Fei Xia

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RESEARCH STATEMENT

My research interests lie in **Computer Vision** and **Machine Learning**. In particular, I am interested in simulation to real world transfer and domain adaptation for vision and robotics tasks. I am also interested in 3d vision and deep learning methods for point cloud and meshes. For machine learning, I am intersted in practical learning based methods with provable performance.

EDUCATION

Stanford University, Stanford, CA, USA *2016.9 - Present*
PhD Student, Department of Electrical Engineering, Advisor: Silvio Savarese and Leo Guibas
GPA: 4.2/4.0

Tsinghua University, Beijing, China *2012.8 - 2016.7*
Bachelor of Engineering, Department of Automation

PUBLICATIONS AND MANUSCRIPTS

[1] **Fei Xia***, Martin Zhang*, James Zou, David Tse. NeuralFDR: learning decision threshold from hypothesis features. *NIPS 2017*. (*equal contributions)

[2] Qiao Liu, **Fei Xia**, Qijin Yin, Rui Jiang. Chromatin accessibility prediction via a hybrid deep convolutional neural network. *Bioinformatics*.

[3] Govinda Kamath*, Ilan Shomorony*, **Fei Xia***, Thomas Courtade, David Tse. " HINGE: Long-Read Assembly Achieves Optimal Repeat Resolution." Genome Research Vol 27 2017.(*equal contributions)

[4] Ilan Shomorony, Govinda Kamath, **Fei Xia**, Thomas Courtade and David Tse, "Partial DNA Assembly: A Rate-Distortion Perspective." *ISIT 2016*.

[5] **Fei Xia**, *et al.* "Human-aware mobile robot exploration and motion planner." *Proceeding of IEEE SoutheastCon 2015*.

RESEARCH EXPERIENCES

Stanford University, Stanford, CA, USA *2016.12 - Present*
CVGL, Stanford AI Lab
Research Assistant, Advisor: **Prof. Silvio Savarese**, Secondary Advisor: **Prof. Leo Guibas**

Project 1: **Cambria: Embodied active real-world perception**

- Developed Cambria, a robotics simulator for easy transfer to real-world. First robotics simulator that enables real-world perception. Used neural network to do real-time rendering for generating photo-realistic video stream.
- Implemented a pixel level domain adaptation mechanism to map real-world images and neural network generated images to a common space for transferring to real world.
- Ongoing research project. Paper submitted to CVPR18.

Project 2: **View Synthesis from a Single RGB Image**

- Create an end-to-end deep learning based method where the geometric constraints inherent to the problem (specifically 3D rigid body transformation) are internally enforced.
- Implemented the method and tested on two indoor scene datasets.

Stanford University, Stanford, CA, USA *2015.7 - 2016.12*
Information Systems Laboratory, Department of Electrical Engineering
Research Assistant, Advisor: **Prof. David Tse**

Project 1: *De novo* **DNA Sequence Assembly from Barcoded Reads**

- Established the information-theoretic bounds for a third generation sequencing technology, 10X. Discovered that closely spaced interleaved repeats are the main bottleneck for this read model.
- Designed algorithms to take advantage of barcoded linked reads in order to generate better assembly than what is currently available.
- Experimented on Human Chromosome 21, and boosted N50 of state-of-the-art assembler by 30%.

Project 2: HINGE: A *de novo* **Sparse String Graph Assembler for PacBio Reads**

- Generated **finished** assembly at accuracy 99.9% for *E.Coli* based on sparse string graph methods, with details in publication [3-4].
- Extended NSG(Not-So-Greedy) algorithm to a regime when triple repeats are all-bridged and interleaved repeats are bridged, i.e. information-theoretic bound for perfect assembly.

Project 3: NeuralFDR: learning decision threshold from hypothesis features

- Proposed a learning based method for FDR control. Developed mirroring method for FDP prediciton. NeuralFDR has provable performance in FDP control.
- Implemented the method and tested on RNASeq and GWAS datasets. Details can be found in paper [1].

Megvii Inc., Beijing, China *2016.3-2016.7*
DTR(Detection, Tracking, Re-identification) Group
Research Intern, Mentor: **Chi Zhang, Chief Scientist**

Project 1: Pedestrain Parsing Models

- Built an deep convolutional neural network model based on Holistically-Nested Edge Detection model and adapted it for pedestrian parsing.

Project 2: Pixel Level Domain Transfer for Pedestrian Re-identification

- Built a generative adversial network that transfer from pedestrian domain to upper-cloth domain, and used that model for pedestrian re-identification.
- Both models were incoporated into company's API for downstream applications.

AWARDS

2016 Stanford Graduate Fellowship (Michael J. Flynn Fellow), Stanford University
2015 Chang Jiong Scholarship (Highest honor in Dept. of Automation, 1/560)
2014 Fang Chongzhi Scholarship (Highest honor in Dept. of Automation, 1/560)
2013 National Southwest Associated University Scholarship (1/560)

TECHNICAL STRENGTHS

Deep Learning Software Stacks	Torch, PyTorch, Tensorflow, TF & PyTorch CUDA module development
Programming Languages	Proficient with C/C++, Python, MATLAB, Java
Additional Skills	ROS, MPI, OpenMP, CUDA