Zhijing(Rey) Hu

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EDUCATION

Johns Hopkins University — **Baltimore, MD, US**
Master of Science in Engineering in Robotics — *Aug 2021 - May 2023*
- Major GPA: 3.5/4.0 | Track on Perception and Cognitive Systems

Rutgers University - New Brunswick — **New Brunswick, NJ, US**
Bachelor of Science in Mechanical Engineering with Honors — *Aug 2017 - May 2021*
- Major GPA: 3.6/4.0 | Honor Student in Dean's List | Best Overall ME Senior Design of Class 2021

WORK EXPERIENCE

Hangzhou KEQIANG Information Technology Co., ltd — **Zhejiang, China**
Software Engineer Intern — *June 2021 - Aug 2021*
- Participated in Injection Molding Machine Operation with High-Net Control System Program
- Learned and operated basic OPC server and clients by different two different coding languages - Python and C Sharp, and applied them to IFMS (Intelligent digital factory management system)
- Imported production plans into manufacture system through ERP, monitored the processing parameters, checked the defective goods feedback and followed PDCA to complete the maintenance
- Set up Machine-To-Machine communication and improved back-ends of alarm system through computer server, mobile APP and emails

RELEVANT PROJECTS

SLAM Auto-driving Car Robot — *June 2022 - Present*
- Design and assembled a mechanical car robot with Raspberry Pi
- (Current Working)

Various Hand Gestures and Motion Recognition — *Apr 2022 - May 2022*
- Built and improved our own convolutional neural network (CNN) for classifying the experimental datasets, which is composed by 2 convolutional layers and 2 fully connected layers
- Designed and created our own datasets with 8 different hand gestures by collecting nearly 10,000 RGB images from webcam in real-time, performing the landmark extraction and later saving the data in flattened version
- Came up an object extraction method based on the landmarks, cropping out the images around the landmark positions with 21 key points, then pre-processing the cropped images, including image resizing and intensity normalization
- Trained the model on the training dataset with 8,000+ images both including RGB images and landmark images, and later evaluated on the 1,000+ validation images achieving to 97.6% with real-time speed of 60 ($\pm$ 20) fps on feedback interface via MediaPipe

Haptic Vision Cap for Visually Impaired Users — *Nov 2021 - Dec 2021*
- Designed and built up the 3D Haptic Cap System model involving: main body, laser cutting works, IR/Ultrasonic sensors, mini vibrators, circuit wire connections and Arduino boards on SolidWorks, and later handcrafted on assembling the corresponding real parts
- Developed Detect-to-Signal function coding in C/C++ programming on Arduino to realize 4 vibration feedback modes according to different presence of approaching objects to the users, transferring the sensing signals to specific frequencies of vibration feedback
- Set up and conducted the test procedures with 10 non-blinding trails on the 6 participants, simulating the encountered obstacles in various cases for the users
- Collected user feedback data for adjusting the frequencies of vibration in each case, and evaluated system performance via avoidance reminding success rates with users reaction times or distances differences

Low Cost COVID-19 Ventilator — *Aug 2020 - May 2021*
- Helped to conducted meetings with advisors and teams, devising project strategies and designing project features: low-cost, portable, remotely-controllable and automatic
- Responsible for designing sub-assemblies of ventilators including air delivery system and bellow-based compressor mechanism on SolidWorks, and performed 5+ trials for improving the relevant safety features (valves, alarms, controllers and sensors) in each subsystems
- Calculated the compressor volume changing rate for different air delivery modes in MATLAB and simulated the air flow in tube model using ANSYS for checking safety features and requirements
- Developed and debugged on the driving code for controlling the stepper motor using C/C++ in Arduino, and realized three different speeds of air delivery according to required user modes

Tripod Arms Grabbing Robot based on Delta 3D Printer — *May 2019 - Aug 2019*
- Designed and revised the system mechanisms, specially on Grabbing Sub-systems on SolidWorks, involving grabbing hand, Arduino board, circuit wire connections, MKS base and CNC controller
- Calculated the spatial linkages and DOF (Degree of Freedom) of the system, and investigated 3D rotation, translation and motion velocities of rail joints with over 2000+ 3D coordinate matrices collected by API laser tracker to adjust and optimize the motion path of grabbing hand
- Helped to set up the grabbing platform, acquisition system as well as the object category and pose recognition system, realizing the 3D point cloud data translation and outputting the object category and pose information to the control system
- Programmed and debugged the function code in C/C++ in Arduino to realize the locate-and-grab motion paths according to the recognition result outputs