Yu Xiang

Contact Information

Assistant Professor
Department of Computer Science
The University of Texas at Dallas
800 W. Campbell Road, Richardson, TX 75080

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http://yuxng.github.io/
Google Scholar
GitHub

Research Interests

Robotics, Computer Vision, Machine Learning, Deep Learning

Education

University of Michigan, Ann Arbor, Michigan, USA — Sep 2010 – Dec 2015
Ph.D. in Electrical Engineering: Systems
Dissertation: 3D Object Representations for Recognition
Advisor: Prof. Silvio Savarese

Fudan University, Shanghai, China — Sep 2007 – Jul 2010
M.S. in Computer Science
Dissertation: Graphic Models for Semantic Context Modeling in Automatic Image Annotation
Advisor: Prof. Xiangdong Zhou

Fudan University, Shanghai, China — Sep 2003 – Jul 2007
B.S. in Computer Science

Experience

The University of Texas at Dallas, Richardson, Texas, USA — Aug 2021 – present
Assistant Professor

NVIDIA Research, Seattle, Washington, USA — Jun 2018 – Jul 2021
Senior Research Scientist

NVIDIA Research, Seattle, Washington, USA — Jan 2018 – May 2018
Postdoctoral Researcher

University of Washington, Seattle, Washington, USA — Aug 2016 – Dec 2017
Postdoctoral Researcher
- Advisor: Prof. Dieter Fox

Stanford University, Stanford, California, USA — Jan 2016 – Jul 2016
Postdoctoral Researcher
- Advisor: Prof. Silvio Savarese

Stanford University, Stanford, California, USA — Sep 2013 – Dec 2015
Visiting Student Researcher
- Advisor: Prof. Silvio Savarese

NEC Laboratories America, Inc., Cupertino, California, USA — Jun 2015 – Sep 2015, May 2014 – Aug 2014
Summer Research Intern
- Department: Media Analytics

Publications

1. **Goal-Auxiliary Actor-Critic for 6D Robotic Grasping with Point Clouds**
Lirui Wang, **Yu Xiang** and Dieter Fox
In *arXiv*, 2021.

2. **DexYCB: A Benchmark for Capturing Hand Grasping of Objects**
Yu-Wei Chao, Wei Yang, **Yu Xiang**, Pavlo Molchanov, Ankur Handa, Jonathan Tremblay, Yashraj Narang, Karl Van Wyk, Umar Iqbal, Stan Birchfield, Jan Kautz and Dieter Fox
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021.

3. **RGB-D Local Implicit Function for Depth Completion of Transparent Objects**
Luyang Zhu, Arsalan Mousavian, **Yu Xiang**, Hammad Mazhar, Jozef van Eenbergen, Shoubhik Debnath and Dieter Fox
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021.

4. **Learning Composable Behavior Embeddings for Long-horizon Visual Navigation**
   Xiangyun Meng, **Yu Xiang** and Dieter Fox
   In *IEEE Robotics and Automation Letters (RA-L)*, 2021.

5. **Unseen Object Instance Segmentation for Robotic Environments**
   Christopher Xie, **Yu Xiang**, Arsalan Mousavian and Dieter Fox
   In *IEEE Transactions on Robotics (T-RO)*, 2021.

6. **PoseRBPF: A Rao-Blackwellized Particle Filter for 6D Object Pose Tracking**
   Xinke Deng, Arsalan Mousavian, **Yu Xiang**, Fei Xia, Timothy Bretl and Dieter Fox
   In *IEEE Transactions on Robotics (T-RO)*, 2021.

7. **Learning RGB-D Feature Embeddings for Unseen Object Instance Segmentation**
   Yu Xiang, Christopher Xie, Arsalan Mousavian and Dieter Fox
   In *Conference on Robot Learning (CoRL)*, 2020.

8. **Manipulation Trajectory Optimization with Online Grasp Synthesis and Selection**
   Lirui Wang, **Yu Xiang** and Dieter Fox
   In *Robotics: Science and Systems (RSS)*, 2020.

9. **LatentFusion: End-to-End Differentiable Reconstruction and Rendering for Unseen Object Pose Estimation**
   Keunhong Park, Arsalan Mousavian, **Yu Xiang** and Dieter Fox
   In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020.

10. **Scaling Local Control to Large-Scale Topological Navigation**
    Xiangyun Meng, Nathan Ratliff, **Yu Xiang** and Dieter Fox
    In *International Conference on Robotics and Automation (ICRA)*, 2020.

11. **Self-supervised 6D Object Pose Estimation for Robot Manipulation**
    Xinke Deng, **Yu Xiang**, Arsalan Mousavian, Clemens Eppner, Timothy Bretl and Dieter Fox
    In *International Conference on Robotics and Automation (ICRA)*, 2020.

