

Proceedings of the KSAM 2023 Spring Conference

2023년 춘계학술대회 초록집

Vol.28. No.1

2023. 4. 27.(목) - 28.(금) KT대전인재개발원



주최



■ 좌장 : 서영욱 박사(국립농업과학원) ■

9:00~9:17	67	다중분광 영상을 이용한 배추의 생육정보 추정 회귀 모델 Regression model for Growth Information of Chinese Cabbage using Multispectral Image 정종찬(경상국립대학교), 유찬석*, 박기수, 김은리
9:17~9:34	68	완숙 토마토 군집 영역 검출 기반 과일 자세 추정 Tomato fruits pose estimation based on ripe tomato bunch area 강승우(충남대학교), 조수현, 성백겸, 이대현*
9:34~9:51	69	공공기상 정보와 LSTM Network를 이용한 콩 재배 토양수분 예측 Soil Moisture Prediction of Soybean Field Using Public Weather Data and LSTM Network 박수환(강원대학교), 김민지, 상완규, 임경재, 모창연*
9:51~10:08	70	CCTV Image based Broiler Feeding and Drinking Behavior Monitoring System using Improved YOLOv5 and DeepSORT Do-Hwan Kim(Chonnam National University), Xiaosa He, Jiwoong Lee, Kyeong-Hwan Lee*
10:08~10:25	71	Development of Semantic Segmentation Algorithm for Crops with Long Narrow Leaves using UAV RGB Imagery Dong-Wook Kim(Seoul National University), Gyujin Jang, Hak-Jin Kim*
10:25~10:42	72	CNN 기반 콩 및 옥수수 발 우점 잡초 분류 모델 개발 Development of CNN based Classification Model of Dominant Weed Species in Soybean and Corn Field 노승우(서울대학교), 박성민, 홍석주, 김상연, 김응찬, 이창협, 김성제, 류지원, 누르히스나, 김대영, 김규민, 김기석*
10:42~10:59	73	초분광 형광 영상기반 딸기 잿빛 곰팡이 감염 조기 검출을 위한 딥러닝 알고리즘 개발 Deep Learning Algorithm for Early Detection of Botrytis Cinerea Infected Strawberry Fruit Using Hyperspectral Fluorescence Imaging 천승우(강원대학교), 송두진, 이광호, 김민지, 김경수, 모창연*
10:59~11:16	74	Mask-RCNN 및 초분광 영상 특성 결합을 활용한 자색 옥수수 종자 품종 분류 딥러닝 알고리즘 개발 Deep Learning Algorithm for classification of purple corn seed varieties using Mask-RCNN and Feature Fusing of Hyperspectral Imaging 김남욱(강원대학교), 김민지, 이주경, 모창연*
11:16~11:33	75	Improving Model Performance on Scarce Datasets using SE Blocks in YOLOv7 Architecture Zhe Wang Zhang(Chonnam National University), Yu Zheng, Kyeong-Hwan Lee*
11:33~11:50	76	Agricultural Robot Dataset for Visual Simultaneous Localization and Mapping (VSLAM) in Orchard Farms Anditya Sridamar Pratyasta(Kangwon National University), Xiongzhe Han*, Jongwoo Ha
11:50~13:00		점심시간

CCTV Image based Broiler Feeding and Drinking Behavior Monitoring System using Improved YOLOv5 and DeepSORT

Do-Hwan Kim¹, Xiaosa He¹, Jiwoong Lee², Kyeong-Hwan Lee^{1,3,4*}

¹Department of Convergence Biosystems Engineering, Chonnam National University, Gwangju, Korea

²Division of Animal Science, Chonnam National University, Gwangju, Korea

³Agricultural Automation Research Center, Chonnam National University, Gwangju, Korea

⁴BK21 Interdisciplinary Program in IT–Bio Convergence System, Chonnam National University, Gwangju, Korea

Abstract

Monitoring broiler feeding and drinking behaviors is essential for optimizing the health, productivity, and welfare of the poultry. However, it can be challenging due to the small size of broilers and the dynamic environment of poultry houses. This study proposes a broiler feeding and drinking behaviors monitoring system that uses improved YOLOv5 and DeepSORT to detect and track broilers, despite their relatively small size compared to other livestock. To better handle small objects in CCTV views, we leverage a query mechanism to accelerate the inference of YOLOv5. This mechanism initially predicts the coarse locations of small object on low-resolution features and then refines the detection results in high-resolution features sparsely guided by the coarse positions. In addition, we utilize shuffleNetv2 to accelerate the DeepSORT inference speed while maintaining accuracy. The proposed system was evaluated using videos footage from a commercial broiler farm, and the results showed that the system can detect and re-identification the broiler feeding and drinking behaviors with the mean average precision(mAP) of 97% when IOU threshold was set to 0.5. The proposed system has the potential to improve the welfare of broilers through enabling early intervention and broiler productivity by facilitating more effective management of feeding and drinking behaviors.

Keywords

Broiler, Feeding behavior, Drinking behavior, YOLOv5, DeepSORT

Acknowledgement

This work was supported by Korea Institute of Planning and Evaluation for Technology in Food, Agriculture and Forestry(IPET) and Korea Smart Farm R&D Foundation(KosFarm) through Smart Farm Innovation Technology Development Program, funded by Ministry of Agriculture, Food and Rural Affairs(MAFRA) and Ministry of Science and ICT(MSIT), Rural Development Administration(RDA)(42104404) and by Korea Institute of Planning and Evaluation for Technology in Food, Agriculture and Forestry(IPET) through the Open Field Smart Agriculture Technology Short-term Advancement Program, funded by Ministry of Agriculture, Food and Rural Affairs(MAFRA)(32204003).

*Corresponding author: Kyeong-Hwan Lee (khlee@jnu.ac.kr)