SHANGZHOU YE

@ shangzhouye2020@u.northwestern.edu
in linkedin.com/in/shangzhouye
Portfolio - shangzhouye.tech
https://github.com/shangzhouye

EXPERIENCE

Robotics Software Intern, Vecna Robotics

June 2020 – Sep. 2020 Waltham, MA

⇒ Developed image-LiDAR fusion-based 3D object detection and pose estimation system in warehouse environment using 3D-LiDAR

- Implemented camera-lidar calibration, point cloud registration, and multi-threaded pose estimation pipeline

⇒ Developed groundtruth motion capture system to provide robot pose for validation of localization algorithms

- Achieved 25Hz frame rate and less than 2.5cm error

Research Assistant, RoMI Lab, Monash University

Nov. 2018 – Feb. 2019 Melbourne, Australia

⇒ Designed a novel foot interface that controls 4-DoF robotic assistive arm

- Completed CAD modeling, FEA, prototyping, assembly, encoder/sensor selection, and Arduino programming

⇒ Designed assessment protocol and led a two-stage comparative study involving 18 participants

- Validated to have a lower mental burden than the conventional design

⇒ First-authored publication on IEEE BioRob 2020

ROBOTICS PROJECTS

Stereo Visual SLAM | 2020 [Website]

- Developed a stereo visual localization and mapping system with ORB feature-based tracking and keyframe-based optimization
- Implemented motion estimation, map management/expansion, and backend bundle adjustment in C++ using OpenCV and g2o
- Achieved 4.17% translational error on KITTI dataset

EKF SLAM on Turtlebot3 | 2020 [Website]

- Developed a wheeled robot navigation stack from scratch using 2D LiDAR
- Implemented feature-based EKF SLAM and landmark detection
- Developed 2D Lie Group library in C++ for a differential drive robot

Sawyer Robot Playing Mini-Golf | 2019 [Website]

- Implemented obstacle avoidance motion planning using ROS MoveIt
- Collaborated in a team of four and adopted Git/Github for version control

Motion Planning and Navigation | 2019 [Website]

- Implemented a graph-based (A* search) and sampling-based (RRT) obstacle avoidance motion planner using Python
- Designed an inverse kinematics controller for path tracking

Omnidirectional Robot Manipulation | 2019 [Website]

- Generated reference trajectory for end-effector to pick and place a cube
- Developed trajectory following PID controller with singularity avoidance

2-D Hopping Robot Simulation | 2019 [Website]

- Developed dynamics simulation of a 2D one-legged hopping robot on flat ground using Python SymPy

See shangzhouye.tech for further projects in portfolio

SKILLS

- Using Linux as Primary OS
- **Languages:** C++, Python, C, MATLAB
- **Robotics:** ROS, MoveIt, Gazebo, Rviz
- **Libraries:** OpenCV, PCL, g2o (graph optimization), Eigen, Sophus
- **Data:** PyTorch, NumPy, Pandas
- **Tools:** Git (Version Control), CMake
- **Mechanical:** SolidWorks, ANSYS, 3D Printing, FEA

EDUCATION

Northwestern University

Master of Science in Robotics

Expected Dec. 2020 Evanston, IL

- GPA 3.9/4.0
- **Coursework Focus:** Deep Learning, Perception, Computer Vision, State Estimation, Localization, Mapping

Monash University

Bachelor of Engineering (Honors) in Mechanical Engineering

Dec. 2018 Melbourne, Australia

- GPA: 3.8/4.0 (1st. in Mechanical Eng.)
- Award for Excellence in Robotics
- P. Dransfield Prize for Excellence in Systems and Control Engineering

Central South University

Bachelor of Engineering in Traffic Equipment and Control Engineering

July 2019 Changsha, China

- GPA: 3.58/4.0
- Tutor for freshman class
- Established and led department journal

PUBLICATION

S.-Z. Ye, P. Jain, A. Walley, Y.-J. Yang, and E. Abdi, "A Novel Four-Degree-of-Freedom versus a Conventional Foot Interface for Controlling a Robotic Assistive Arm in Surgery," presented at the 8th IEEE RAS/EMBS International Conference on Biomedical Robotics & Biomechatronics, New York, NY, USA, 2020.