12. **The Best of Both Modes: Separately Leveraging RGB and Depth for Unseen Object Instance Segmentation**
    Christopher Xie, **Yu Xiang**, Arsalan Mousavian and Dieter Fox
    In *Conference on Robot Learning (CoRL)*, 2019.

13. **PoseRBPF: A Rao-Blackwellized Particle Filter for 6D Object Pose Tracking**
    Xinke Deng, Arsalan Mousavian, **Yu Xiang**, Fei Xia, Timothy Bretl and Dieter Fox
    In *Robotics: Science and Systems (RSS)*, 2019.

14. **Object Discovery in Videos as Foreground Motion Clustering**
    Christopher Xie, **Yu Xiang**, Dieter Fox and Zaid Harchaoui
    In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019.

15. **Neural Autonomous Navigation with Riemannian Motion Policy**
    Xiangyun Meng, Nathan Ratliff, **Yu Xiang** and Dieter Fox
    In *International Conference on Robotics and Automation (ICRA)*, 2019.

16. **Deep Object Pose Estimation for Semantic Robotic Grasping of Household Objects**
    Jonathan Tremblay, Thang To, Balakumar Sundaralingam, **Yu Xiang**, Dieter Fox and Stan Birchfield
    In *Conference on Robot Learning (CoRL)*, 2018.

17. **DeepIM: Deep Iterative Matching for 6D Pose Estimation**
    Yi Li, Gu Wang, Xiangyang Ji, **Yu Xiang** and Dieter Fox
    In *European Conference on Computer Vision (ECCV)*, 2018 **-Oral**.

18. **PoseCNN: A Convolutional Neural Network for 6D Object Pose Estimation in Cluttered Scenes**
    Yu Xiang, Tanner Schmidt, Venkatraman Narayanan and Dieter Fox
    In *Robotics: Science and Systems (RSS)*, 2018.

19. **Recurrent Autoregressive Networks for Online Multi-Object Tracking**
    Kuan Fang, **Yu Xiang**, Xiaocheng Li and Silvio Savarese
    In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2018.

20. **DA-RNN: Semantic Mapping with Data Associated Recurrent Neural Networks**
Yu Xiang and Dieter Fox
In *Robotics: Science and Systems (RSS)*, 2017.

21. **Subcategory-aware Convolutional Neural Networks for Object Proposals and Detection**
Yu Xiang, Wongun Choi, Yuanqing Lin and Silvio Savarese
In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, pp. 924–933, 2017.

22. **Anticipating Accidents in Dashcam Videos**
Fu-Hsiang Chan, Yu-Ting Chen, **Yu Xiang** and Min Sun
In *Asian Conference on Computer Vision (ACCV)*, pp. 136–153, 2016 **-Oral**.

23. **ObjectNet3D: A Large Scale Database for 3D Object Recognition**
Yu Xiang, Wonhui Kim, Wei Chen, Jingwei Ji, Christopher Choy, Hao Su, Roozbeh Mottaghi, Leonidas Guibas and Silvio Savarese
In *European Conference on Computer Vision (ECCV)*, pp. 160–176, 2016 **-Spotlight Oral**.

24. **Pose Estimation Errors, the Ultimate Diagnosis**
Carolina Redondo-Cabrera, Roberto López-Sastre, **Yu Xiang**, Tinne Tuytelaars and Silvio Savarese
In *European Conference on Computer Vision (ECCV)*, pp. 118–134, 2016.

25. **Deep Metric Learning via Lifted Structured Feature Embedding**
Hyun Oh Song, **Yu Xiang**, Stefanie Jegelka and Silvio Savarese
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 4004–4012, 2016 **-Spotlight Oral**.

26. **Learning to Track: Online Multi-Object Tracking by Decision Making**
Yu Xiang, Alexandre Alahi and Silvio Savarese
In *International Conference on Computer Vision (ICCV)*, pp. 4705–4713, 2015 **-Oral**.

27. **Data-Driven 3D Voxel Patterns for Object Category Recognition**
Yu Xiang, Wongun Choi, Yuanqing Lin and Silvio Savarese
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 1903–1911, 2015 **-Oral**.

28. **A Coarse-to-Fine Model for 3D Pose Estimation and Sub-category Recognition**
Roozbeh Mottaghi, **Yu Xiang** and Silvio Savarese
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 418–426, 2015.

29. **Monocular Multiview Object Tracking with 3D Aspect Parts**
Yu Xiang*, Changkyu Song*, Roozbeh Mottaghi and Silvio Savarese (*equal contribution)
In *European Conference on Computer Vision (ECCV)*, pp. 220–235, 2014.

