THE 6TH CIGR INTERNATIONAL CONFERENCE 2024

ICC JEJU, KOREA

PROGRAM BOOK

CIGR 2024

DIGITAL AGRICULTURE

MAY 19-23

Day 1, May 20 (Mon.) | Scientific Program

S7-3 Technical Section 7: Information Technology

16:30 - 18:00 Halla B (3F)

Chair(s): HYUN-KWON SUH (Sejong University)

S7-3-01 16:30-16:45

Interactive segmentation method for agricultural land object perception in High-Resolution orthoimagery

Author: HAO WANG (Research Center of Intelligent Equipment, Beijing Academy of Agriculture and Forestry Sciences)

S7-3-02 16:45-17:00

Recognition and monitoring of individual dairy cows using computer vision technology

Author: STEFANO BENNI (University of Bologna, Dept. of Agricultural and Food Sciences)

Co-author(s): CLAUDIA GIANNONE (University of Bologna, Department of Agricultural and Food Sciences)
MARCO BOVO (University of Bologna, Department of Agricultural and Food Sciences)
MATTIA CECCARELLI (University of Bologna, Department of Agricultural and Food Sciences)
DANIELE TORREGGIANI (University of Bologna)
PATRIZIA TASSINARI (University of Bologna, Department of Agricultural and Food Sciences)

S7-3-03 17:00-17:15

Deceased broiler detection using Bi-Spectral imaging and deep learning algorithms

Author: DOHWAN KIM (CHONNAM NATIONAL UNIVERSITY)

Co-author(s): JUNG-WOONG YOON (Department of Convergence Biosystems Engineering, Chonnam National University)
ÖMER FARUK İNCE (Agricultural Automation Research Center, Chonnam National University)
KYEONG-HWAN LEE (Chonnam national University)

S7-3-04 17:15-17:30

Cow mastitis detection using deep learning-based anomaly detection

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DAE-HYUN LEE (Department of Biosystems Machinery Engineering, Chungnam National University)

S7-3-05 17:30-17:45

Time-Series prediction of quality degradation in Cold-Stored agricultural products using recurrent neural networks

Author: SANG-YEON KIM (Seoul National University)

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Co-author(s): EUNGCHAN KIM (Seoul National University)
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JIWON RYU (Seoul National University)
GYUMIN KIM (Seoul National University)
SUBIN LEE (Seoul National University)
GHISEOK KIM (Seoul National University)

S7-3-06 17:45-18:00

Exploring the performance of Transformer-based models for strawberry detection with different backbones

Corresp. Author: HYEONJI PARK (Department of Integrative Biological Sciences and Industry, Sejong University)
HYUN KWON SUH(Department of Integrative Biological Sciences and Industry, Sejong University)

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Deceased Broiler Detection Using Bi-Spectral Imaging and Deep Learning Algorithms

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Abstract

Typically, the incidence rate of deceased broilers in indoor poultry farms is estimated to be approximately 1% to 2% of broilers perishing daily. Due to the potential for disease transmission and outbreaks associated with deceased broilers, their prompt removal is imperative. However, the manual process of farm owners inspecting the entire facility to identify and remove deceased broilers, particularly in densely populated poultry farms, is a labor-intensive and time-consuming task.

In this study, we propose a method for detecting deceased broilers using a bi-spectral camera and deep learning algorithms. Our method involves capturing RGB and thermal images with a bi-spectral camera and aligning them to ensure consistent results. In RGB images, broilers, whether deceased or alive, are identified using a YOLO-based object detection model. Conversely, in thermal images, deceased broilers exhibit temperature characteristics distinct from live ones, simplifying their identification. We employ the RANSAC-Flow image alignment algorithm in conjunction with a YOLO-based object detection model to locate broilers in thermal images. Additionally, we conduct thermal pixel distribution analysis to differentiate between deceased and live broilers, leveraging the Support Vector Machine (SVM) for classification based on significant features extracted from the distribution.

The YOLOv8 achieved an impressive mean average precision of 96.8% with an intersection of union (IoU) set at 0.5. Furthermore, the SVM-based classification achieved an accuracy of 98.3% in distinguishing between deceased and live broilers. In summary, our approach provides valuable insights for precise livestock management.

Keywords: Intensive poultry houses, Thermography, Image alignment, Object detection

References

[1] Shen, X., Darmon, F., Efros, A. A., & Aubry, M. (2020). Ransac-flow: generic two-stage image alignment. In *Computer Vision–ECCV 2020: 16th European Conference, Glasgow, UK, August 23–28, 2020, Proceedings, Part IV 16* (pp. 618-637). Springer International Publishing.

[2] Chaurasia, A. (2023, November 12). *Ultralytics YOLOv8 Docs*. Ultralytics. https://docs.ultralytics.com/

Acknowledgments

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Figures

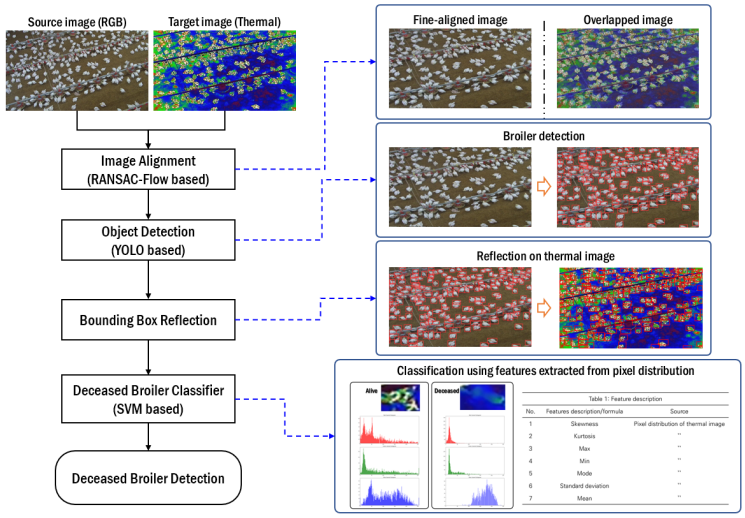

Figure 1. The overall structure of our proposed method.