Yu Chen

Website: https://neuling-jpg.github.io/yuchen.github.io/

Email: uchen0223@gmail.com, 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: 4.19
- Coursework: Kinematics/Dynamics/Control (A+), Introduction to Robot Learning (A+), Machine Learning (A+), Computer Vision (A+), Mechanics of Manipulation (A), Optimal Control & Reinforcement Learning (A), Robot Math (A).
- Research interest: Motion planning, 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.
- Selected coursework: Design of Mechatronics System, Power Electronics Technology, Design of Mechanics, Fluid Mechanics and Hydraulic Transmission, Computer Hardware Technology, C++.
- Selected awards: 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%).

Selected Publications

1. **[WAFR'24, submitted]** Propagative Distance Optimization for Constrained Inverse Kinematics

   Yu Chen, Yilin Cai, Jinyun Xu, Zhongqiang Ren, Guanya Shi, Howie Choset.

2. **[RAL / Invited to IROS'24 (*Oral*)]** 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, Lu Li.

3. **[IROS'21 (*Oral*)]** 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.

Selected Research Experiences

Biorobotics Lab, Carnegie Mellon University. **2022.9 – present**

In collaboration with Prof. Howie Choset, Prof. Guanya Shi, and Prof. Zhongqiang Ren *Pittsburgh, USA*

- Proposed an efficient framework that efficiently and effectively solving kinematics and motion planning problems for a broad range of articulated robots with complex task constraints using propagative distance optimization.

In collaboration with Prof. Howie Choset and Mr. Ben Brown (*Project Scientist*) *Pittsburgh, USA*

- 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.

Big Data Institute, University of Oxford **2022.6 – 2022.8**

In collaboration with Prof. Guang-Zhong Yang and Dr. Jian-Qing Zheng *Oxford, UK*

- 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**

In collaboration with Dr. Xiao-Yun Zhou and Prof. Peng Qi *Shanghai, CN*

- 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.

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**.

Selected 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