30. **Beyond PASCAL: A Benchmark for 3D Object Detection in the Wild**
Yu Xiang, Roozbeh Mottaghi and Silvio Savarese
In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, pp. 75–82, 2014.

31. **Object Detection by 3D Aspectlets and Occlusion Reasoning**
Yu Xiang and Silvio Savarese
In *IEEE Workshop on 3D Representation and Recognition (3dRR)*, pp. 530–537, 2013.

32. **Object Co-detection**
Sid Yingze Bao, **Yu Xiang** and Silvio Savarese
In *European Conference on Computer Vision (ECCV)*, vol. 7572, pp. 86–101, 2014.

33. **Estimating the Aspect Layout of Object Categories**
Yu Xiang and Silvio Savarese
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 3410–3417, 2012.

34. **Semantic Context Modeling with Maximal Margin Conditional Random Fields for Automatic Image Annotation**
Yu Xiang, Xiangdong Zhou, Zuotao Liu, Tat-Seng Chua and Chong-Wah Ngo
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 3368–3375, 2010.

35. **Learning Contextual Metrics for Automatic Image Annotation**
Zuotao Liu, Xiangdong Zhou, **Yu Xiang** and Yan-Tao Zheng
In *Advances in Multimedia Information Processing - PCM*, vol. 6297, pp. 124–135, 2010.

36. **A Revisit of Generative Model for Automatic Image Annotation using Markov Random Fields**
Yu Xiang, Xiangdong Zhou, Zuotao Liu, Tat-Seng Chua and Chong-Wah Ngo
In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 1153–1160, 2009.

37. **Adaptive Model for Web Image Semantic Automatic Image Annotation**
Hongtao Xu, Xiangdong Zhou, **Yu Xiang** and Baile Shi
In *Journal of Software (in Chinese)*, vol. 21, no. 9, pp. 2183–2195, 2009.

38. **Exploiting Flickr's Related Tags for Semantic Annotation of Web Images**
Hongtao Xu, Xiangdong Zhou, **Yu Xiang** and Baile Shi
In *ACM International Conference on Image and Video Retrieval (CIVR)*, no. 46, 2009.

39. **Automatic Web Image Annotation via Web-Scale Image Semantic Space Learning**
Hongtao Xu, Xiangdong Zhou, Lan Lin, **Yu Xiang** and Baile Shi
In *Advances in Data and Web Management*, vol. 5446, pp. 211–222, 2009.

Teaching Experience

Artificial Intelligence, University of Washington, Seattle, Washington, USA 2017
Guest Lectures for Prof. Dieter Fox

Computer Vision, University of Washington, Seattle, Washington, USA 2017
Guest Lecture for Prof. Linda Shapiro

Computer Vision, Stanford University, Stanford, California, USA 2016
Guest Lectures for Prof. Silvio Savarese

The C Programming Language, Fudan University, Shanghai, China Sep 2009 – Jan 2010
Teaching Assistant

Student Mentorship

Lirui Wang, Master Student, University of Washington Sep 2017 – Jul 2021

NVIDIA Research Internship Program:

Xiangyun Meng, PhD Student, University of Washington	2021
Luyang Zhu, PhD Student, University of Washington	2020
Xinke Deng, PhD Student, UIUC	2018, 2019
Keunhong Park, PhD Student, University of Washington	2019
Corinne Jones, PhD Student, University of Washington	2019
Raluca Scona, PhD Student, Edinburgh Center for Robotics	2019
Fei Xia, PhD Student, Stanford University	2018
Rui Wang, PhD Student, TUM	2018
Christopher Xie, PhD Student, University of Washington	2018

Awards and Honors

One of the 12 Best Papers in ECCV Selected for a IJCV Special Issue	2018
University of Washington CSE Postdoc Research Award	2016
ICCV Doctoral Consortium Travel Award	2015
Outstanding Master's Thesis Award of Shanghai	2012

Professional Service

Journal Reviewer
- International Journal of Robotics Research (IJRR)
- IEEE Robotics and Automation Letters (RA-L)
- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- International Journal of Computer Vision (IJCV)
- Computer Vision and Image Understanding (CVIU)
- IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)
- IEEE Transactions on Multimedia (TMM)
- IEEE Transactions on Signal Processing (TSP)

Conference Reviewer
- Robotics: Science and Systems Conference (RSS)
- IEEE International Conference on Robotics and Automation (ICRA)
- International Conference on Intelligent Robots and Systems (IROS)
- IEEE International Conference on Robot and Human Interactive Communication (ROMAN)
- IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
- International Conference on Computer Vision (ICCV)
- European Conference on Computer Vision (ECCV)
- Asian Conference on Computer Vision (ACCV)
- British Machine Vision Conference (BMVC)
- International Conference on 3D Vision (3DV)
- Neural Information Processing Systems (NIPS)

