

HAOMIN CHEN

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SUMMARY

Applied Research Scientist in Ericsson working in Ericsson Digital Human (EDH) for interpretable video translation. Graduated as a Computer Science Ph.D. from Johns Hopkins University with a background in interpretable computer vision systems for medical image analysis with human-computer interaction, image classification, object detection, and segmentation. Rich experience with whole slide images, CT scans, and X-rays. The first author of Nature partner journal paper. Excellent communication skills and ability to work on multi-disciplinary teams.

EDUCATIONS

Johns Hopkins University

Jan 2018 - Dec 2022 (Degree Completed)

Doctor of Philosophy, Computer Science

Degree Awarded in 05/2023

Advisors: Dr. Mathias Unberath, Dr. Gregory Hager

Baltimore, MD, USA

First author publications: 5 conference papers, 4 journal papers

First author of one Nature partner journal paper

Columbia University

Sep 2016 - Dec 2017

Master of Arts, Statistics

New York City, NY, USA

Overall GPA: 4.1 / 4.0

Fudan University

Sep 2012 - Jun 2016

Bachelor of Science, Physics

Shanghai, CHINA

Core GPA: 3.6 / 4.0

SKILLS

Python, C++, Linux, Slurm, Docker, PyTorch, Tensorflow, Matlab, R, Machine Learning, Deep Learning, Computer Vision, Medical Image Analysis, Human-Computer Interaction, Interpretable Learning, Classification, Object Detection, Instance Segmentation, Audio Processing, Statistical Analysis

EXPERIENCES

Ericsson, Los Angeles

Feb 2023 - now

Applied Research Scientist

Los Angeles, CA, USA

Interpretable Video Translation

Background: International in-person or virtual real-time communication/entertainment is limited by languages. Even with human interpreters, asynchrony between facial movements and interpreted sentences creates a sense of distance and a non-immersive experience.

Contribution: I created the largest dataset of speaking face videos from a wild source - YouTube. I established an algorithm for synchronization between translated audio and original video at the sentence level in a multiperson and multilingual situation. I refined the facial landmark generation network for better articulation. I used the diffusion technique to achieve immersive lip synchronization in videos with translated audio.

Extra: In an internal user study, my video-audio synchronization proved to be more robust and generalizable compared to a similar product from ElevenLabs.

Meta, Redmond

Research Intern

Jun 2022 - Oct 2022

Redmond, WA, USA

2D-3D style transfer

Background: Users are willing to customize their virtual 3D space in Metaverse with styles in their favorite images. This project aims to stylize 3D scenes with arbitrary 2D style images.

Contribution: The stylized 3D scene can easily be displayed with real-time VR applications. The stylized 3D scene is also interactive. More importantly, I am the first to preserve 3D reality in 3D stylization. I performed a user study within Meta's group and all participants preferred my method to the other works.

Performance: I quickly learned style transfer, 3D graphics, and rendering from scratch in one week. Internship performance exceeds director/mentor/peers' expectations in review.

Johns Hopkins University

Research Assistant

Jan 2018 - Feb 2023

Baltimore, MD, USA

Systematic Review for Interpretable ML in Medical Image Analysis

Background: Medical images are analyzed for high-stakes decision makings with the following treatments impacting lives. Interpretable model design aims to reveal the working mechanism of complex algorithms. However, designers are not clinical stakeholders. A human-centered design is desired to create models that are indeed interpretable to end users.

Contribution: I conducted a systematic review of the literature in 3 databases. I identified 2508 records and included 68 articles. I introduce guidelines that recommend formative user research as the first step to understanding user needs and domain requirements.

Extra: My first-author journal paper is accepted in npj Digital Medicine ($IF = 11.6$)

Interpretable Cancer Subtyping with Cytopathology Images

Background: Uveal Melanoma (UM) is an eye cancer threatening patients' lives. UM prognostication selects patients for the most suitable follow-up treatments. However, UM cancer subtyping with cytopathology images is beyond pathologists' ability. I aim to create an automatic and interpretable algorithm for UM cancer subtyping.

Contribution: I created automatic and interactive algorithm that accelerates > 10 times for high-quality region extraction. Another algorithm for cancer subtyping by analyzing cell composition in cytopathology images is proved to be interpretable to pathologists through a web-based user study.

Extra: My first-author papers are accepted by MICCAI workshop and ICML workshop. A journal extension paper is being reviewed by Nature BME journal.

Automatic Splenic Injury Grading System with CT Scans

Background: Splenic injury is a common injury in adult abdominal trauma and AAST grading guideline is the gold criterion. Automated AAST grading could potentially provide a rapid, objective, and accurate second-reader capability, but no work has described automated AAST grading to date.

Contribution: Following AAST guideline, I first segment and detect the most salient features of the AAST grading system. I further created rule-based symbolic reasoning with these features for splenic injury grading by strictly following AAST guideline.

Extra: My first-author journal paper is accepted in Emergency Radiology ($IF=1.59$).

NVIDIA, Bethesda

Applied Research Intern

May 2018 - Dec 2018

Bethesda, MD, USA

Multi-Abnormality classification in Chest X-rays

Background: It takes around 30 minutes for radiologists to find all abnormalities in one chest X-ray. Some places even lack clinicians to diagnose scanned chest x-rays. This project aims to create automatic models for abnormality classification in chest x-rays that is explainable to radiologists.

Contribution: I follow clinical taxonomy to build models understandable to clinicians. The performance of abnormality classification outperforms state-of-the-art methods.

Extra: My first-author paper is accepted by MIDL 2019 with an oral presentation. I received special invitation to Journal “Medical Image Analysis” ($IF = 13.8$) and the first-author journal paper is also accepted.

