Axiu Mao

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PROFESSIONAL EXPERIENCE

Non-tenured Associate Professor Dec. 2023 – Present

Hangzhou Dianzi University

School of Communication Engineering

Department of Information and Communication Engineering

Part-time Research Assistant Sep. 2021 – Sep. 2023

City University of Hong Kong, Hong Kong

Jockey Club College of Veterinary Medicine and Life Sciences

Department of Infectious Diseases and Public Health

EDUCATION BACKGROUND

Ph.D. City University of Hong Kong (**CityU**), Hong Kong Oct. 2019 – Oct. 2023

Jockey Club College of Veterinary Medicine and Life Sciences

Department of Infectious Diseases and Public Health | GPA: 3.96/4.30

Supervisor: Prof. Kai Liu

B.S. China Jiliang University (**CJLU**), China Sep. 2015 - Jun. 2019

College of Quality and Safty Engineering

Quality Management Engineering | GPA: 89.9/100 | Rank: 1/81

RESEARCH INTERESTS

Key words: deep learning, wearable sensors, computer vision, activity pattern recognition, acoustic detection, intelligent animal monitoring, precision livestock farming

Recently, I am interested in computer vision combined with wearable sensor techniques for real-time animal identification, tracking, behavior estimation.

During Ph.D. period, I mainly focused on the applications of deep learning and wearable sensors in automated animal activity recognition and acoustic detection, aiming to construct intelligent animal monitoring systems.

PUBLICATIONS

Refereed Journal Articles

1. [*COMPAG*] A Teacher-to-Student Information Recovery Method Toward Energy-Efficient Animal

Activity Recognition at Low Sampling Rates

Axiu Mao, Meilu Zhu, Endai Huang, Xi Yao, Kai Liu*

Computers and Electronics in Agriculture, Sep, 2023. [JCR Q1/SCI-IF: 8.3]

2. [*COMPAG*] Deep Learning-based Animal Activity Recognition with Wearable Sensors: Overview, Challenges, and Future Directions

Axiu Mao, Endai Huang, Xiaoshuai Wang, Kai Liu*

Computers and Electronics in Agriculture, Aug, 2023. [JCR Q1/SCI-IF: 8.3]

3. [*ANIMALS*] FedAAR: A Novel Federated Learning Framework for Animal Activity Recognition with Wearable Sensors

Axiu Mao, Endai Huang, Haiming Gan, Kai Liu*

Animals, Aug, 2022. [JCR Q1/SCI-IF: 3.0]

4. [*J. R. Soc. Interface*] Automated Identification of Chicken Distress Vocalisations Using Deep Learning Models

Axiu Mao, Claire S. E. Giraudet, Kai Liu*, Inês De Almeida Nolasco, Zhiqin Xie, Zhixun Xie, Yue Gao, James Theobald, Devaki Bhatta, Rebecca Stewart, and Alan G. McElligott*

Journal of the Royal Society Interface, Jun, 2022. [JCR Q1/SCI-IF: 3.9]

5. [*SENSORS*] Cross-Modality Interaction Network for Equine Activity Recognition Using Imbalanced Multi-Modal Data

Axiu Mao, Endai Huang, Haiming Gan, Rebecca S. V. Parkes, Weitao Xu, Kai Liu*

Sensors, Sep, 2021. [JCR Q2/SCI-IF: 3.9]

6. [*COMPAG*] Occlusion-Resistant Instance Segmentation of Piglets in Farrowing Pens Using Center Clustering Network

Endai Huang, **Axiu Mao**, Junhui Hou, Yongjian Wu, Weitao Xu, Maria Camila Ceballos, Thomas D. Parsons, Kai Liu*

Computers and Electronics in Agriculture, May, 2023. [JCR Q1/SCI-IF: 8.3]

7. [*COMPAG*] Center Clustering Network Improves Piglet Counting Under Occlusion

Endai Huang, **Axiu Mao**, Haiming Gan, Maria Camila Ceballos, Thomas D. Parsons, Yueju Xue, Kai Liu*

