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Jintai Chen

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Education

2018 - Present	**Zhejiang University** College of Computer Science and Technology Ph.D Candidate Advisor: Professor Jian Wu	Hangzhou, China
2014 - 2018	**Zhongnan University of Economics and Law** School of Statistics and Mathematics B.S. in Applied Statistics, with honor	Wuhan, China

Research Summary

I am a final-year Ph.D. student at the College of Computer Science and Technology of Zhejiang University, advised by Professor Jian Wu (Chang Jiang Scholar of China) and working closely with IEEE Fellow, Professor Danny Ziyi Chen. My main research interests are in the areas of deep learning algorithm design, AI for healthcare, machine learning, computer vision, EHR analysis, computational biomedicine, and tabular data analysis. I am also interested in part-hierarchy learning and capsule neural networks, imbuing neural networks (especially for images and tabular data) with interpretability across multiple levels.

I have published 7 first-authored papers on top-tier AI conferences (2×ICML,1×ICLR, 1×CVPR, 2×AAAI, 1×IJCAI) and 10+ top-tier AI-for-Healthcare conferences and journals. I initiated a research direction "**Electrocardio Panorama Synthesis**", and developed the first panoramic visualization approach for ECG data. I also designed the **first** neural networks achieving GBDT-level performances with fixed hyper-parameters on tabular datasets. I am also the core member of our team participating MICCAI-19 competitions, and we won the 1-st place in the Challenge of Signet Ring Cell Detection and in the Challenge of Organ-At-Risk Segmentation from Chest CT Scans, and won the 2-th place in the Challenge of Colonoscopy Tissue Segmentation.

Publications (by Topics)

†= co-first authors, * = corresponding author(s)

ECG Single Analysis

1. **Electrocardio panorama: Synthesizing new ECG views with self-supervision**
   (Got scores 7, 9, 10 out of a total of 10 in peer-review)
   Jintai Chen†, Xiangshang Zheng†, Hongyun Yu†, Danny Z. Chen, Jian Wu*
   The Thirtieth International Joint Conference on Artificial Intelligence (IJCAI-2021)
2. **ME-GAN: Learning panoptic electrocardio representations for multi-view ECG synthesis conditioned on heart diseases**
   Jintai Chen†, Kuanlun Liao†, Kun Wei, Haochao Ying, Danny Z. Chen, Jian Wu* The Thirty-ninth International Conference on Machine Learning (ICML-2022)
3. **Identifying Electrocardiogram abnormalities using a handcrafted-rule-enhanced neural network**
   Yuexin Bian, **Jintai Chen**, Xiaojun Chen, Xiaoxian Yang, Danny Z. Chen, Jian Wu*

IEEE/ACM Transactions on Computational Biology and Bioinformatics (T-CBB), January, 2022 (Q1)

4. **Superior detection of congenital heart diseases by pediatric electrocardiogram based deep learning integrated with human knowledge**
Jintai Chen†, Shuai Huang†, Ying Zhang†, Dantong Li, Jia Qiu, Lianting Hu, Xiaoting Peng, Yunmei Du, Yunfei Gao, Danny Z. Chen, Abdelouahab Bellou, Jian Wu*, Huiying Liang*
Under Review for Nature Communications

Tabular Learning

1. **DANETs: Deep Abstract Networks for tabular data classification and regression**
Jintai Chen, Kuanlun Liao, Yao Wan, Danny Z. Chen, Jian Wu*
Proceedings of the thirty-sixth AAAI Conference on Artificial Intelligence (AAAI-2022)

2. **T2G-Former: Organizing tabular features into relation graphs promotes heterogeneous feature interaction**
Jiahuan Yan†, **Jintai Chen**†, Yixuan Wu, Danny Z. Chen, Jian Wu*
Proceedings of the thirty-seventh AAAI Conference on Artificial Intelligence (AAAI-2023, oral representation)

3. **TabCaps: A capsule neural network for tabular data classification with BoW routing**
Jintai Chen, Kuanlun Liao, Yanwen Fang, Danny Z. Chen, Jian Wu*
The International Conference on Learning Representations (ICLR-2023)

4. **ExcelFormer: A neural network surpassing GBDTs on tabular data**
Jintai Chen†, Jiahuan Yan†, Danny Z. Chen, Jian Wu*
Preprint

Computer Vision and Medical Image Analysis

1. **A hierarchical graph network for 3D object detection on point clouds**
Jintai Chen†, Biwen Lei†, Qingyu Song†, Haochao Ying, Danny Z Chen, Jian Wu*
The Thirty-third IEEE Conference on Computer Vision and Pattern Recognition (CVPR-2020)

2. **A receptor skeleton for capsule neural networks**
Jintai Chen, Hongyun Yu, Chengde Qian, Danny Z. Chen, Jian Wu*
The Thirty-eighth International Conference on Machine Learning (ICML-2021)

