Shizhuo Sun

Address: QianxiangWanhe-D, Changchun North Road, High-tech Development Zone
Zhengzhou City, Henan Province, China Zip Code: 450000
Email: ssz13940205281@163.com Mobile: +86-13940205281

Northeastern University, Shenyang, P.R. China **08/2017-07/2021**

Major: Computer Science and Technology GPA: 4.0/5.0 (90/100)

Degree: Bachelor of Engineering (expected in 07/2021)

PUBLICATIONS

F. Wang, **S. Sun** and Y. Liu, "A Bi-directional Interactive System of Sign Language and Visual Speech Based on Portable Devices," *2019 IEEE International Conference on Robotics and Biomimetics (ROBIO)*, Dali, China, 2019, pp. 1071-1076

Wang F, Zeng Z, **Sun S**, Liu Y. *Diversity Amplification and Data Generation of Chinese Sign Language Based on Generative Adversarial Network*, IEEE-CYBER, 2020 (been accepted, passcode: 296X-G4A6B9E8B6)

Fei Wang, Chen Li, Zhen Zeng, Ke Xu, Yanjun Liu, **Shizhuo Sun**. *Cornerstone Network with Feature Extractor: A Metric-based Few-shot Model for Chinese Natural Sign Language*, Applied Intelligence (paper, submitted)

Fei Wang, Chen Li, **Shizhuo Sun**, Yanjun Liu. A*n Automatic Locating-Tagging model for Chinese Sign Language and Database Construction based on Multi-Information Fusion,* (paper, submitted)

RESEARCH EXPERIENCE

Research on Surgical Assistant System Based on Human Motor Intention Recognition **Advisor: Fei Wang**

Core member, Intelligent Robot Research Center, Faculty of Robot Science and Engineering 12/2019-Present

- Proposed a method based on tactile enhancement to estimate finger force, through judging the force change by the degree of skin stretch to realize the prediction of doctor's hand movement
- Participated in the design of the improved Yolov3 model to detect different surgical instruments
- Built DDPG deep reinforcement learning network, got the trained network model to adjust the relative target position of the mechanical arm, so to realize the delivery of surgical instruments to doctors in the process of surgery

Study on Communication System based on Sign language and Visual Speech for Deafness **Advisor: Fei Wang**

Group leader, Intelligent Robot Research Center, Faculty of Robot Science and Engineering 11/2018-05/2020

- Responsible for the arrangement of the project, controlling the overall progress, organizing group meetings
- Designed and implemented the Classification-Verification mechanism of Chinese sign language recognition, implemented the verification mechanism by adding Siamese Network to the latter part of the classification model
- Proposed a bi-directional interactive system of Chinese sign language and visual speech based on portable devices, achieve the fluency of communication between the deaf and the normal in various complex environments
- Studied the method of constructing one-dimensional data annotation and location model through literature review, aiming to explore the current situation of sign language word database and assess the feasibility of scheme design
- Responsible for the construction of classification model of the first round of pre-training using 1D-VGGNet and the artificial synthesis of continuous sign language sentences using parallel vision method
- Applied the improved YOLO model to one-dimensional temporal sign language data so as to locate, segment and label the sign language words automatically, which reduce the workload of collecting data manually

Study on the Design of Intelligent Chinese Sign Language Interactive System **Advisor: Fei Wang**

Member of the Intelligent Robot Research Center, Faculty of Robot Science and Engineering 11/2017-06/2018

- Assisted graduate students to integrate literature materials, conducted background research on the project
- Read papers on sign language recognition, got acquaintance with the features of sEMG and inertial signals
- Responsible for the acquisition and preprocessing of Chinese sign language data including wavelet transform and normalization to input sign language data which is transformed to vectors into the classification model
- Got to know the working mechanism of CNN, learned to apply the NN model which processes 2D signals to 1D data

Research and Development of MICS Platform **Advisor: Wei Li**

Member of Medical Imaging Laboratory, School of Computer Science and Engineering 03/2018-06/2018

- Got familiar with the project background and service objects, understood the basic laboratory workflow
- Responsible for the front end of the MICS platform web page design and the implementation of electronic medical records system
- Simplified the structure of the medical records, speeded up the review and follow-up examination

WORK EXPERIENCE

Image Recognition and Classification Based on Cascading SVM and Improved ResNeSt **06/2020-07/2020**

Project manager *Advisor: Wei Li*

- Responsible for the completion of the feature engineering of machine learning including feature extraction and feature combination according to weight, the *Improved ResNeSt* network structure improvement of deep learning
- Completed the feature extraction for the preprocessed images; finished the combined design of the features based on weight value to make preparation for the classification while the SVM classifier was employed
- Added extra attention-block to the original ResNeSt to enhance the semantic features of the context so as to increase the extraction of features; the best recognition rate on the test set reached 93%
- Completed the paper *Image Recognition and Classification Based on Cascading SVM and Improved ResNeSt*

Shenyang Wuzhi Technology Limited Company **04/2019-Present**

Tech lead *Supervisor: Zhen Zeng*

- Responsible for the maintenance and upgrade of the *Magic Hand Echo*-gesture interactive system
- Participated in the APP design, adopted the Android framework, proposed the design of sign language micro-blog community module, which was of great significance for deaf people and now is in AppStore online
- Applied GAN to the amplification of one-dimensional sign language signals to increase the amount of sign language words, participated in implementing random core extraction method to perform rapid data amplification and effectively prevent model overfitting by increasing the sample size of the sign language data set.

EXTRACURRICULAR ACTIVITIES

The 5th China College Students' *Internet Plus* Innovation and Entrepreneurship Competition **10/2019**

- Participated in the competition as the technical leader of Shenyang Wuzhi Technology Limited Company (a start-up company); responsible for the technical guidance and the PPT making and presentation

Project Manager, Enactus **10/2017-06/2018**

- Completed the construction and operation of the campus information sharing platform
- Facilitated the on campus students to get first-hand information

Student Societies Association, Student Union **09/2017-01/2018**

- Responsible for the planning of internal copywriting of the association
- Participated in the holding of large-scale school activities

Volunteer Activities **06/2019-12/2019**

- Sign language information Collection, sponsored by Liaoning Disabled Persons' Federation

HONORS & AWARDS

Second Class Scholarship, school-level 10/2020

Best Creative Program, the 13th National College Students' Innovation Training Program 06/2020

Silver Award, the 5th China College Students' *Internet Plus* Innovation and Entrepreneurship Competition 09/2019

Second Class Scholarship, school-level 12/2018

National Third Prize, the Chinese Mathematics Competitions (CMC) 11/2018

SKILLS

Proficiency in C, C++, JAVA, PYTHON, JavaScript, HTML, VHDL, CSS

Operating system: Linux, windows