Computers and Electronics in Agriculture, Oct, 2021. [JCR Q1/SCI-IF: 8.3]

8. [*COMPAG*] A Semi-Supervised Generative Adversarial Network for Amodal Instance Segmentation of Piglets in Farrowing Pens

Endai Huang, Zheng He, **Axiu Mao**, Weitao Xu, Maria Camila Ceballos, Thomas D. Parsons, Kai Liu*

Computers and Electronics in Agriculture, Apr, 2023. [JCR Q1/IF: 8.3]

9. [*COMPAG*] Automated Detection and Analysis of Piglet Suckling Behaviour Using High-accuracy Amodal Instance Segmentation

Haiming Gan, Mingqiang Ou, Chengpeng Li, Xiarui Wang, Jingfeng Guo, **Axiu Mao**, Maria Camila Ceballos, Thomas D. Parsons, Kai Liu*, Yueju Xue*

Computers and Electronics in Agriculture, Aug, 2022. [JCR Q1/SCI-IF: 8.3]

Conference Proceedings

1. [*USPLF'2023*] Robust Animal Activity Recognition Using Wearable Sensors: A Correlation Distillation-based Information Recovery Method toward Data Having Low Sampling Rates

Axiu Mao, Endai Huang, Meilu Zhu, and Kai Liu*
*The 2nd U.S. Precision Livestock Farming Conference (USPLF), May, **2023**.*

2. [*ECPLF'2022*] Uniting farms: Federated Learning for Sensor-based Animal Activity Recognition
Axiu Mao, Endai Huang, Haiming Gan, and Kai Liu*
*The 10th European Conference on Precision Livestock Farming (ECPLF), Aug, **2022**.*

3. [*ISAEW'*2021] Cross-Modality Interaction Network for Equine Activity Recognition Using Time-Series Motion Data
Axiu Mao, Endai Huang, Weitao Xu, Kai Liu*
*International Symposium on Animal Environment and Welfare (ISAEW), Oct, **2021**.*

4. [*ISAEW'*2023] DeMVpp-YOLO: A Lightweight Pig Behavior Detection Model for Improved Pig Health Management in Farrowing Pens
Zhaojin Guo, Li Lyu, Zheng He, **Axiu Mao**, Endai Huang, Kai Liu*
*International Symposium on Animal Environment and Welfare (ISAEW), Oct, **2023**.*

5. [*USPLF'2023*] Occlusion-resistant Locomotion Analysis of Piglets Using Amodal Instance Segmentation
Haiming Gan, **Axiu Mao**, Cheryl Natalie Sze, Endai Huang, Maria Camila Ceballos, Thomas D. Parsons, Kai Liu*
*The 2nd U.S. Precision Livestock Farming Conference (USPLF), May, **2023**.*

6. [*ECPLF'2022*] Occlusion Resistant Spatial Analysis of Pig Distribution Pattern in Farrowing Pens Using Center Clustering Network
Endai Huang, **Axiu Mao**, Haiming Gan, and Kai Liu*
*The 10th European Conference on Precision Livestock Farming (ECPLF), Aug, **2022**.*

7. [*ISAEW'*2021] A Key Frame Selection Method for Creating Deep Learning Training Set in Animal Research Involving Time-Series Video Data
Endai Huang, **Axiu Mao**, Haiming Gan, Kai Liu*
*International Symposium on Animal Environment and Welfare (ISAEW), Oct, **2021**.*

8. [*ASABE'*2021] Capacity Limit of Deep Learning Methods on Scenarios of Pigs in Farrowing Pen under Occlusion
Endai Huang, **Axiu Mao**, Maria Camila Ceballos, Thomas D. Parsons, Kai Liu*
*ASABE Annual International Virtual Meeting (ASABE), Jul, **2021**.*

