

Zhihua Liu

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Research Interests: Shape Analysis | Motion Modeling | Computer Vision | Machine Learning

Educations

University of Leicester, UK

09/2018 – 12/2024

- M.Phil., Ph.D. in Computer Science, Biomedical Image Processing Lab (BIPL).
- Supervisor: Prof. Huiyu Zhou.

University of Edinburgh, UK

09/2015 – 11/2016

- MSc in Artificial Intelligence, School of Informatics.
- Supervisor: Dr. Myungjin Lee

University of Science and Technology Beijing, China

09/2011 – 06/2015

- BEng of Internet of Things, School of Computer Science and Communication Engineering.
- Supervisor: Prof. Stephen McKenna, Prof. JianGuo Zhang, Dr. Sebastian Stein, University of Dundee, Scotland, UK
- Major GPA: 3.56/4.0, Overall GPA: 3.21/4.0 (Top 10%)

Research Projects

Medical Image Analysis Based on Deep Relational Learning

09/2020

M.Phil. Thesis

- Glioma context modeling with feature relational learning on accurate sub-region semantic segmentation.
- Spatial correlation modeling with query-key-value relation learning on fetoscopy image mosaicking.

Multi-Classes Training and Testing in Food Preparation Recognition Tasks

06/20215

B.Eng. Thesis

- Data collection and processing from egocentric food preparation, generated from sensors with Kinect camera, and accelerators.
- Utilize a structured SVM as a classifier within hidden markov model for time-series vision behavior recognition.

Working Experience

Obstacle Detection in Point Cloud

09/2016 - 09/2018

Algorithm Engineer, JD.COM

Beijing, China

- Research works on car, pedestrian and cyclist detection in 3D Point Clouds generated from LiDAR.
- Point cloud interactive labeling tool development with PyQT and vtk, including functions for point selecting, point grouping with cubes.
- Proposed a modified Single Shot MultiBox Detector (SSD) and an adaptive Fully Convolutional Network (FCN) using 3D voxels.

Automated building construction detection and grading in satellite images

04/2020 - 11/2020

Research Assistant, University of Leicester & Astrosat Ltd

Leicester, UK

- Data collection and house construction degree labeling from satellite images.
- Deploy YOLOv3 with focal loss for automated imbalanced house construction site detection and construction degree classification.

Deep learning based anomaly detection in DOMINOES (Smart Grid) project.

12/2020 - 06/2021

Research Assistant, University of Leicester

Leicester, UK

- Utilize a 1D CNN with LSDM for time-series classification.

Teaching Experience

Graduate Teaching Assistant

12/2020 - 12/2023

University of Leicester

- CO4105 Advanced C++ Programming - Lab Session
- CO3002 Analysis and Design of Algorithms - Tutorial Session

Lab Demonstrator

09/2019 - 09/2020

University of Leicester

- FS0023 STEM Foundation Year Lab - Physics Lab

Publications

Google Scholar: <https://scholar.google.com/citations?user=je2KXVYAAAAJ&hl=en>

Pre-Prints

- [PP2] **3M-CMT: 3D Strain Assessment with Multi-Modal Mesh Based Cardiac Motion Tracking**
Zhihua Liu, Huiyu Zhou
In Progress
- [PP1] **BOTM: Echocardiography Segmentation via Bi-directional Optimal Token Matchings**
Zhihua Liu, Lei Tong, Xilin He, Huiyu Zhou
Under Review

