Shiquan Zhang

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EDUCATION

University of Chinese Academy of Sciences (UCAS) Beijing, China

Shenzhen Institute of Advanced Technology (**SIAT**) Shenzhen, China

M.Eng. in Computer Technology GPA: 3.78/4 Ranking: 3/62 (5%) Jun. 2019 – Jun.2022

Master Thesis: A Novel Spatial-Temporal Method for Automatic Diagnosis of Patent Foramen Ovale

Related Courses: Design and Analysis of Algorithms, Digital Image Processing, Digital Signal Processing, Data Visualization, Computer Architecture Cloud Computing and Big Data Processing, High Performance Computing and Applications, 5G Wireless Communication, Biomedical Informatics

Hainan University (HNU) Haikou, China

B.Eng. in Mechatronic Engineering GPA: 3.27/4 Ranking: 20/111 Sep. 2015 – Jun. 2019

Undergraduate Thesis: Vehicle License Plate Recognition System Based on OpenCV

Related Courses: C language program Design and Experiment, Control Engineering, Single Chip Microcomputer, Higher Mathematics, Linear Algebra Probability and Statistics, Data Structure, Principles of Computer Organization, Computer Network, Computer Operating System

SELECTED AWARDS

First place in the professional interview in Postgraduate Entrance Examination in SIAT 2019

National inspirational scholarship 2017

HNU Outstanding Graduate 2019

HNU Elite Youth Training Program (3%) Mar. 2017 – Jun. 2019

HNU merit student and excellent student leader 2016, 2017

First and Second prize of Innovation and Entrepreneurship Competition of College of Mechanical and Electrical Engineering 2017

HNU second-class scholarship 2016

First prize of Chemistry Competition in Guangdong Province, China 2014

Chinese Academy of Sciences Public Science Day's Outstanding Volunteer 2021

Excellent Vice President of PKU Boxing Club of Peking University Shenzhen 2019 – 2020

National Top 100 Summer Social Practice Team and Outstanding Individual 2018

Haikou International Marathon Competition's Outstanding Volunteer 2017

First place in the High School 1km Competition (time: 3'03) 2014

PUBLICATIONS

[1] Yang, J., Zhang, H., Wang, Y., **Zhang, S.**, Lan, T., Zhang, M., ... & Du, L. (2020). The Efficacy of Contrast Transthoracic Echocardiography and Contrast Transcranial Doppler for the Detection of Patent Foramen Ovale Related to Cryptogenic Stroke. *BioMed research international, 2020*. Volume 2020, Article ID 1513409 #https://doi.org/10.1155/2020/1513409

[2] Yin, L., Du, L., Li, Y., Xiao, Y., **Zhang, S.**, Ma, H., & He, W. (2021). Quantitative Evaluation of Gastrocnemius Medialis Stiffness During Passive Stretching Using Shear Wave Elastography in Patients with Parkinson's Disease: A Prospective Preliminary Study. *Korean Journal of Radiology, 22.* Nov;22(11):1841-1849 #https://doi.org/10.3348/kjr.2020.1338

[3] Zhang, X., Xiao, Y., Wang, C., **Zhang, S.** Deep residual convolutional neural network for the diagnosis of muscle atrophy based on dynamic ultrasound shear-wave elastography video. Chinese Journal of Biomedical Engineering, 2021. (minor revision)

[4] Yang, J.#, **Zhang, S**.#, et al. A machine learning approach based on spatial-temporal information for detection of patent foramen ovale from contrast transthoracic echocardiography. (co-first author paper, under drafting in European Radiology)

PATENTS

[1] **Zhang, S.**, Xiao, Y., Du L., Ma T., Zheng, H. Patent foramen ovale detection method, system, terminal and storage medium, CN Invention and PCT, CN202011373095.3 & PCT/CN2020/139680, First trial.

[2] Xiao, Y., Zhang, X., **Zhang, S.**, Wang, C., Ma T., Zheng, H. Muscle ultrasonic image detection method, system, terminal, and storage medium, CN Invention and PCT, CN202011230395.6 & PCT/CN2020/139413, First trial.

[3] Tang, Z., Zhang, J., **Zhang, S.**, et al. A new mechanical impact buffering device for automobile, CN Utility Model, ZL201721292832.0, Issued.

