JINGPEI LU

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EDUCATION

M.S. in Electrical and Computer Engineering September 2018 - June 2020
University of California San Diego, CA, USA GPA: 3.69 / 4.0
Area of focus: Intelligent System, Robotics and Control

B.S. in Electrical and Computer Engineering September 2014 - June 2018
University of California San Diego, CA, USA Major GPA: 3.71 / 4.0
Area of focus: Machine Learning

FIELD OF INTERESTS

Robotic Perception and Automation; State Estimation; Surgical Robotics; Machine Learning

RESEARCH PROJECTS

Robust Keypoint and Pose Estimation on Robot Manipulators April 2020 - Present
UCSD Advanced Robotics and Control Lab

- Proposed a general keypoint optimization algorithm which solves for the locations of the set of keypoints to maximize their detectibility on robotic manipulators
- Utilized robot simulator CoppeliaSim to generate synthetic dataset for sim-to-real transfer
- Submitted a paper to **IEEE RA-L** as first author

Semi-autonomous Telesurgery System September 2019 - Present
UCSD Advanced Robotics and Control Lab

- Collaborated with scientists at SRI International on testing the remote robotic teleoperation
- Contributed to the development of the tool tracking module for the semi-autonomous telesurgery system

The Surgical Perception Framework April 2019 - March 2020
UCSD Advanced Robotics and Control Lab

- Efficiently integrated a surgical tool tracker and a deformable tissue tracker into the perception framework for autonomous robotic manipulation
- Utilized the deep neural networks for feature extraction, which improved the state-of-the-art tool tracking accuracy by **10%**, and significantly improved the tissue reconstruction performance of the surgical perception framework
- Experimented the framework on the da Vinci Surgical® System for real-time tissue manipulation tasks
- Published a paper at **IEEE RA-L** and submitted a paper to **ICRA 2021** as first author

Image Retrieval System for Plankton Images January 2018 - September 2018
The Statistical Visual Computing Laboratory

- Developed a content-based image retrieval system for plankton images using a deep convolutional neural network which assisted biological oceanographers in researching and labeling the plankton images
- Researched on different machine learning and deep learning methods, which accelerated the searching process and improved the precision of the baseline retrieval system by about **30%**
- Presented our work on UC San Diego's Summer Research Conference (SRC 2018)

PUBLICATIONS

J. Lu, F. Richter and M. C. Yip, "Robust Keypoint Detection and Pose Estimation of Robot Manipulators with Self-Occlusions via Sim-to-Real Transfer," arXiv:2010.08054, 2020.

J. Lu, A. Jayakumari, F. Richter, Y. Li and M. C. Yip, "SuPer Deep: A Surgical Perception Framework for Robotic Tissue Manipulation using Deep Learning for Feature Extraction," arXiv:2003.03472, 2020.

Y. Li, F. Richter, **J. Lu**, E. K. Funk, R. K. Orosco, J. Zhu and M. C. Yip, "SuPer: A Surgical Perception Framework for Endoscopic Tissue Manipulation with Surgical Robotics," in *IEEE Robotics and Automation Letters*, vol. 5, no. 2, pp. 2294-2301, April 2020. (presented at ICRA 2020)

PROFESSIONAL EXPERIENCE

Educational Vision Technologies, Inc. July 2019 - December 2019
Machine Learning Engineer *La Jolla, CA, USA*

- Managed and led a group of undergraduate students in developing the speech recognition server
- Developed the prototype of the automated slides video segmentation framework, which achieves **97%** accuracy on recall and **74%** accuracy on precision compared to human labeling
- Built the testing frameworks to ensure the algorithms function properly on NVIDIA Jetson TX2

TEACHING EXPERIENCE

University of California, San Diego January 2019 - December 2019
Teaching Assistant, Jacob School of Engineering

- Course: Introduction to Digital Design

TECHNICAL SKILLS

Programming	Python, C/C++, Matlab, Cuda
Tools	Tensorflow, Pytorch, ROS, Git, Linux, Docker, LaTeX
Language	Proficient in English and Chinese

SELECTED GRADUATE COURSES

Neural Networks for Pattern Recognition (A+); Deep Learning and Applications (A); Robot Reinforcement Learning (A+); Computer Vision I (A); Digital Image Processing (A+)

SELECTED PROJECTS

Autonomous R/C Vehicle

- Built a remote control vehicle that can autonomously run on an outdoor scaled track from scratch
- Developed the traffic signs recognition functionality and speeded up the video processing efficiency **three times** using the multi-threaded approach

Drone Integration for RF Scanner Payload

- Integrated an RF scanning payload with a drone (DJI Matrice 100) to automate the processes of detecting wireless signal's strength in open area
- Developed a mobile app to record the signal strength data and generate the heatmap which can visualize the data better