Peer-reviewed Conference and Journal Publications

- [P8] **Long-Short Diffeomorphism Memory Network for Weakly-Supervised Ultrasound Landmark Tracking**
Zhihua Liu, Bin Yang, Yan Shen, Xuejun Ni, Sotirios A. Tsaftaris, Huiyu Zhou
MedIA Medical Image Analysis, 2024
- [P7] **Deep Learning Based Brain Tumor Segmentation: A Survey**
Zhihua Liu, Lei Tong, Zheheng Jiang, Long Chen, Feixiang Zhou, Qianni Zhang, Xiangrong Zhang, Yaochu Jin, Huiyu Zhou
CAIS Complex & Intelligent Systems, 2022
- [P6] **Detecting and Tracking of Multiple Mice Using Part Proposal Networks**
Zheheng Jiang, Zhihua Liu, Long Chen, Lei Tong, Xiangrong Zhang, Xiangyuan Lan, Danny Crookes, Ming-Hsuan Yang, Huiyu Zhou
TNNLS IEEE Transactions on Neural Networks and Learning Systems, 2022
- [P5] **Cost-sensitive Boosting Pruning Trees for Depression Detection on Twitter**
Lei Tong, Zhihua Liu, Zheheng Jiang, Feixiang Zhou, Long Chen, Jialin Lyu, Xiangrong Zhang, Qianni Zhang, Abdul Sadka, Yinhai Wang, Ling Li, Huiyu Zhou
TAE IEEE Transactions on Affective Computing, 2022
- [P4] **CANet: Context Aware Network for Brain Glioma Segmentation**
Zhihua Liu, Lei Tong, Long Chen, Feixiang Zhou, Zheheng Jiang, Qianni Zhang, Yinhai Wang, Caifeng Shan, Ling Li, Huiyu Zhou
TMI IEEE Transactions on Medical Imaging, 2021
- [P3] **Structured Context Enhancement Network for Mouse Pose Estimation**
Feixiang Zhou, Zheheng Jiang, Zhihua Liu, Fang Chen, Long Chen, Lei Tong, Zhile Yang, Haikuan Wang, Minrui Fei, Ling Li, Huiyu Zhou
TCSVT IEEE Transactions on Circuits and Systems for Video Technology, 2021
- [P2] **Perceptual underwater image enhancement with deep learning and physical priors**
Long Chen, Zheheng Jiang, Lei Tong, Zhihua Liu, Aite Zhao, Qianni Zhang, Junyu Dong, Huiyu Zhou
TCSVT IEEE Transactions on Circuits and Systems for Video Technology, 2020
- [P1] **Underwater Object Detection using Invert Multi-Class Adaboost with Deep Learning**
Long Chen, Zhihua Liu, Lei Tong, Zheheng Jiang, Shengke Wang, Junyu Dong, Huiyu Zhou
IJCNN, 2020

Professional Service

Conference Reviewer

- BMVC (2019-), ACCV (2020), ECCV (2021-), CVPR (2020-), ICCV (2021-)

Journal Reviewer

- IEEE Transactions on Medical Imaging
- IEEE Journal of Biomedical and Health Informatics
- Medical Physics
- IEEE Transactions on Human-Machine Systems

Workshop Organizer

- Leicester AIDAM Winter AI Workshop (2019, 2022)

Skills

Programming	Python, C/C++, Matlab, CMake, Git, Scripting (Bash), LaTeX, HTML, Vim
Computer Vision	OpenCV, Point Cloud Library, PyTorch3D, Detectron
Software	Linux, Pytorch
Language	English, Chinese

Honors

- Graduate Teaching Assistantship (University of Leicester, 2020)
- People's Scholarships (Top 10%. University of Science and Technology Beijing, 2012, 2013)
- Fresh year student Scholarship (Top 5%. University of Science and Technology Beijing, 2011)

Extracurricular Activities

- Candidate Cambridge Centre for AI in Medicine Summer School (2023)
- Candidate at the UCL Medical Image Computing Summer School (2022)
- Candidate at the PRAIRIE / MIAI Artificial Intelligence Summer School (2021)
- Candidate at the UCL Medical Image Computing Summer School (2020)
- Edinburgh Art Festival Volunteer (2016)
- James Hutton Institute Volunteer (2014)

References

Huiyu Zhou

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Bin Yang

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Professor
School of Engineering, the University of Edinburgh
Canon Medical/Royal Academy of Engineering Research Chair in Healthcare AI
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Stephen McKenna

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