

# XIANGXIANG CUI

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## 🎓 EDUCATION

**Beijing Normal University**, Beijing, China Sep. 2022 – Present

*Ph.D.* in Cognitive Neuroscience. Advisor: Jing Sui

*Research:* Machine Learning, Deep Learning, Brain Cognition.

**Xi'an Jiaotong University**, Xi'an, China Sep. 2019 – June 2022

*M.E.* in Software Engineering, Advisor: Zhongyu Li

*Thesis Topic:* Research on benign and malignant diagnosis and robustness evaluation method of deep model for dynamic ultrasound.

## ⚙️ EMPLOYMENT

**Frontline Intelligent Technology**, Xi'an, China Dec. 2020 – Dec. 2021

Intern. Analysis of dynamic ultrasound video.

**Keya Medical Technology**, Shenzhen, China June 2020 – Dec. 2020

Intern. Coronary Segmentation & Head and Neck Segmentation.

**Lobon Technology**, Shenzhen, China Jan. 2018 – June 2018

Intern. Embedded Software Development.

## ♥️ RESEARCH INTEREST

- **Model Robustness:** Adversarial Attack, Model Robustness Evaluation
- **Medical Informatics:** Computer-Aided Diagnosis, Medical Image Analysis

## 📖 PUBLICATIONS

- Yichen Wang, Zhongyu Li, Xiangxiang Cui, et al. "Key-frame Guided Network for Thyroid Nodule Recognition using Ultrasound Videos." *MICCAI* (2022).
- Xiangxiang Cui, Shi Chang, Chen Li, Bin Kong, Lihua Tian, Hongqiang Wang, Peng Huang, Meng Yang, Yanan Wu, Zhongyu Li. "DEAttack: A differential evolution based attack method for the robustness evaluation of medical image segmentation." *Neurocomputing* (2021).

## 👨‍🔬 RESEARCH PROJECTS

**Ultrasound Video Image Classification** Mar. 2021 – Present

**Role:** Leader of computational methods, finished in Frontline Intelligent Technology.

- Feature extraction of multiple consecutive video frames based on CNN and LSTM.
- The verification accuracy of video-based(Our) classification is higher than single-frame classification.

**Adversarial Attack and Model Robustness Evaluation** Jan. 2020 – Jan. 2021

**Role:** Project Leader, cooperated with Prof. Zhongyu li and other professors, finished in Xi'an Jiaotong University.

- We proposed the evaluation method of the segmentation model robustness based on the differential evolution.
- Implemented Adversarial Attack approach including FGSM, PGD, ASMA, in four medical datasets for compare experiments.

- Does not require additional target network information. Attack the medical image segmentation model while perturbing only a tiny fraction of the image pixels. For the robustness evaluation of different segmentation models under adversarial attacking by comparing the numbers of perturbation points.

## Head and Neck Segmentation

Oct. 2020 – Dec. 2020

**Role:** Leader of computational methods, finished in Keya Medical Technology.

- Label Data Preparation: using regional growth and optical flow to generate pre-segmentation. The Label specialists manually revised pre-segmentation.
- Deep Learning: using label data and 3D CNN to generate smooth segmentation results.

## Coronary Segmentation

June 2020 – Oct. 2020

**Role:** Leader of aorta segmentation, participate in coronary segmentation full process, finished in Keya Medical Technology.

- Using CNN to segment the aorta, analyse the aorta segmentation results and then adjust algorithmic to adapt to different hospital datasets.
- Participating in the refinement of coronary segmentation, including vessel broken, vein removal.
- Develop vessel segmentation results evaluation tools to improve iterative efficiency.

## The embedded car

Oct. 2017 – Mar. 2018

**Role:** Developers.

- The whole system is completed by using microsystem STM32, Cortex-A8 and C language.
- Using KNN to identify direction(turn to left or right) based on the Opencv library.
- Using PID algorithm and sensor to control the travel stability of the embedded car.

## Web online compiler

June 2017 – Sep. 2017

**Role:** Developers.

- The whole system is completed by using Html, Javascript, Php, Linux shell, Mysql.
- Support languages: C, C++, C#, Java, Html, Javascript, Php.
- As a sub-module of the online video and live programming learning website, we embed the online compiler into the learning website to assist computer science students in completing programming languages.

## ⚙️ SKILLS & EXPERTISE

- Proficient with deep learning and computer vision algorithms, proficient with Pytorch framework, proficient with state-of-the-art deep neural networks.
- Proficient with multiple Image processing open source library, including ITK, SimpleITK, Scikit-Image, VTK, VMTK, Opencv. Proficient with format and processing of 2D and 3D medical images. Such as DICOM, NIFTI.
- Proficient with multiple programming languages, including Python, C, C++, PHP, Java, HTML, Javascript, Linux shell. Proficient with Network Socket Programming, Multi-process communication, Docker container.
- Proficient with microcomputer system, including MSC-51, STM32, Cortex-A8.
- Leading engineer experience in Websites, Web Server, Embedded Internet of Things, Android APP and so on.
- Extensive experience in cooperation with researchers with multidisciplinary and different engineer backgrounds.

## ♥️ HONORS & AWARDS

<i>Intelligent Algorithm Contest of China</i> , Rank: 13/600	Nov. 2019
<i>Double Excellent Graduate</i> , Anhui Province	July 2018
<i>Special scholarships</i> , Rank: Top 1%, Undergraduate	July 2018
<i>Special scholarships</i> , Rank: Top 1%, Undergraduate	July 2017
<i>President of the Computer Association</i> , Undergraduate	Sep. 2016

*National scholarships*, Rank: 1/800, Undergraduate  
*Special scholarships*, Rank: Top 1%, Undergraduate  
*Special scholarships*, Rank: Top 1%, Undergraduate

July 2016  
July 2016  
July 2015