RESEARCH EXPERIENCES

- **1Removal of Domain Distribution's Differences in Radiomics Features**, Independent May. 2021 – Present

  SIAT-Medical AI Center, advisor: P.I. Zhicheng Li

  # **Feature Extraction, Empirical Bayes, Radiomics, CNNs**

  - Discrepancy across domain distributions (e.g., multicenter, scanner model, reconstruction settings) may greatly influence radiomic

feature extraction and cause degradation in subsequent analysis. We have conducted experiments to use deep learning methods to fit mathematical relationships to improve the performance of traditional Combat (Empirical Bayes) algorithm in feature domain.

- **2Patent Foramen Ovale (Heart) Disease Classification**, Independent #Video #Slide Sep. 2019 – Apr. 2021

SIAT-Paul C. Lauterbur Biomedical Imaging center & Shenzhen University & Peking Tiantan Hospital, advisor: P.I. Yang Xiao and Prof. Yongjin Zhou

 # CNNs, Image Processing, Segmentation, Bubble Detection, Superpixel, Radiomics, Classification, Temporal Sequences, Echocardiography

- Preliminarily achieved an automatic diagnosis method in patent foramen ovale (PFO) classification in 2D contrast echocardiography videos, which firstly explored the feasibility of PFO diagnosis with artificial intelligence, revolved around interference and microbubble detection, and achieved 0.7750 accuracy, 0.7847 sensitivity and 0.7500 specificity compared to regular clinicians' 0.6800, 0.6200 and 0.8200.
- Utilized CNNs (Deeplabv3+/Unet) to make 2D left atrium segmentation.
- Proposed a time-domain preprocessing method to remove inherent interference (noise and motion artefacts) in echocardiography, which utilized conventional TTE imaging's prior knowledge and projected minimal gray interval from TTE videos to cTTE videos, thereby minimizing inherent interference as much as possible.
- Developed a two-stage detection method in space domain, which includes a superpixel segmentation method and a radiomics method, coarsely aggregates the features of similar pixels into superpixel block and discriminate bubbles under the constraints of grayscale threshold and elliptic or circular circularity, and further finely makes radiomics feature extraction and selection.

- **3Muscle Atrophy Disease Classification**, Participate Sep. 2020 – Apr. 2021

SIAT-Paul C. Lauterbur Biomedical Imaging Lab, advisor: P.I. Yang Xiao

 # CNN, Data Fusion, Classification, Elastography

- Utilized 3D-ResNet to make binary classification in 2D shear-wave elastography videos, which fused B-mode and SWE (shear wave elasticity) images, realized the effective discrimination of muscle atrophy and achieved 0.9556 accuracy, 0.9557 sensitivity and 0.9554 specificity.

- **4Other Projects Experiences**

4.1Competition

- **Huawei Cloud Cup Precipitation Nowcasting** May. - Jun. 2020

 # GAN, Temporal Sequences, Precipitation Prediciton

Enhanced the performance of convGRU through introducing GAN module to make prediction of future precipitation in radar data.

- **User Cellphone Traffic Upgrade Prediction** Oct. - Nov. 2019

 # Data Cleaning, Feature Engineering, SVM, XGBoost

Preprocessed and analyzed text data, practiced feature engineering, utilized basic machine learning models to make traffic upgrade classification.

4.2Undergraduate projects

- **Sliding Double-deck Parking Space** #Video 2017. Sep - Jan. 2018

 # Mechanical Transmission, Physical Production, Design and Rendering in Pro/E

Designed a sliding mechanical transmission control system in car parking area, which can semi-automatically park, lift and rotate, and participated in the physical production, test and calibration.

- **Vehicle Life Monitoring System** #Video Jul. - Oct. 2017

 # Microcontroller, Sensors, GSM/GPS, Solar Power

Designed a multi-judgment integrated system with alarming mechanism to reflect the status of life form, which covered positioning, sensor detection, solar battery and false alarm release modules.

LEARNING EXPERIENCES

- **Convolutional Neural Networks for Visual Recognition** (CS231n), Stanford University, Online #Code on github
- **Statistical Data Analysis**, Johns Hopkins University, Coursera #Code and certificate on github
- **Artificial Intelligence in Healthcare** (CS271), Stanford University, Online

SKILLS

Standardized Test: IELTS 6.5 (R7 L7 S6 W6) in Sep. 2021

Software Skills:

- **1Programming**
  - Proficient in Python, Matlab, R and C
  - Linux, Pytorch, Tensorflow
  - Experiences with LaTex, Javascript and HTML
- **2Visualization: Strong in multimedia technologies (image and video design)**
- **3Software: Proficient in AutoCAD, Pro/E, Adobe Photoshop, Premiere, Illustrator and AfterEffects**

Extracurriculum: #More details and soft skills (feel free to check)

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