PingAn Technology, Bethesda

Applied Research Intern

May 2019 - Dec 2019

Bethesda, MD, USA

Fracture Detection in Pelvic Trauma X-rays

Background: Pelvic trauma is life-threatening and pelvic x-rays are scanned to detect fractures in the emergency room. A quick diagnosis with high performance is desired. I designed a deep learning method for fracture detection in pelvic x-rays.

Contribution: My method is deployed in Changzheng Hospital in Taiwan and has been used by over 5 thousand patients. My methods spend < 1 second to detect fractures in each pelvic x-ray. The results reach 98% AUC, which outperforms previous works. My method mimicked radiologists’ clinical practice to detect fractures by comparing vertical anatomical regions.

Extra: My first-author paper is accepted by ECCV 2020 with a poster presentation.

PingAn Technology, Shanghai

Data Mining Scientist Intern

May 2017 - Aug 2017

Shanghai, CHINA

Lung nodule detection in CT scans

Background: I attended the Skylake competition sponsored by Intel and Alibaba about lung nodule detection in CT scans.

Contribution: I applied 3D UNet with Pytorch and Faster RCNN with Caffe to detect lung nodules in 1000 CT scans.

Extra: I achieved top 6 out of 2887 teams.

SELECTED PUBLICATIONS

Journal papers:

1. **Haomin Chen***, Catalina Gomez*, Chien-Ming Huang, Mathias Unberath. Explainable Medical Imaging AI Needs Human-Centered Design: Guidelines and Evidence from a Systematic Review. (2022) **npj Digital Medicine (IF=11.65)** **5**, 156.
2. **Haomin Chen**, Shun Miao, Daguang Xu, Gregory Hager, Adam Harrison. Deep hierarchical multi-label classification applied to chest X-ray abnormality taxonomies. (2020) **Medical Image Analysis (IF=13.82)** **66**, 101811.
3. T. Y. Alvin Liu*, **Haomin Chen***, Catalina Gomez, Zelia Correa, Mathias Unberath. Direct Gene Expression Profile Prediction for Uveal Melanoma from Digital Cytopathology Images via Deep Learning. (2022) **Ophthalmology Science (IF=7.18)** 100240.
4. **Haomin Chen**, David Dreizin, Mathias Unberath. Toward automated interpretable AAST grading for blunt splenic injury. (2022) **Emergency Radiology (IF=1.59)**
5. David Dreizin, Bryan Nixon, Jiazhen Hu, Benjamin Albert, Chang Yan, Gary Yang, **Haomin Chen**, Yuanyuan Liang, Nahye Kim, Jean Jeudy, Guang Li, Elana B. Smith, Mathias Unberath. A pilot study of deep learning-based CT volumetry for traumatic hemothorax. (2022) **Emergency Radiology (IF=1.59)** DOI:10.1007/s10140-022-02087-5.

Conference papers:

1. **Haomin Chen***, Yirui Wang*, Kang Zheng, Weijian Li, Chi-Tung Chang, Adam P. Harrison, Jing Xiao, Gregory D. Hager, Le Lu, Chien-Hung Liao, Shun Miao. Anatomy-aware siamese network: Exploiting semantic asymmetry for accurate pelvic fracture detection in x-ray images. **ECCV** 2020.
2. **Haomin Chen**, Shun Miao, Daguang Xu, Gregory D. Hager, Adam P. Harrison. Deep hierarchical multi-label classification of chest X-ray images. **MIDL** 2019.
3. **Haomin Chen**, T. Y. Alvin Liu, Catalina, Gomez, Mathias Unberath. An Interpretable Algorithm for Uveal Melanoma Subtyping from Whole Slide Cytology Images. **IMLH**, 2021. (*ICML workshop*).
4. **Haomin Chen**, T. Y. Alvin Liu, Zelia M. Correa, Mathias Unberath. An Interactive Approach to Region of Interest Selection in Cytologic Analysis of Uveal Melanoma Based on Unsupervised Clustering. **OMIA**, 2020 (*MICCAI workshop*).
5. David Dreizin, **Haomin Chen**, Alexander Upegui, Guang Li, Mathias Unberath. Blunt splenic trauma: accuracy of automated active bleed and contained vascular injury detection on CT with Faster R-CNN. **ASER** 2022 and **RSNA** 2022.
6. David Dreizin, **Haomin Chen**, Alexander Upegui, Guang Li, Mathias Unberath. Blunt splenic trauma: automated splenic parenchymal disruption volumes for decision making in patients with no vascular injuries on CT. **ASER** 2022 and **RSNA** 2022.
7. Yifan Gao*, **Haomin Chen***, Catalina Gomez*, Sophie Cai, Craig K. Jones, Adrienne Scott, Mathias Unberath. An Interpretable Approach to Identifying Sea Fan Neovascularization in Ultra-Widefield Color Fundus Photographs of Patients With Sickle Cell Hemoglobinopathy. **SPIE**, 2021.
8. T. Y. Alvin Liu, Hongxi Zhu, **Haomin Chen**, J. Fernando Arevalo, Ferdinand K. Hui, Paul H. Yi, Jinchi Wei, Mathias Unberath, Zelia M. Correa. Gene Expression Profile Prediction in Uveal Melanoma Using Deep Learning: A Pilot Study for the Development of an Alternative Survival Prediction Tool. **Ophthalmology Retina**, 2020.

AWARDS

Mentor award in the Howard County Public School.	<i>April 2022</i>
National College Students Mathematics Competition, National Silver Medal.	<i>Oct 2013</i>
National College Students Mathematics Model Contest, the third prize of Shanghai.	<i>Oct 2014</i>
Second-class scholarship of Fudan University.	<i>May 2015</i>
Mensa Member in China.	<i>May 2016</i>