual Reality Testbed for Physical and Interactive AI *Chengdu, China*

ACM TURC Oral Presentation *May 2019*