3. **Doctor imitator: A graph-based bone age assessment framework using hand radiographs**
Jintai Chen†, Bohan Yu†, Biwen Lei†, Ruiwei Feng, Danny Z Chen, Jian Wu*
The Twenty-third International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI-2020)

4. **Flow-Mixup: Classifying multi-labeled medical images with corrupted labels**
Jintai Chen, Hongyun Yu, Ruiwei Feng, Danny Z Chen, Jian Wu*
The fourteen IEEE International Conference on Bioinformatics and Biomedicine (BIBM-2020)

5. **LSRC: A long-short range context-fusing framework for automatic 3D vertebra localization**
Jintai Chen†, Yanjie Wang†, Ruoqian Guo†, Bohan Yu, Tingting Chen, Wenzhe Wang, Ruiwei Feng, Danny Z Chen, Jian Wu*
The Twenty-second International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI-2019)

6. **Cross-Layer retrospective retrieving via layer attention**
   Yanwen Fang, Yuxi Cai, **Jintai Chen**, Jingyu Zhao, Guangjian Tian, Guodong Li*
   The International Conference on Learning Representations (ICLR-2023)
7. **Self-learning and one-shot learning based single-slice annotation for 3D medical image segmentation**
   Yixuan Wu, Bo Zheng, **Jintai Chen**, Danny Z Chen, Jian Wu*
   The Twenty-fifth International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI-2022, oral representation)
8. **A deep learning approach for colonoscopy pathology WSI analysis: Accurate segmentation and classification**
   Ruiwei Feng†, Xuechen Liu†, **Jintai Chen**, Danny Z Chen, Honghao Gao, Jian Wu*
   IEEE Journal of Biomedical and Health Informatics (J-BHI), October, 2021 (Q1)
9. **Interactive few-shot learning: Limited supervision, better medical image segmentation**
   Ruiwei Feng†, Xiangshang Zheng†, Tianxiang Gao†, **Jintai Chen**, Wenzhe Wang, Danny Z Chen, Jian Wu*
   IEEE Transactions on Medical Imaging (T-MI), October, 2021 (Q1)
10. **A semi-supervised deep convolutional framework for signet ring cell detection**
    Haochao Ying, Qingyu Song, **Jintai Chen**, Tingting Liang, Jingjing Gu, Fuzhen Zhuang, Danny Z Chen, Jian Wu*
    Neurocomputing, September, 2021 (Q1)
11. **D-Former: A U-shaped dilated Transformer for 3D medical image segmentation**
    Yixuan Wu, Kuanlun Liao, **Jintai Chen**, Danny Z Chen, Jinhong Wang, Honghao Gao, Jian Wu*
    Neural Computing and Applications, October, 2022 (Q1)

Awards

2022.10	Huawei Foundation Research Scholarship (Top 3%)
2021.10	National Scholarship of China (Top 1%)
2021.10	Tencent Scholarship (Top 1%)
2020.10	Outstanding Ph.D. Student Scholarship, Zhejiang University (Top 3%)
2019.10	Doctoral Freshman Scholarship, Zhejiang University (Top 3%)
2016.10	Chinese Bank Scholarship (Top 1%)
2015.10	National Scholarship of China (Top 1%)
2015.10	First Prize Scholarship, Zhongnan University of Economics and Law (Top 3%)

Interns & Visiting

Jun. - Sep., 2022	**DAMO Academy, Alibaba** Research Intern
Jun. - Sep., 2021	**Medical Big Data Center, Guangdong Academy of Medical Sciences** Visiting Scholar Working closely with Professor Huiying Liang, Shuai Huang, and Dantong Li.

Grant Proposals

1. Project Writting:
   - Participate in preparing more than 15 winning national grant proposals.
   - Participate in preparing 3 winning national grant proposals with over 2 million CNY.

2. Participated Projects:
    - Research on algorithms for cardiovascular disease prediction from multi-factor, multi-level, and multi-omics data
    - Research on artificial intelligence for medical information systems and database developments
    - Research on AI technologies for medical images

Talks

2022.11	How to conduct researches on AI for healthcare, Shanghai University
2022.10	ECG Signal Processing and Synthesis for Heart disease diagnosis, Carnegie Mellon University
2022.10	ECG Synthesis for New View and New Data, Shanghai AI Lab
2022.09	Part Hierarchy Learning, ByteDance AI Lab
2022.11	Tabular Data Processing, UberAI
2022.11	Domain Mixup for distant transfer learning, Shanghai Jiao Tong University

Professional Services

Conference Paper Reviewer	ICML, AAAI, IJCAI, MICCAI, ISBI
Journal Article Reviewer	TNNLS, JBHI, TCBB, Frontiers in Public Health, JBSM, TCDS, Frontiers in Genetics
Teaching	Cutting-edge AI technologies for healthcare, Fall 2022, Teaching Assistant
Monitoring	Offering / discussing ideas & polishing articles & reviewing codes for several doctoral freshmen and undergraduate students
Lab Works	Communicating with the external project partners and develop research plans

Software Skills

Python, Pytorch, Tensorflow, R, Matlab