

EDUCATION BACKGROUND

South China University of Technology, Guangzhou, China (985 Project, "Double First-Class Universities")

Bachelor of Engineering (Expected graduation date: Jun. 2023)

- Concentration: Robotics Engineering | GPA: 3.81/4.0
- Coursework includes: *Modeling, Analysis, and Control of Dynamic Systems, Mechanical Behavior of Materials, Thermodynamics and Fluid mechanics, Design and Manufacturing, Embedded System and Design etc.*
- Award: Third Prize merit scholarship & "Outstanding Student Leader" (1/45) in Sept. 2021
"Zhizao Shunde" Scholarship (1/370) & "Outstanding Student Leader" (2/46) in Sept. 2020
Second Prize merit scholarship (Top 2 out of 78 students) in Sept. 2019

University of California, Berkeley, Online

Summer Session Visitor (Jun. 2020-Aug. 2020)

- Concentration: Computer Science | Course: *Data Structure*

RESEARCH INTEREST

Domestic Robots, Autonomous driving

PUBLICATION

- Yuchen Song and Xuejian Zhang "Lymph node sections detection based on deep convolutional neural networks", Proc. SPIE 12079, Second IYSF Academic Symposium on Artificial Intelligence and Computer Engineering, 120792F (1 December 2021); <https://doi.org/10.1117/12.2622998>

RESEARCH EXPERIENCE

Application of Continuous-Discrete Reinforcement Learning

Supervised by Professor Yuan Lin (Work in progress, since Sept. 2021)

Research purpose: Apply continuous-discrete reinforcement learning to parameterized action space (traffic scenario -- merging).

- Used SUMO to build parallel type merging scenario, and registered it as a customized environment to gym.
- Used TraCI to interact self-defined agent (ego vehicle) with SUMO predefined driving models and deployed reinforcement learning approaches to explore a good control policy for parallel-type merging scenario.
- Made a customized policy for continuous-discrete reinforcement learning.

Lymph Node Sections Detection Based on Deep Convolutional Neural Networks (CNN)

Online research seminar supervised by Professor Mark Vogelsberger, MIT (Jul. 2021-Aug. 2021)

Research purpose: Compare and explore novel approaches to achieve efficient cancer detection based on lymph node section photos.

- Applied various kinds of CNNs on the dataset from Kaggle and achieved high accuracy on making predictions.
- Conducted experiments and comparisons between VGG16, ResNet-18, and EfficientNet.
- Made a comparison to emphasize the importance of pre-trained weights of VGG16.
- Designed a user-interface based on PyQt5.
- Source code available at <https://github.com/bqdqj/Cancer-detection-based-on-tensorflow-and-PyQt5>.

Tools Applied: Deep learning framework, TensorFlow and Keras.

Research on Continuous Motion Trajectory Tracking and Position Compensation of Vertical Six-Axis Manipulator

Research assistant supervised by Professor Kai Wu (Apr. 2020-Mar. 2021)

Research purpose: Improve the performance of robotic arms when working in macro-displacement and high-precision environments.

- Completed the research report together with other team members, focusing on the analysis of accuracy influencing factors and methods to improve accuracy.
- Delved into the knowledge of robot kinematics, and wrote a MATLAB program to reflect the application of the robot coordinate position transformation formula.

- Conducted researches on communication between KUKA robot controller data and Raspberry Pi controller based on OPC-UA communication.

COURSE PROJECTS

Design & Manufacturing of Robot Cars (Three semesters' project)

Group Leader (Jan. 2020 & Jun. 2021 & Dec. 2021)

Research purpose: Design robot cars using Arduino or STM32 as the main control board to effectuate the assigned tasks.

- Took charge of the processes of pre-planning, cars design, mid-term manufacturing, post-improvement, and debugging, also distributed appropriate tasks to each team mates.

Achievement: Designed three cars to successfully conduct task implementation: the first one could achieve line tracking and deliver cargo; the second one could control and shoot the balls to a designated area; the third car was able to conduct wireless charging and capacitor storage during cruise.

Feature Detection and Matching

Group Leader (Nov. 2020)

- Used the Harris corner detection method to identify points of interest in the image for feature detection;
- Came up with two descriptors for the feature centered at each interest point;
- Implemented the matchFeatures function of SSDFeature Matcher and RatioFeature Matcher to conduct feature matching;
- Wrote codes to detect discriminating features in an image and found the best matching features in another image.

COMPETITION

Contemporary Undergraduate Mathematical Contest in Modeling

Third Prize (Provincial) (Sept. 2020)

Objective: Develop a mathematical model to study the credit strategies for MSMEs (Micro, small and medium enterprises).

- Conducted data screening of 425 data records in Excel and used deletion method and interpolation method to deal with missing data;
- Pored over dozens of documents to upgrade my ability in dealing with bugs in coding;
- Engaged in model construction and enhanced the model with matlab to find the best model parameters;
- Proposed credit strategies for the banks, such as the amount of loans, the interest rates and the term of loans, according to credit risk analysis of the enterprise.

SKILL-SET

- Technical Skills: Be reasonably skillful in C++/C, MATLAB (Simulink), Python, and Java.
- Language Skills: Chinese (Native), TOEFL 100, GRE 321+3.5.