JIASEN ZHENG

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EDUCATION

NORTHWESTERN UNIVERSITY
MS in ROBOTICS   GPA: 3.93/4.00
Sep 2021 - Dec 2022

UNION COLLEGE (NY)
BS in MECHANICAL ENGINEERING
(Departmental Honorary)
Sep 2015 - Jun 2019

SKILLS

ROBOTICS
- **Perception:** OpenCV, PCL
- **Planning:** A*, RRT, Frontier Exploration
- **SLAM:** Stereo Visual Odometry, RTAB Map, Slam Toolbox, Sensor Fusion
- **Control:** PID control, Kinematics, Dynamics
- **Simulation:** Lagrangian Dynamics, Coppelia Sim

SOFTWARE
- **Programming:** Python, C++, C, Matlab
- **Robot Operating System (ROS):** MoveIt, Gazebo, Rviz
- **Other:** Linux, Git

ELECTRICAL
- **Embedded:** PIC32, Arduino
- Soldering, Wiring

MECHANICAL
- **CAD:** SolidWorks, AutoCAD
- **Simulation (FEA):** Stress-Strain, Heat transfer, Topology Optimization (SolidWorks); Electromagnetic (Ansys); Fluid Dynamics (STAR-CCM+); Simulink (Matlab)
- **Prototype:** 3D printing, Laser cut, Mill, Lathe, Drill press

EXPERIENCE

First Robotics Team 7522 | Mechanical Mentor (part-time) | Shanghai, CN
Jun 2020 - Jun 2021
- Advised a team of 5 to build a ball-shooting mechanism of a robot for the season "Infinite Recharge", which won 1st place at the WE RoboStar 2020 game in Guangzhou
- Guided design, in SolidWorks, of a swerve drivetrain, which significantly improved the agility and traction of the robot
- Mentored students on using SolidWorks and developed an online video tutorial on that

ZF Automotive (ZJG Plant) | Manufacturing Engineer Intern | Suzhou, CN
Feb 2020 - May 2020
- Analyzed data from the automated Electric Parking Brake (EPB) assembly line to identify and help correct errors caused by the automatic mechanisms shortening the cycle time by 3%
- Developed a piston press-in approach to reduce the damage to piston seal and excluder of the brake, enhancing the First Pass Yield (FPY) by 0.5%

Runshan Precision Machinery | Mechanical Engineer | Suzhou, CN
July 2019 - Jan 2020
- Collaborated with a senior engineer to design a new model of knitting machine using SolidWorks and applied FEA for design validation
- Performed topology optimization for load-bearing components to maintain strength and save material costs
- Participated in the mechanical design of a ring gear driving mechanism of circular knitting machines and filed for domestic patents (China Patent No. 201911363163.5)

PROJECTS   jiasenzheng.github.io

Extended Kalman Filter (EKF) SLAM From Scratch on Turtlebot3
- Developed a feature-based EKF SLAM package using C++ and Robot Operating System (ROS) in both simulation and real robot
- Implemented a landmark detection algorithm using supervised learning with unknown data association and wrote a control library for differential drive robot

3D SLAM And Point Cloud Colorization on Jackal UGV
- Performed 3D SLAM on Jackal UGV with Velodyne Lidar and Realsense camera using Robot Operating System (ROS) and the RTAB-Map package
- Developed a C++ ROS package to calibrate and compute the extrinsic parameters between lidar and camera using direct linear transform (DLT)
- Wrote a perception algorithm with C++ to align RGB data to the point cloud using PCL

Stereo Visual Odometry Using KITTI Dataset
- Created a visual odometry with stereo camera setup on the KITTI dataset using Python
- Calculated disparity maps and performed feature extractions using SIFT in OpenCV
- Applied RANSAC solver from OpenCV to determine the 3D rigid body transform between each frame
- Estimated the position and orientation of the vehicle within a reasonable drift (lower than 50m at loop closure)

Marker Assembling Robot
- Collaborated with a team of 5 to control a Franka arm to assemble markers and caps through a sequence of pick, place, press, and sort operations using Robot Operating System (ROS), and MoveIt
- Led the development of a computer vision algorithm with OpenCV to detect a wide range of colors and their positions
- In 50 rounds of testing with 9 of markers under different situations, the vision system was 100% reliable