Han Wu

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RESEARCH INTEREST

Knowledge-driven landmark detection in medical images, label-efficient learning in medical images

EDUCATION

ShanghaiTech University <div align="right">**Shanghai, China**</div>
Ph.D. in Computer Science <div align="right">*Sept. 2022 - Present*</div>

- Supervisors: Prof. Dinggang Shen, Prof. Zhiming Cui

Wuhan University of Technology <div align="right">**Wuhan, China**</div>
B.E. in Information Engineering <div align="right">*Sept. 2018 - June, 2022*</div>

- Rank: 8/160 (Postgraduate-Recommendation)

RESEARCH EXPERIENCE

Cephalometric Landmark Detection across Ages <div align="right">**Dec. 2023 - Present**</div>
ShanghaiTech University

- Motivation: Provide a robust and accurate solution for cephalometric landmark detection with different age groups, i.e. the adult cases, with permanent teeth only, and adolescent cases, with both baby teeth and permanent teeth.
- Method: Collected a dataset for cephalometric landmark detection with different age groups. Propose a prototypical network to extract the landmark prototypes of both adult and adolescent cases, and introduce consistent constraint and a masked mining module to capture the unified representation of the landmark across ages with SOTA results. To the best of our knowledge, this is the first effort toward developing a unified solution and dataset for cephalometric landmark detection across age groups.

Semi-supervised Learning for Medical Image Segmetation <div align="right">**Feb. 2024 - Sept. 2024**</div>
ShanghaiTech University

- Motivation: Try to address the limitation of previous works on failing to handle the inconsistent distribution between labeled and unlabeled datasets.
- Method: Introduce a multi-prototypical network based on the teacher-student network. By introducing a volume-fusion strategy, we extract the multi-scale and multi-view prototypes of both labeled and unlabeled data and build up two semantic consistency of unified representation from both labeled and unlabeled data. A dynamic uncertain-area search is also proposed to guarantee more stable learning from the teacher model. We achieved superior performance against other SOTA methods on 3 public datasets.

Vertebra Localization and Identification from CT Scans <div align="right">**June 2022 - June 2023**</div>
ShanghaiTech University

- Motivation: To accurately localize and identify the vertebra from CT scans with sequential and global information without the large computation.
- Method: Introduce DRR to transform a complicated 3D labeling task into a set of 2D tasks where a 2D DRR projection image can be fed into networks for global information without cropping. The proposed Sequence Loss further captures sequential information as extra supervision. A novel multi-view fusion method is introduced to map the 2D results back to 3D. The results outperform the SOTA methods in localization and identification with just two 2D networks.

Landmark-driven Condyle Remodeling Evaluation <div align="right">**Oct. 2022 - Dec. 2022**</div>
ShanghaiTech University

- Motivation: Provide a fast and efficient solution for condyle remodeling evaluation after orthognathic surgery with intuitive assisted information.
- Method: Get the condyle in a localization-cropping strategy based on the mandible. Final condyle remodeling evaluation is achieved by registering the cropped condyle before and after the surgery using the target RoIs as a reference. To the best of our knowledge, this is the first fully automated method for condyle remodeling evaluation, which could be finished within 30 seconds.

Last Updated: 2024-09-26

PUBLICATIONS

CONFERENCE:

- **Rethinking Cephalometric Landmark Detection with Prototype and Heatmap Regression**
  <u>Han Wu</u>, Yunjie Tan, Chong Wang, Dinggang Shen, Zhiming Cui
  MICCAI Workshop on Medical Image Analysis for Biometry (***MICCAI-MIAB***), *2024. oral*

- **Cephalometric Landmark Detection across Ages with Prototypical Network**
  <u>Han Wu</u>, Chong Wang, Lanzhuju Mei, Tong Yang, Min Zhu, Dinggang Shen, Zhiming Cui
  International Conference on Medical Image Computing and Computer-Assisted Intervention (***MICCAI***), *2024.*

- **Multi-View Vertebra Localization and Identification from CT Images**
  <u>Han Wu</u>, Jiadong Zhang, Yu Fang, Zhentao Liu, Nizhuan Wang, Zhiming Cui, Dinggang Shen
  International Conference on Medical Image Computing and Computer-Assisted Intervention (***MICCAI***), *2023.*

JOURNAL:

- **Dual Cross-image Semantic Consistency with Self-aware Pseudo Labeling for Semi-supervised Medical Image Segmentation**
  <u>Han Wu</u>, Chong Wang, Dinggang Shen, Zhiming Cui
  Submitted to IEEE Transactions on Medical Imaging (*Under Review*).

- **CLIP in Medical Imaging: A Comprehensive Survey**
  Zihao Zhao*, Yuxiao Liu*, <u>**Han Wu***</u>, Mei Wang*, Yonghao Li, Sheng Wang, Lin Teng, Disheng Liu, Zhiming Cui, Qian Wang, Dinggang Shen
  Submitted to Medical Image Analysis (*Minor Revision*).

- **Geometry-Aware Attenuation Field Learning for Sparse-View CBCT Reconstruction**
  Zhentao Liu, Yu Fang, Changjian Li, <u>Han Wu</u>, Yuan Liu, Zhiming Cui, Dinggang Shen
  IEEE Transactions on Medical Imaging (***IEEE TMI***), *2024.*

AWARDS AND ACHIEVEMENTS

- **Champion** of MICCAI CL-2024 Challenge, 2024.
- **Outstanding Student**, ShanghaiTech, 2023.
- **Outstanding Graduates**, WUT, 2022.
- **Outstanding Graduation Thesis**, WUT, 2022.
- **2nd National Prize**, National Undergraduate Engineering Practice and Innovation Competition, 2021.
- **3rd National Prize**, "China Software Cup" College Student Software Design Competition, 2021.
- **3rd Prize**, National University Student Intelligent Car Race, Hubei Prov. 2021.
- **3rd Prize**, National Undergraduate Computer Design Competition, Hubei Prov., 2021.
- **3rd Prize**, The 6th "Internet+" Innovation and Entrepreneurship Competition, Hubei Prov. 2020.

SERVICES

Conference Reviewer

- International Conference on Machine Learning in Medical Imaging (MLMI), 2022, 2023, 2024
- International Conference on Pattern Recognition (ICPR), 2022

Journal Reviewer

- IEEE Transactions on Biomedical Engineering (TBME)

Membership

- Student Member of China Computer Federation (CCF)
- Student Member of Chinese Society of Biomedical Engineering (CSBME)
- Student Member of Medical Image Computing and Computer Assisted Intervention Society (MICCAI)

KEY SKILLS

Language	Chinese(native), English(Fluent, CET-6: 593)
Programming	Python, Matlab, Java, SQL, HTML/CSS
Research Tool	PyTorch, ITK-SNAP, LaTeX, Notion, 3D Slicer, Git

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