Chaoxing Huang

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EDUCATION

The Chinese University of Hong Kong — Hong Kong SAR
PhD candidate in Medical Imaging (Engineering track) — *August 2021 - Current*

Research areas: *Quantitative MRI, Deep learning, Uncertainty, Liver imaging*
Supervisor: Prof. Weitian Chen

The Australian National University — Canberra, Australia
Master in Machine Learning and Computer Vision — *July 2018 - July 2020*

Courses: *Computer vision, Deep learning in computer vision, Statistical machine learning, Robotics, Engineering data analysis,Bio-inspired computing, Control system, Network optimization and control, System engineering*

South China Normal University — Guangzhou, China
Bachelor of science in Opto-electronic — *Sep 2014 - June 2018*

Courses: *Signal processing, Fourier optics, Digital image processing, Analog and digital Circuit, Electrodynamics, Information Optics, Quantam Mechanics, Laser Principle, Thermodynamics and statistical Physics*

SKILLS SUMMARY

- **Languages**: Cantonese, Mandarin, English
- **Programming**: Python, MatLab, C
- **Frameworks**: Pytorch, Scikit, Monai, Pandas
- **Platforms**: Windows, Linux, Arduino
- **Others**: Latex, Filmora, Research presentation

WORK EXPERIENCE

South Surveying and Mapping Ltd. — Guangzhou, China
Computer Vision Engineer (Full-time) — *Feb 2021 - May 2021*

- **Panoramic imaging** : Designed and implemented algorithm for panoramic stitching of Guangzhou city
- **Road test of a surveying and mapping vehicle**: Debugged and tested the car-mounted industrial camera sensor for city mapping
- **Point cloud colorization**: Collected 3D point-cloud and image data using Faro scanner and Industrial Camera. Implemented a 3D point-cloud colorization algorithm.

Institute of Computing Technology, Chinese Academy of Science — Beijing, China
Research Assistant (Full-time) — *Sep 2020 - Jan 2021*

- **Eye pupil dataset collection** : Collected an image based eye pupil diameter prediction dataset using eye tracker. Conducted data cleaning and pre-preprocessing.
- **Iris segmentation**: Explored the the feasibility of using non-negative factorization to generate coarse label to improve the iris segmentation performance of a deep network.

PROJECTS

- **Numerical optimization method for MRI-based fatty acid quantification in the liver**: (Aug 2023 - current). This project is part of my PhD study in CUHK.
  - Implemented IDEAL-based algorithm for mapping the number of double-bonds in triglycerides.
  - Proposed to map the number of double-bonds in triglycerides via deep image prior method.

- **Deep learning based liver parametric mapping in quantitative MRI** : (Aug 2021 - Oct 2023). This project is part of my PhD study in CUHK.
  - Proposed a self-supervised learning method to map $T_1\rho$ and T_2 parameters in the liver by leveraging the physics constraint.
  - Proposed to integrate Bayesian learning to the mapping networks to facilitate the mapping results with uncertainty.
  - Studied the impact of the uncertainty in model training and post-hoc analysis.

- **Using deep feature factorization in Iris segmentation from near infrared image**: (Oct 2020 - Jan 2021). This is a project conducted at the Visual Information Processing and Learning (VIPL) research group at Institute of Computing Technology, Chinese Academy of Sciences.
  - Generated real world concept based semantic coarse ground-truth heatmaps by using deep feature factorization.
  - Trained segmentation models for pupil and iris segmentation and validate the feasibility of using deep feature factorization in eye-part segmentation.

- **A Genetic Feature Selection Based Two-stream Neural Network for Anger Veracity Recognition**: (Feb 2020 - July 2020)
  This project was done in cooperation with members from the Human Centered Computing Group, ANU.
  - Proposed a two stream neural network to predict the anger veracity from binocular physiological data.
  - Proposed a genetic based feature selection algorithm to select temporal data features as well as network architecture.

- **Event-based human action recognition and anticipation**: June 2019-July 2020
  This is the master final project conducted at the CV Lab of ANU
  - Transformed event-based data to frame representation by using timestamp image spatial-temporal encoding method.
  - Implemented an action recognition model by training a frame-based CNN.
  - Implemented an action anticipation model by training a future frame generator and use teacher-student mechanism to equip the future frame with action class semantic information.

- **Deep reinforcement learning based optimal trajectory tracking control of autonomous underwater vehicle**: (Dec 2015 - April 2017)
  This is part of the National Undergraduate Training Program for Innovation and Entrepreneurship and Student Research Training Program in China.
  - Used Lyapunov function to derive the reward function for the reinforcement learning agent.
  - PID algorithm implementation on robot hardware.
  - Sensor circuit design on robot hardware.

SELECTED PUBLICATIONS

- An Uncertainty Aided Framework for Learning based Liver Mapping and Analysis. Physics in Medicine and Biology. 2023 (**Huang, C**, Wong,V, Chan,Q, Chu, W, Chen,W)

- Uncertainty-weighted Multi-tasking for $T_1\rho$ and T_2 Mapping in the Liver with Self-supervised Learning. 45th International Engineering in Medicine and Biology Conference, Sydney, 2023 (**Huang C**, Qian Y, Hou J, et al.)

- Uncertainty-Aware Self-supervised Neural Network for Liver $T_{1\rho}$ Mapping with Relaxation Constraint. Physics in Medicine and Biology. 2022 (**Huang, C**, Qian, Y, Yu, S. C. H., Hou, J, Jiang, B, Chan, Q., . . . and Chen, W.)

- Breathing Freely: Self-supervised Liver T1rho Mapping from A Single T1rho-weighted Image. Medical Imaging with Deep Learning (MIDL) 2022 (**Huang, C.**, Qian, Y., Hou, J., Jiang, B., Chan, Q., Wong, V., Chen, W.)

- A genetic feature selection based two-stream neural network for anger veracity recognition. Neural Information Processing: 27th International Conference, ICONIP 2020, Bangkok, Thailand, November 23–27, 2020, (**Huang, C.**, Zhu, X., Gedeon, T.)

- Deep reinforcement learning based optimal trajectory tracking control of autonomous underwater vehicle. In 2017 36th Chinese control conference (CCC) (pp. 4958-4965). IEEE.(Yu, R., Shi, Z., **Huang, C.**, Li, T., Ma, Q)

PATENT

Trajectory Control Method and Control System for Underwater Robots Based on Deep Reinforcement Learning (Patent NO. CN107102644B, in Chinese) 2019 (Qingmao Zhang, Qiongxiong Ma, Runsheng Yu, Zhenyu Shi, Chaoxing Huang,Tenglong Li)

VOLUNTEER EXPERIENCE

- **Summer course teaching in Guangdong Guangya High school**   Guangzhou, China
  Aug,2017

OTHERS

I am a table tennis lover in daily life.