Yu Chen

Email: yuchen3@andrew.cmu.edu

Google Scholar: https://scholar.google.com/citations?hl=en&user=U6s4IpUAAAAJ

Education

Carnegie Mellon University, School of Computer Science, Robotics Institute   **2022.8 – 2024.8**

Master of Science in Robotics

- GPA: 4.16/4.0
- Coursework: Optimal Control & Reinforcement Learning (A), Machine Learning (A+), Kinematics/Dynamics/Control (A+), Mechanics of Manipulation (A).
- Research interest: Model-based robotics control, data-driven robotics control, and robotics system design.

Tongji University, Institute of Rail Transit   **2017.9 – 2022.6**

Bachelor in Vehicle Engineering (Railway), Minor in Artificial Intelligence

- GPA: 4.78/5.0 or 92.83/100, rank No.1 in the department.
- Coursework: Design of Mechatronics System, Power Electronics Technology, Design of Mechanics, Fluid Mechanics and Hydraulic Transmission, Computer Hardware Technology, C++, etc.
- Awards and honors: Graduation with Honor - College Graduate Excellence Award of Shanghai (top 5%), Outstanding Graduation Project (top 5%), National Scholarship (top 5%), Special Award in Tongji University Challenge Cup (team leader, top 5%), #1 in Tongji University Excellent Scientific Research and Education Competition (team leader, top 1), First Prize Scholarship (3 times, top 10%).

Publications

1. [RAL, submitted] "Graph-Propagation-based Kinematic Algorithm for In-pipe Truss Robots." **Yu Chen**, Jinyun Xu, Yilin Cai, Shuo Yang, Ben Brown, Fujun Ruan, Yizhu Gu, Howie Choset, and Lu Li.

2. [RAL, submitted] "A Compacted Structure for Cross-domain learning on Monocular Depth and Flow Estimation." **Yu Chen***, Xu Cao*, Xiaoyi Lin, Baoru Huang, Xiao-Yun Zhou, Jian-Qing Zheng, Guang-Zhong Yang. (arXiv)

3. [IROS] "Semi-Supervised Vein Segmentation of Ultrasound Images for Autonomous Venipuncture." **Yu Chen**, Yuxuan Wang, Bolin Lai, Zijie Chen, Xu Cao, Nanyang Ye, Zhongyuan Ren, Junbo Zhao, Xiao-Yun Zhou, Peng Qi. (IEEE)

4. [IDETC-CIE] "Autonomous robotic subcutaneous injection under near-infrared image guidance." Dingliang Huang, Bin Hu, Yinna Chen, **Yu Chen**, Liangchen Sui, Zhaoyang Wang, Yijun Jiang, Zhongyuan Ren, Yuxuan Wang, Xu Cao, Peng Qi. (ASME)

5. [IROS workshop] "VeniBot: Towards Autonomous Venipuncture with Automatic Puncture Area and Angle Regression from NIR Images," Xu Cao, Chen Zijie, Bolin Lai, Yuxuan Wang, **Yu Chen**, Zhengqing Cao, Zhilin Yang, Ye Nanyang, Junbo Zhao, Xiao-Yun Zhou, Peng Qi. (arXiv)

6. [Cell Research] "Deep learning-based rapid generation of broadly reactive antibodies against SARS-CoV-2 and its Omicron variant." Hantao Lou, Jianqing Zheng, Xiaohang Fang, Zhu Liang, Meihan Zhang, **Yu Chen**, Chunmei Wang, Xuetao Cao. (Nature)

* Equal contribution

Research Experiences

Biorobotics Lab, Carnegie Mellon University   2022.9 – present
Supervised by Prof. Howie Choset and Prof. Guanya Shi   *Pittsburgh, USA*

- Proposed an efficient framework solving large-scale distance-based inverse kinematics for a broad range of articulated robots and complex task constraints utilizing the graph propagation method.

Supervised by Prof. Howie Choset and Prof. Ben Brown

- Proposed and formulated an efficient locomotion technique for the confined-and-complex-space traversal of truss robots,
- Devised a computationally efficient kinematic algorithm for truss robots using graph propagation principles.
- Designed and constructed an in-pipe truss robot hardware system capable of navigating straight pipes and pipe elbows.

Supervised by Prof. Zhongqiang Ren (Shanghai Jiao Tong University)

- Proposed and implemented a parallel computation approach to efficiently solve multi-object shortest-path-problems.

Big Data Institute, University of Oxford   2022.6 – 2022.8
Supervised by Prof. Guang-Zhong Yang and Dr. Jian-Qing Zheng   *Shanghai, China*

- Developed a general compact framework facilitating cross-domain learning in monocular depth and flow estimation.
- Created a novel generative model employing GAN and diffusion techniques for the generation of protein sequences.

School of Electronics and Information Engineering, Tongji University   2020.6 – 2022.5
Supervised by Dr. Xiao-Yun Zhou and Prof. Peng Qi   *Shanghai, China*

- Proposed and formulated an overall hardware-software framework for an autonomous venipuncture robot, including mechanical structure design and the formulation of a semi-supervised learning algorithm for ultrasound-image-based vein detection.

Institute of Rail Transit, Tongji University   2018.4 – 2019.4
Supervised by Prof. Zhi-Zhuang Yu   *Shanghai, China*

- Proposed a wedge-principle-based self-locking technique for fastener vibration resistance.

Selected Patents

1. [CN113788081B] "Multi-terrain Driving Unmanned Vehicle Based on Vehicle Body Deformation." Qing Jia, **Yu Chen**, Rongsheng Zhou, Yijun Jiang, Bowen Liang, Wenyi Cui, Chen Luo.
2. [CN114252178A] "Touch Sensor, Pressure Event Detection Method and Device and Intelligent Robot." Peng Qi, **Yu Chen**, Yu Zheng, Zhengyou Zhang, Juhong Wang, Tingting Liu.
3. [CN112109111A] "Three-Dimensional Mechanical Joint, Mechanical Arm and Control Method for Oblique-Section Cylindrical Connection." Peng Qi, **Yu Chen**.
4. [CN112089490A] "Full-Automatic Venipuncture Recognition Integrated Robot." Peng Qi, **Yu Chen**, Xu Cao, Yuxuan Wang, Zhiyu Tian.
5. [CN112022293A] "Gesture Recognition Venipuncture Method and Device for Intravenous Injection Robot." Peng Qi, **Yu Chen**.
6. [CN112022294A] "Operation Trajectory Planning Method of Venipuncture Robot Based on Ultrasonic Image Guidance." Peng Qi, **Yu Chen**.
7. [CN111968097A] "Blood Vessel Puncture Image Processing Method and Blood Vessel Puncture Robot." Peng Qi, **Yu Chen**.

Skills

Languages: Mandarin, English, German

Programming: C/C++, Python, Matlab, Arduino IDE

Computer-Aided Design: AutoCAD, Solidworks, UG (Unigraphics NX), AD (Altium Designer), Blender

Computer-Aided Engineering: ANSA, HyperMesh, Simulink, LabVIEW