Ruijie Geng

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EDUCATION

- **Rensselaer Polytechnic Institute(RPI)**, Troy, NY **Graduation in May 2020**

  Bachelor of Science in Computer Science, GPA: 3.87/4.0
  Concentration in Robotics, Vision and Machine Learning

PUBLICATIONS

- Ruijie Geng, Thom McManus, Malik Magdon-Ismail, *Examining the suitability of random-number generators in Monte Carlo simulations of Bridge deals*(In Review)

RESEARCH

- **Assistive Robots, Research Program, RPI (Full-time in Summer)** January.2019-present
  - Develop assistive robot(Baxter and Kinova) to look after quadriplegics people.
  - Design control and motion planning algorithm with moveit for Baxter/Kinova in Gazebo/real world
  - Utilize convolutional neural network and segmentation technique to recognize food and drinks. Control robot arm-camera to localize and retrieve the desired objects.
  - Utilize two kinect cameras to map the room and track the humans. Guide the robots to deliver objects and avoid collision.
- **Machine Learning Related Research, Research Program, RPI** January.2019-present
  - **Dam Operation Strategy Design**: Use reinforcement learning to create operation model for dam-manager. The model will automatically control the output of water for power plants based on inflow and weather.
  - **Randomness Test**: Generate and analyze the randomness of sequence with different random number generators. Apply random number generators to simulate bridge card games. Compare the randomness between our game and the real game.

PROJECTS

- **Rock Raider(Self-Driving Ground Vehicle)** February.2019-present
  - Develop perceptron and simultaneous localization and mapping system for ground vehicle by using ZED camera and compass. Let the ground vehicle follow the GPS guide, move within the lanes and avoid the obstacles.
  - Received 3rd place in design competition in Intelligent Ground Vehicle Competition(IGVC) and Rookie-of-the-Year Award in 2019 summer.
- **Individual Projects** September.2017-present
  - **AutoGrading System**: Explore image process techniques(opencv) to autonomously grade answer sheet and recognize hand-writing letters. Develop website to run the grading system and user interface.
  - **RPI Course Trends**: Collect and provide objective data about courses for RPI students, helping students choose the courses.

EXPERIENCE

- **CS Department Pay Mentor, RPI** September.2017-present
  - Tutoring in intro to computer science, data structure, computer organization and machine learning course. Check students' exercise in lab session and help students to understand key points in lecture notes. Attend in training sessions to improve teaching skill.
- **Relevant Courses** September.2018-May.2019
  - **Intro to Robotics**: Utilize tools and methods to analyze the kinematics, dynamics and control for articulated robots. I explored how to control quadcopter in semester work. I combined proportional-derivative(PD) controller and vision to enable quadcopter hovering.
  - **Algorithmic Robotics**(Audition): Learn different kinds of algorithm in the area of robotics including localization, path planning and navigation. Implement simple Extended Kalman filter to do simultaneous localization and mapping.
  - **Computational Vision**: Develop efficient algorithms for solving problems in computer vision. Assess the difficulty of specific technical problems in computer vision and select potential solution techniques.
  - **Machine Learning**: Learn fundamental theorem within machine learning area. Learn how to implement basic learning models inculding logistic regression, k-nearest neighborhood, support vector machine and neural network. Based on data selects learning model and algorithm.

Technical Skills:

- **Embedded Framework**: Robot Operating System(ROS), Robot Raconteur, Gazebo, Moveit.
- **Embedded System Hardware**: Jetson, Raspberry pi, Arduino, ZED camera, Intel Realsense
- **System**:Linux Ubuntu, Bash, MySQL database, MIPS
- **Program language**: Experience with Python, Matlab, C, C++, Java,