JIASEN ZHENG

ROBOTICS, PERCEPTION, SLAM, PLANNING AND MORE

jiasenzheng2020@u.northwestern.edu
linkedin.com/in/jiasen-zheng/
jiasenzheng.github.io
(224) 204-3864

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

PROGRAMMING

- **Proficient:** Python, Matlab, Git/Github
- **Comfortable:** C, C++

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

ELECTRICAL

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

ROBOTICS

- **ROS:** Moveit, Gazebo, Rviz
- Implement **Forward/Inverse Kinematics/Dynamics** and simulate in **CoppliaSim**
- Model, fine-tune, and simulate **PID Control** systems
- Model 2D multi-body physics system from scratch using **Lagrangian Dynamics**
- **Computer Vision:** OpenCV, SIFT, RANSAC, ORB, Canny, Hough, Target Tracking
- **Planning:** A*, RRT, Frontier Exploration
- **SLAM:** Stereo Visual Odometry, RTAB Map, Slam Toolbox, Sensor Fusion

EXPERIENCE

First Robotics Team 7522 | Mechanical Mentor (part-time) | Shanghai, CN
Jun 2020 - Jun 2021

- Guided 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
- Advised to design and create a swerve drivetrain using SolidWorks, 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 2021

- Analyzed data from the automated Electric Parking Brake (EPB) assembly line to identify and help correct errors caused by automatic mechanism 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

3D SLAM And Point Cloud Colorization
Jan 2022- Present

- Performed 3D SLAM on Jackal UGV using Velodyne Lidar and the RTAB Map package
- Designed a perception algorithm to align RGB/thermal data to the point cloud

Stereo Visual Odometry Using KITTI Dataset

- Created a visual odometry stereo camera setup using the KITTI dataset
- Calculated disparity maps and performed feature extractions using SIFT
- Applied RANSAC to solve for 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 (group project; responsible for perception and modeling)

- Controlled a Franka arm to assemble markers and caps through a sequence of pick, place, press, and sort operations using ROS, and Moveit
- Developed a perception algorithm using OpenCV to detect a wide range of colors and their positions
- The algorithm is robust in that no perception error emerged in 50 rounds of tests

2D Physics Engine From Scratch

- Simulated a planer multi-body dynamics of a jack in the box with external forces and impacts by applying lagrangian dynamics
- Animated the simulation with collision detections and user-specified external forces