Program Chair
- The Visual Learning and Reasoning for Robotics Workshop at RSS, 2021

Program Chair
- The 3D Vision and Robotics Workshop at CVPR, 2021

Program Chair
- The Visual Learning and Reasoning for Robotic Manipulation Workshop at RSS, 2020

Program Chair
- 5th International IEEE Workshop on 3D Representation and Recognition at ICCV, 2015

Program Committee
- 4th International IEEE Workshop on 3D Representation and Recognition at ICCV, 2013

Tutorial Organizer
- 3D Object Geometry from Single Image Tutorial at International Conference on 3D Vision, 2016

Talks

1. **6D Robotic Grasping of Unseen Objects**
   Electronics and Telecommunications Research Institute, South Korea, 8/19/2021.
2. **Perceive, Plan, Act and Learn: Towards Intelligent Robots in Human Environments**
   UNC, 2/24/2021; UT Dallas, 3/16/2021.
3. **Learning RGB-D Feature Embeddings for Unseen Object Instance Segmentation**
   In NVIDIA Research, Seattle, Washington, 10/12/2020.
4. **PoseRBPF: A Rao-Blackwellized Particle Filter for 6D Object Pose Tracking**
   In University of Washington, Seattle, Washington, 9/27/2019.
5. **Object Perception for Robot Manipulation**
   In Toyota Research Institute, Cambridge, Massachusetts, 7/12/2019.
6. **PoseCNN: A Convolutional Neural Network for 6D Object Pose Estimation in Cluttered Scenes**
   In Robotics: Science and Systems (RSS), CMU, Pittsburgh, Pennsylvania, 6/26/2018.
7. **Perceiving the 3D World from Images and Videos**
   In Nvidia Research, Redmond, Washington, 11/07/2017; University of Michigan, 3/15/2018.
8. **3D Object Recognition and Scene Understanding from RGB-D Videos**
   In GRASP Lab at University of Pennsylvania, 10/11/2017; Microsoft Research, Redmond, 10/17/2017; Vision Lab at Stanford University, 10/23/2017.
9. **3D Object Recognition and Scene Understanding**
   In Mitsubishi Electric Research Laboratories, Boston, Massachusetts, 7/14/2017.
10. **DA-RNN: Semantic Mapping with Data Associated Recurrent Neural Networks**
    In Robotics: Science and Systems, Massachusetts Institute of Technology, Massachusetts, 7/13/2017.
11. **Subcategory-aware Convolutional Neural Networks for Object Proposals and Detection**
    In IEEE Winter Conference on Applications of Computer Vision, Santa Rosa, California, 3/29/2017.

12. **Tutorial on 3D Object Recognition**
In International Conference on 3D Vision, Stanford University, 10/28/2016.

13. **3D Object Representations for Recognition**
In Carnegie Mellon University, 3/28/2016; University of Toronto, 4/4/2016; Massachusetts Institute of Technology, 4/12/2016; University of California, Berkeley, 4/21/2016; University of Illinois at Urbana-Champaign, 5/5/2016; University of Washington, 5/31/2016.

14. **3D Object Detection and Pose Estimation**
In the 1st International Workshop on Recovering 6D Object Pose in conjunction with ICCV, Santiago, Chile, 12/17/2015.

15. **Learning to Track: Online Multi-Object Tracking by Decision Making**
In International Conference on Computer Vision, Santiago, Chile, 12/16/2015.

16. **Data-Driven 3D Voxel Patterns for Object Category Recognition**
In IEEE Conference on Computer Vision and Pattern Recognition, Boston, Massachusetts, 06/08/2015.

17. **Monocular Multiview Object Tracking with 3D Aspect Parts**
In the 1st Stanford-SNU Workshop on Automated Driving, Stanford University, 02/24/2015.

18. **Beyond PASCAL: A Benchmark for 3D Object Detection in the Wild**
In IEEE Winter Conference on Applications of Computer Vision, Steamboat Springs, Colorado, 03/24/2014.

19. **Object Detection by 3D Aspectlets and Occlusion Reasoning**
In the 4th International IEEE Workshop on 3D Representation and Recognition in conjunction with ICCV, Sydney, Australia, 12/08/2013.

20. **Estimating the Aspect Layout of Object Categories**
In Midwest Vision Workshop, University of Illinois at Urbana-Champaign, 09/21/2012.

Skills and Languages

Programming Languages: Python, C/C++, CUDA

Libraries: PyTorch, Tensorflow, OpenCV, OpenGL, ROS

Operating Systems: Linux, Windows and Mac OS X

Languages: English, Chinese