Jiantong ZHAO

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EDUCATION BACKGROUND

Department of Automation, Tsinghua University   08/2019 – 06/2023
- Research interests: ***System Design & Development and Optimization for Computer Vision***
- Programming languages: C/C++, Java, Python, JavaScript, C#, Matlab.
- Main Courses:

Operating Systems	Computer Architecture	Computer Networks
Data Structures	Pattern Recognition and Machine Learning	Signals and System Analysis
Programming Languages	Principles of Automatic Control	Design of Modern Electronic Systems

RESEARCH EXPERIENCE

Research on Practical Video Super-Resolution Using Look-Up Table   10/2022 – 01/2023
Undergraduate Research, directed by Associate Prof. Jiwen Lu
- The core was to complete high-definition repair of low-resolution images by means of look-up table and tetrahedral interpolation, and I addressed the efficiency bottleneck of the repair speed.
- Simplified the algorithmic complexity of the search and reconstruction process, and used the Numpy feature to change the process mode from serial to parallel.
- shortened the processing time 90% of original after optimization, which is fast and light enough for video SR on mobile devices.

Research on Prediction and Generation of Mouse Gene Expression Images under Zero/Few-shot   03/2022 – 10/2022
Summer Research, directed by Associate Prof. Sheng Wang
- In order to solve the problem of dying during the development of stained mice, the slice map of mouse embryos in later stages of development is predicted based on neural network.
- Combined VAE with Transformer, used the encoder to compress the picture into a latent space vector to meet the input requirements of the Transformer sequence, and the processed vector is restored to the predicted image through the decoder.
- Introduced a reference time point mechanism to guide the network to obtain sequence space-time information as much as possible, and predict future time points through interpolation.
- Used the few-shot technique, pre-trained on similar tasks with large training sets to initialize model parameters and adjust hyperparameters to the optimum, which solved the problem of slow model convergence and fuzzy prediction under the limitation of small samples.
- Outperformed SOTA models in the field on MSE and PSNR.

SELECTED COURSE PROJECTS

Real-time facial expression recognition based on neural network   10/2021
Foundation of Artificial Intelligence, directed by Prof. Rui Jiang
- Trained the ResNet network using the dataset of Facial Expression Recognition Challenge 2013.
- Realized facial recognition & annotation using the trained network.

"Thunder Class" Online-Teaching software   06/2020
C++Programme Design and Training, directed by Prof. Jingtao Fan
- Developed a software that can conduct audio and video teaching in real time.
- Accomplished multiple accounts management, student sign-in, student voice speech, screen sharing, online question sending and online answering.

All-terrain polymorphic robot based on Psoc   07/2021
Contemporary Electronic System Design, directed by Prof. Zhaohui Ye
- Accomplished remote switching between quadruped walking mode and wheeled mode.
- Realized automatic walking, avoid obstacles, and keep the platform level in potholes.

Automatic fetch quadcopter UAV based on STM32   09/2021
- Wrote the inner and outer loop control program, processing the five-axis sensor data and GPS data to realize automatic positioning.
- Deployed the trained image recognition network on the mobile chip to realize the UAV to automatically pick up the target items.

COMPETITIONS EXPERIENCE

Tsinghua Smart Car Design Competition 'Dynamic chip' Program   01/2020
- Accomplished the electromagnetic tracking of the car using the chip provided by Infineon.
- Realized the car camera to send back the front image in real time for the mobile phone to view.