9. [*ACPLF'*2020] Deep Learning-based Assessment of Laying-hen Feather Conditions Using Color and Thermal Images
Endai Huang, **Axiu Mao**, Kai Liu*, Yueju, Xue
*The 2nd Asian Conference on Precision Livestock Farming (ACPLF), Oct, **2020**.*

Preprints

1. Automatic Detection of Feral Pigeons in Urban Environment Using Deep Learning

Zhaojin Guo, Zheng He, Li Lyu, **Axiu Mao**, Endai Huang, Kai Liu*

https://www.preprints.org/manuscript/202311.0672/v1, **2023**

2. Effectiveness of quarantine measure on transmission dynamics of COVID-19 in Hong Kong
   Hsiang-Yu Yuan*, **Axiu Mao**, Guiyuan Han, Hsiangkuo Yuan, Dirk Pfeiffer
   *medRxiv, https://www.medrxiv.org/content/10.1101/2020.04.09.20059006v1, **2020**.*

3. The importance of the timing of quarantine measures before symptom onset to prevent COVID-19 outbreaks-illustrated by Hong Kong's intervention model
   Hsiang-Yu Yuan*, Guiyuan Han, Hsiangkuo Yuan, Susanne Pfeiffer, **Axiu Mao**, Lindsey Wu, Dirk Pfeiffer
   *medRxiv, https://www.medrxiv.org/content/10.1101/2020.05.03.20089482v1, **2020**.*

SELECTED AWARDS

- Second Runner-up Prize at the 2023 Huawei Developer Competition - Asia Pacific   Nov. 2023
  - Theme: Empowering Livestock Industry With Next GEN AI
- Bronze Award of The 9th China International College Students' 'Internet +' Innovation and Entrepreneurship Competition, International   Nov. 2023
  - Theme: Smart Livestock Industry: Future Solution Based on New Generation Artificial Intelligence
- Silver Award of The 8th China International College Students' 'Internet +' Innovation and Entrepreneurship Competition, International   Nov. 2022
  - Theme: WeKnow Tech: Solution for Intelligent Animal Monitoring
- Research Tuition Scholarship (RTS), CityU   Sep.2022
- Outstanding Graduate Student Paper and Presentation Award at ISAEW'2021, Chongqing, China
  Oct. 2021
- Outstanding Graduates, Zhejiang Province   Jun. 2019
- Meritorious Winner, Mathematical Contest in Modeling (MCM), International   May. 2018
  - Key Words: HF radio, Reflection Loss Model, Signal-to-noise Ratio
- The First Prize, National Mathematical Modeling Competition, Zhejiang Area   Oct. 2017
  - Key Words: CT System Parameter and Imaging
- The First Prize, National Mathematics Competition   Nov. 2018
- The First Prize, Higher Mathematics Competition (Calculus), Zhejiang Province   Oct. 2018
- The First Prize, Physics Innovation Competition (Theory), Zhejiang Province   Jan. 2018
- Outstanding Graduates, CJLU   Jun. 2019
- The First Prize, Hexagon Technology Public Benefit Scholarship (only one), CJLU   Mar. 2019
- The First Prize, Challenge Cup College Students Entrepreneurship Competition, CJLU   Jan.2018
  - Key Words: RFID, Information Traceability System
- First-class Student Award, CJLU   2015-2018

PROFESSIONAL ACTIVITIES

Journal Reviewers

- Expert Systems With Applications (ESWA)
- Computers and Electronics in Agriculture (COMPAG)
- Computers in Biology and Medicine (CIBM)
- Information Processing in Agriculture (IPA)
- Patterns – Cell Press
- Journal of the ASABE
- PeerJ

Conference Reviewers

- USPLF'2023, Tennessee, United States

Conference Presentations

- USPLF'2023, Tennessee, United States   May. 2023
- ECPLF'2022, Vienna, Austria   Aug. 2022
- ISAEW'2021, Chongqing, China   Oct. 2021