Axiu Mao

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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

PROFESSIONAL EXPERIENCE

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

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 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. [*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****.*

5. [*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****.*

6. [*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****.*

7. [*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****.*

8. [*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. 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****.*

2. 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

- Silver Award of The 8th China International College Students' 'Internet +' Innovation and Entrepreneurship Competition, International Nov. 2022

- Key Words: 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

- Computers and Electronics in Agriculture (COMPAG)
- Expert Systems With Applications (ESWA)
- 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