HAOMIN CHEN

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SUMMARY

Applied Research Scientist working in Ericsson LynkAI 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. Rich experience with computer vision, generative AI, and human-computer interaction. The first author of a 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 May 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, LLM, Generative AI, Audio Processing, Statistical Analysis

EXPERIENCES

Ericsson, Los Angeles **Feb 2023 - now**
Applied Research Scientist *Los Angeles, CA, USA*

Video Translation with Lip Sync and Preserving Tone by Generative AI

- Created the largest dataset of talking head videos from YouTube with 13 languages & 600 hours.
- Established multi-person & lingual audio/video synchronization, outperforming ElevenLabs.
- Refined the facial landmark generation network for better articulation.
- Used diffusion to achieve immersive lip synchronization in videos with translated audio.

Meta, Redmond **Jun 2022 - Oct 2022**
Research Intern *Redmond, WA, USA*

2D-3D Style Transfer for VR

- Achieved real-time inference and human interaction for personalized customization.
- Preserved 3D visual reality and outperformed other methods in user experience.

· Stylized 3D scene with 2D style images by differential rendering with PyTorch3D & nvdiffrast.
· Learned quickly style transfer, 3D graphics, and rendering from scratch in one week.
· Exceeded director/mentor/peers' expectations in internship review.

PingAn Technology, Bethesda **May 2019 - Dec 2019**
Applied Research Intern *Bethesda, MD, USA*

Fracture Detection in Pelvic Trauma X-rays
· Deployed in Chang Gung Memorial Hospital in Taiwan and used by over 5000 patients.
· First-author conference paper is accepted by ECCV 2020 with a poster presentation.
· Improved detection AUC from 0.95 to 0.98 and fracture recall from 0.89 to 0.93 (FPR=0.1).
· Mimicked radiologists to detect fractures by comparing bilateral symmetric regions.
· Focused on anatomical asymmetry with contrastive learning.

NVIDIA, Bethesda **May 2018 - Dec 2018**
Applied Research Intern *Bethesda, MD, USA*

Multi-Abnormality Classification in Chest X-rays
· First-author conference paper is accepted by MIDL 2019 with an oral presentation.
· First-author journal paper is accepted by Medical Image Analysis (*IF = 13.8*).
· Improved classification AUC from 0.87 to 0.89.
· Robust to incompletely labeled data and preserved 85% performance drop.
· Mimicked radiologists to classify abnormality with clinical taxonomy.
· Established numerically stable method for calculation of CE loss of unconditional probabilities.

PingAn Technology, Shanghai **May 2017 - Aug 2017**
Data Mining Scientist Intern *Shanghai, CHINA*

Lung Nodule Detection in CT Scans
· Achieved top 6 out of 2887 teams in the Skylake competition by Intel and Alibaba.
· Applied 3D UNet with Pytorch & Faster RCNN with Caffe for detection in 1000 CT scans.
· Utilized fusion methods to achieve false positive reduction.

Johns Hopkins University **Jan 2018 - Feb 2023**
Research Assistant *Baltimore, MD, USA*

Systematic Review for Interpretable ML in Medical Image Analysis
· First-author journal paper is accepted in npj Digital Medicine (*IF = 11.6*).
· Proposed interpretability as a relationship between end users instead of as a property of models.
· Introduced guidelines to recommend first understanding end users before model design.
· Conducted a systematic review in PubMed, EMBASE, and Compendex databases.
· Identified 2508 records and included 68 articles.

Interpretable Cancer Subtyping with Cytopathology Images
· First-author conference paper is accepted in ICML workshop.
· Improved cancer subtyping AUC from 0.75 to 0.87 and provided interpretation.
· Analyzed cell composition by cell segmentation deep features and rule-based learning.
· Proved to be interpretable in a web-based user study with pathologists.

Interpretable High-Quality ROI Extraction with Cytopathology Images
· First-author conference paper is accepted in MICCAI workshop.
· Created automatic and interactive high-quality ROI extraction with deep clustering.
· Improved recall from 11% to 51% and speeded up by 10 times.

Pelvic Fracture Severity Grading with CT Scans

- First-author journal paper under third-round review in IEEE TMI (*IF = 10.6*).
- Applied Bayesian model to predict severity grading with AO/OTA clinical grading criterion.
- Proposed Bayesian refinement to retrieve false-negative fractures.
- Established augmented inference to calculate robust fracture confidence scores.

Automatic Splenic Injury Grading System with CT Scans

- First-author journal paper is accepted in Emergency Radiology (*IF = 1.59*).
- Proposed neuralsymbolic learning by following AAST clinical guidelines.
- Created rule-based symbolic reasoning for severity grading with deep network findings.

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.	*April 2022*
National College Students Mathematics Competition, National Silver Medal.	*Oct 2013*
National College Students Mathematics Model Contest, the third prize of Shanghai.	*Oct 2014*
Second-class scholarship of Fudan University.	*May 2015*
Mensa Member in China.	*May 2016*