Zhongyi Han, Ph.D. Student

Shandong University, School of Software
Research Building, Software Campus
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EDUCATION

Ph.D. Student, Machine Learning   2019 - Present
Shandong University
    Supervisor: Prof. Yilong Yin
Visiting Scholar, Machine Learning   2019 - 2020
Nanjing University
    Advisor: Prof. Zhi-Hua Zhou
Graduate Student, Biomedical Engineering   2016 - 2019
Shandong University of Traditional Chinese Medicine
    Supervisor: Prof. Benzheng Wei
Visiting Graduate Student, Machine Learning   2016 - 2018
the University of Western Ontario
    Supervisor: Dr. Shuo Li
Bachelor of Science, Biomedical Engineering   2012 - 2016
Shandong University of Traditional Chinese Medicine

WORK EXPERIENCE

Intern, Machine Learning   *Feb. 2018 – Dec. 2018*
Artificial Intelligence Group, Baidu

RESEARCH INTERESTS

Machine Learning   Robust Learning   Medical Image Analysis

RESEARCH EXPERIENCE

The Research Center for Artificial Intelligence, Shandong University
Mentor: Yilong Yin & Benzheng Wei
Projects on Data Analysis of COVID-19   *Mar. 2020 – Present*

- Proposed an Attention-based Deep 3D Multiple Instance Learning Algorithm to achieve accurate and interpretable screening of COVID-19 based on chest CT scans.
- Proposed a Discriminative Cost-Sensitive Learning algorithm to achieve balance and accurate screening of COVID-19 based on chest X-ray scans.
- Proposed to validate the effectiveness of tongue images on screening of COVID-19.

LAMDA Group, Nanjing University
Leader: Zhi-Hua Zhou
Projects on Robust Machine Learning   *Oct. 2019 – Present*

- Proposed a Robust Domain Adaptation (RDA) algorithm to achieve robust and accurate domain adaptation under noisy environments.
- Given a theoretical analysis that reveals how harmful noises influence unsupervised domain adaptation.
- Proposed an offline curriculum learning for minimizing a newly-defined empirical source risk to eliminate the effect of label noise.
- Proposed a proxy distribution based margin discrepancy to reduce the impact of feature noise.

LAMDA Group, Nanjing University
Mentor: Wang-Zhou Dai
Projects on Abductive Learning   *Mar. 2019 – Sep. 2019*

- Proposed Abductive Subconcept Learning to bridge machine learning and logical reasoning in low-level cognitive tasks.
- Proposed to use Subordinate Concepts (subconcepts) for bridging machine learning and logical reasoning.
- Further proposed to use DNNs to identify the subconcepts of raw data, and then uses logical reasoning to perform secondary reasoning on subconcepts to infer the class label.

IDL & Artificial Intelligence Innovation Business department, Baidu Inc.

Leader: Shaoting Zhang & Lei Wang

Projects on Intelligent Diagnosis of Cancers and Fundus Diseases *Feb. 2018 – Dec. 2018*
- Designed a multi-scale classification system to diagnose cancers based on pathological images.
- Designed a deep learning-based system to grade fundus diseases of diabetic retinopathy.
- Proposed a tiny object detection algorithm to detect the tiny lesions of diabetic retinopathy.

The Digital Imaging Group of London, University of Western Ontario

Mentor: Shuo Li

Projects on Intelligent Spinal Image Analysis *Dec. 2016 – Feb. 2018*
- Proposed Spine-Gan to achieve accurate semantic segmentation of multiple spinal structures.
- Proposed a multiple task multiple scale learning framework to achieve accurate detection and grading of multiple spinal structures.
- Proposed to unify neural learning and logical reasoning for the automated radiological report generation of spinal diseases.

Center for Medical Artificial Intelligence, Shandong University of TCM

Mentor: Benzheng Wei & Yuanjie Zheng

Projects on Intelligent Analysis of Breast Cancer *Jul. 2016 – Dec. 2016*
- Proposed a breast cancer multi-classification method to provide an efficient tool for breast cancer multi-classification in clinical settings.
- Proposed a new Class Structure-based Deep Convolutional Neural Network (CSDCNN) to adopts the end-to-end training manner that can automatically learn semantic and discriminative hierarchical features from low-level to high-level.

