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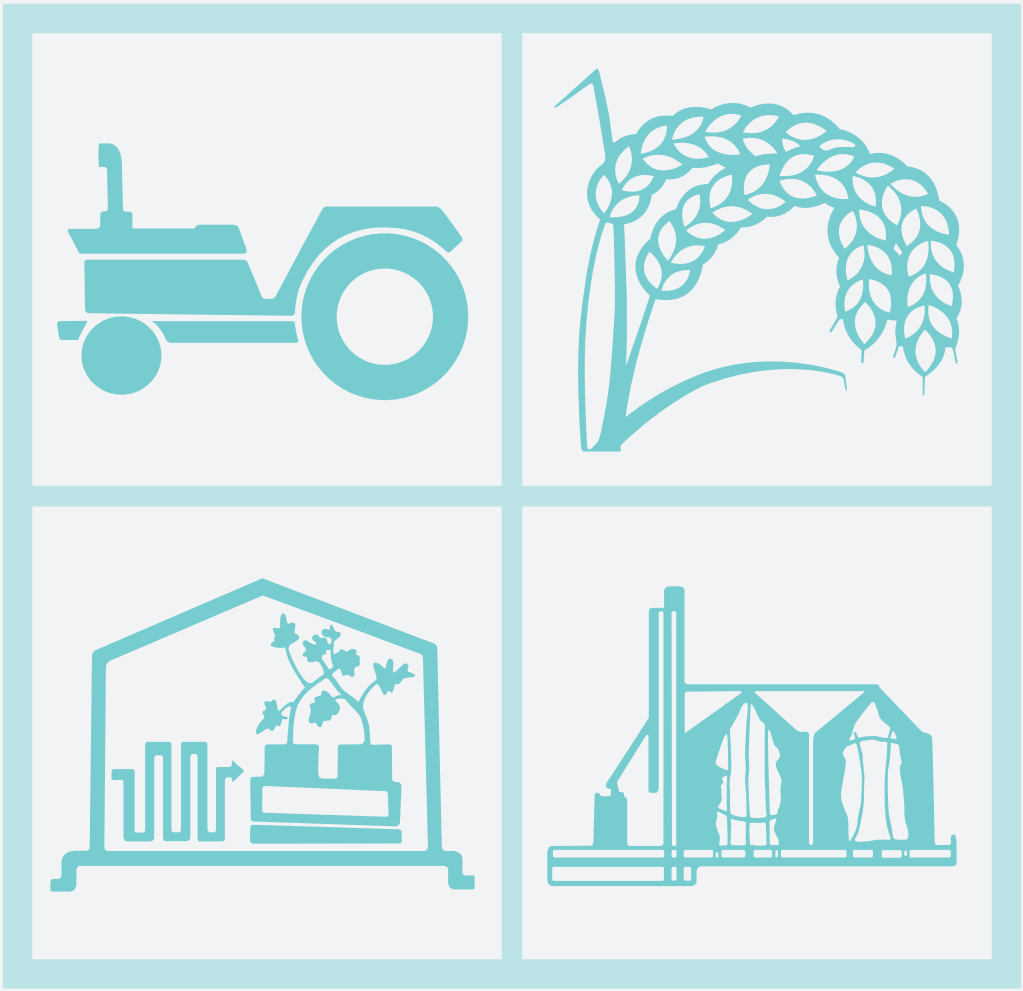

주최

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KSAM Korean Society for Agricultural Machinery

스마트팜 연구센터
Smart Farm Research Center

BAY 2 ▶인공지능 및 정보처리 II

■ 좌장 : 김태형 교수 (서울대학교) ■

11:10~11:22	77	**Development of machine learning technology for strawberry leaf disease detection and the severity diagnosis** Nandita Irsaulul Nurhisna(Seoul National University), Chang-hyup lee, Eungchan Kim, Dae Young Kim, Xianhui Xin, Mingyu Baek, Ghiseok Kim*
11:22~11:34	78	**로봇 수확을 위한 참외의 자세 추정** Pose estimation of oriental melon for robot harvesting 강승우(충남대학교), 조수현, 성백겸, 이대현*, 김경철
11:34~11:46	79	**비전 기반 딥러닝과 Edge 플랫폼을 활용한 둑 인식 알고리즘 개발** Development of a Field Boundary Algorithm Using Vision-Based Deep Learning and Edge Platform 윤원섭(한국생산기술연구원), 김원균, 김종탁*
11:46~11:58	80	**순환신경망 기반 저온 저장 양파의 물성 변화 시계열 예측 모델 개발** Development of RNN-based model for time-series prediction of physical property changes in onions during cold storage 김상연(서울대학교), 이창협, 노승우, 김대영, 장하린, 박성민, 김기석*
11:58~13:00		**BAY 1 – Break Time**
13:00~13:12	81	**Graph-Optimized SLAM Algorithm for Real-time Dense Reconstruction of Greenhouse Crops** Yu Zheng(Chonnam National University), Ömer Faruk İnce, Kyeong-Hwan Lee*
13:12~13:24	82	**제한된 데이터셋 조건별 YOLOv8 객체 분할 탐지 성능 비교** Comparative Analysis of YOLOv8 Object Segmentation Detection Performance under Various Limited Dataset 송지수(부산대학교), 박재성*, 김동석, 김효성, 정은지, 황현정
13:24~13:36	83	**초분광 영상 기반 벼 병해 탐지 기술 개발** Development of Detection Methods for Rice Disease Based on Hyperspectral Data 김대영(서울대학교), 박성민, 김성제, 김상연, 누르히스나, 백민규, 김기석*
13:36~13:48	84	**초분광 영상을 이용한 딥러닝 기반 꿀벌응애 검출** Bee mite detection based on deep learning using hyperspectral imaging 이홍구(강원대학교), 신정용, 김수배, 이수진, 모창연*
13:48~14:00	85	**Semi-supervised Learning for Early Diagnosis of Kimchi Cabbage Downy Mildew Based on Airborne Hyperspectral Imaging** Lukas Wiku Kuswidiyanto(Kangwon National University), Pingan Wang, Hyun Ho Noh, Hee-Young Jung, Xiongzhe Han*

Graph-Optimized SLAM Algorithm for Real-time Dense Reconstruction of Greenhouse Crops

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Abstract

Greenhouse agricultural technology is undergoing rapid advancements, confronting the challenges of digitization and automation. In this study, we introduce a novel system for real-time 3D reconstruction of greenhouse crops based on SLAM. Employing RGBD cameras, the algorithm captures real-time 3D point cloud frames, subsequently extracting features for pose estimation. Only keyframes are retained in memory, constituting a pose-graph to economize computational resources. This architecture undergoes backend loop closure detection and is subjected to global optimization, further fortified by marker constraints. The resultant optimized pose graph, combined with the keyframes, is synthesized into a holistic 3D point cloud model of the greenhouse environment. Our method highly correlates with manual measurements (R^2=0.996, RMSE=6.26 mm). This research offers a robust 3D modeling approach for greenhouse crops, benefiting phenotypic analysis and digital agriculture.

Keywords

Greenhouse, 3D reconstruction, RGBD camera, SLAM, Graph-Optimized.

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