Yuchen Song

Personal website: https://yuchen-song.github.io/

Mobile: + 86 13022076440
E-mail: wisyc@mail.scut.edu.cn

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: 89.49/100 & 3.82/4.0｜Minor: Finance

➢ Coursework includes: *Artificial Intelligence Technology and Applications, Machine Vision and Sensing System, Data Analysis and Modelling, Data Structure, Natural Language Processing, Circuits, and 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)

➢ Department: EECS｜Course: *CS61BL Data Structures and Programming Methodology*

RESEARCH INTEREST

Deep Learning, Reinforcement Learning, Robotics

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

Reinforcement Learning in Merging Scenerio

Supervised by Professor Yuan Lin (Work in progress)

Research purpose: Apply novel reinforcement learning algorithms to the traffic scenario of 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;

➢ Defined a customized policy for novel reinforcement learning.

Lymph Node Sections for Cancer 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 effective approaches to 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.

➢ Made comparisons among the most famous architectures like VGG16, ResNet-18, and EfficientNet;

➢ Conducted experiments to emphasize the importance of pre-trained weights of these networks;

➢ Designed a user-interface based on **PyQt5**;

➢ Source code available at https://github.com/Yuchen-Song/Lymph-Node-Sacns-for-Cancer-Detection.

Tools Applied: Deep learning framework: **TensorFlow** and **Keras**.

Image Inpainting Algorithms Improvement Based on Coherent Semantic Attention

Supervised by Professor Patrick Chan (Sept. 2020-Jun. 2021)

➢ Filled in the missing photo sections based on image defects; applied adversarial learning to train the model and then restored the image using an attention based encoder-decoder structure;

➢ Modified the hyperparameter to tune the weights for several factors which affected the order of inpainting;

➢ Got familiar with the framework of computer vision (feature extraction, image refinement, and encoder-decoder structure) and sharpened the ability in coding.

COURSE PROJECTS

Simple 2D Lidar SLAM Simulation [link]

Group Leader (May 2022)

➢ Collected data, prepocessed it, and did transformation from local coordinates to global coordinates;

➢ Constructed grid maps (map of point occurrence & map of distance);

➢ Performed pose estimation with simple kinematic model then used downhill searching method for a better pose;

➢ Implemented loop closure optimization to reduce accumulated error.

Study on hypertension based on brfss2013 dataset [link]

Group Leader (Dec. 2021)

➢ Prepocessed the dataset to wash out NA values and outliers;

➢ Performed EDA (Exploratory Data Analysis) on several suspicious factors that may corelated to hypertension;

➢ Stated hypothesis and tested their significance on the factors that were highly skewed in distribution;

➢ Modelled using logistic regression, naive Bayes, and random forest and evaluated models.

Feature Detection and Matching [link]

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 [link]

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 Java, MATLAB (Simulink), Python, R, and C++/C.

➢ Language Skills: Chinese (Native), TOEFL 100 [Cer.], GRE 321+3.5 [Cer.].