HONORS AND AWARDS

1. First Class of Academic Scholarship, Shandong University   2019
2. First Class Scholarship for Excellent Graduate   2018
   Students, Yifang Pharmaceutical Co., Ltd (1/27)
3. Science and Technology Innovation Scholarship, Shandong   2018
   University of Traditional Chinese Medicine
4. Second Class of Graduate Academic Innovation Forum,   2018
   Shandong University of Traditional Chinese Medicine
5. Student Travel Award, MICCAI   2018
6. Science and Technology Innovation Scholarship, Shandong   2017
   University of Traditional Chinese Medicine

PUBLICATIONS

Conference Papers

1. **Zhongyi Han**, Xian-Jin Gui, Chaoran Cui, Yilong Yin, "Towards Accurate and Robust Domain Adaptation under Noisy Environments". The 29th International Joint Conference on Artificial Intelligence (IJCAI), 2020.
2. Yang Ning, **Zhongyi Han**, Li Zhong, Caiming Zhang, "Automated Pancreas Segmentation Using Recurrent Adversarial Learning". 2018 IEEE International Conference on Bioinformatics and Biomedicine (BIBM), pp.927-934, 2018.
3. **Zhongyi Han,** Benzheng Wei, Stephanie Leung, Jonathan Chung, Shuo Li, "Towards Automatic Report Generation in Spine Radiology Using Weakly Supervised Framework". 2018 International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI), pp.185-193, 2018.
4. Benzheng Wei, **Zhongyi Han**, Xueying He, Yilong Yin, "Deep Learning Model Based Breast Cancer Histopathological Image Classification". 2017 IEEE 2nd International Conference on Cloud Computing and Big Data Analysis (ICCCBDA), pp. 348-353, 2017.

Journal Papers

5. **Zhongyi Han**, Benzheng Wei, Yanfei Hong, Tianyang Li, Jinyu Cong, Xue Zhu, Haifeng Wei, Wei Zhang, " Accurate Screening of COVID-19 using Attention Based Deep 3D Multiple Instance Learning". IEEE Transactions on Medical Imaging, 2020.
6. **Zhongyi Han,** Benzheng Wei, Ashley Mercado, Stephanie Leung, Shuo Li, "Spine-GAN: Semantic Segmentation of Multiple Spinal Structures". Medical Image Analysis, pp.23-35, 2018.

7. **Zhongyi Han**, Hongbo Wu, Benzheng Wei, Yilong Yin, Shuo Li, "Recursive Narrative Alignment for Movie Narrating". Science China Information Sciences, 63(7), 174101, 2020.

8. **Zhongyi Han**, Benzheng Wei, Stephanie Leung, Ilanit Ben Nachum, David Laidley, Shuo Li, "Automated Pathogenesis-Based Diagnosis of Lumbar Neural Foraminal Stenosis via Deep Multiscale Multitask Learning". Neuroinformatics, pp.325–337, 2018.

9. **Zhongyi Han**, Benzheng Wei, Yuanjie Zheng, Yilong Yin, Kejian Li, Shuo Li, "Breast Cancer Multi-classification from Histopathological Images with Structured Deep Learning Model". Scientific Reports, 2017.

10. Yanfei Hong, Benzheng Wei, **Zhongyi Han**, Xiang Li, Yuanjie Zheng, Shuo Li, "MMCL-Net: Spinal Disease Diagnosis in Global Mode using Progressive Multi-task Joint Learning". Neurocomputing, pp.307-316, 2020.

11. Yang Ning, **Zhongyi Han**, Li Zhong, Caiming Zhang, "DRAN: Deep Recurrent Adversarial Network for Automated Pancreas Segmentation". IET Image Processing, 14(6), pp.1091-1100, 2019.

Under Review Papers

12. **Zhongyi Han,** Wang-Zhou Dai, Le-Wen Cai, Yu-Xuan Huang, Benzheng Wei, Li Lian, Yilong Yin, "Abductive Subconcept Learning". Submitted to NeurIPS 2020.

13. **Zhongyi Han**, Benzheng Wei, Yanfei Hong, Tianyang Li, Jinyu Cong, Xue Zhu, Haifeng Wei, Wei Zhang, "Can Tongue Image Help the Automated Screening of COVID-19?". Submitted to ACM Multimedia 2020 (MM).

14. **Zhongyi Han**, Benzheng Wei, Yilong Yin, Shuo Li, "Unifying Neural Learning and Symbolic Reasoning for Spinal Medical Report Generation". Submitted to Medical Image Analysis, 2020. (under major revision)

15. Tianyang Li, **Zhongyi Han**, Benzheng Wei, Yanfei Hong, Jinyu Cong, Xue Zhu, Haifeng Wei, Wei Zhang, "Robust Screening of COVID-19 from Chest X-ray via Discriminative Cost-Sensitive Learning". Submitted to Artificial Intelligence in Medicine, 2020. (Co-first author)

SERVICES

Program committee or reviewer for conferences:
- China Conference on Data Mining (CCDM 2020)
- International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 2020)
- International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 2019)
- International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 2018)

Reviewer for journals:
- IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
- IEEE Transactions on Medical Imaging (TMI)
- Medical Image Analysis
- Journal of Intelligence Systems
- Scientific Reports
- Applied Soft Computing
- IEEE Access
- Informatics in Medicine Unlocked