

2025 IEEE Conference on AgriFood Electronics (CAFE 2025)

**Montevideo, Uruguay
8-10 October 2025**

IEEE Catalog Number:
ISBN:

CFP25KZ3-POD
979-8-3315-8893-9



Copyright © 2025, IEEE

All Rights Reserved

Copyright and Reprint Permissions:

Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number:	CFP25KZ3-POD
ISBN (Print-On-Demand):	979-8-3315-8893-9
ISBN (Online):	979-8-3315-8892-2

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA

Phone:	(845) 758-0400
Fax:	(845) 758-2633
E-mail:	curran@proceedings.com
Web:	www.proceedings.com

TABLE OF CONTENTS

LoRa-based IoT System for Remote Phytosanitary Monitoring in Agriculture	1
<i>José Acerbis, Javier González, Joel Gak, Matías Miguez, Álvaro Pardo</i>	
Autonomous Edge AI Solution for Post-Harvest Mango Tommy Classification	6
<i>Juan Sebastián Villota-Cáceres, Javier Alberto Chaparro-Preciado PhD</i>	
A Novel LoRa-Enabled IoT Smart Collar for Real-Time Monitoring of Dairy Cows in Rural Environments	11
<i>Cristian Capriles Olivera, Eynar Calle Viles, Katerin Deysi Vasquez Benito</i>	
Greenhouses for Future Homes with Blockchain-IoT Implementation	16
<i>Santiago Cortés Tovar, Jhon F. Gutierrez Rodriguez, Luis F. Leal Baute, P.hD. Alexander Pérez Ruiz P.hD. Carlos A. Gonzalez Amarillo</i>	
Queen Detection in Beehives via Environmental Sensor Fusion for Low-Power Edge Computing	21
<i>Chiara De Luca, Elisa Donati</i>	
A Standalone FLC Framework for Controlled Fertigation in Protected Horticulture	26
<i>Arys Carrasquilla-Batista, Alfonso Chacón-Rodríguez</i>	
From Lab to Field: A Pilot Study Using Portable NIR and ML for Honey Botanical Traceability	31
<i>Alessia Lazzaro, Anna Grazia Mignani, Leonardo Ciaccheri, Mariateresa Russo, Massimo Merenda</i>	
Statistical Detection of Extreme Climate Events in Southern Brazil: A Time Series Approach to Support Sustainable Agro-Systems	36
<i>Gabriel R. Dias, George P. D. Azevedo, Pedro A. M. Paixão, Fábio L. L. Ramos, Gerson A. L. Nunes Fernando L. Dias</i>	
UHF-RFID Reader for Enhanced Traceability and Management in the Livestock-Industry	41
<i>María José Baráibar, Federico Melián, Leandro Shiromizu, Alfredo Arnaud</i>	
An Automatic Multiple-Sensing Irrigation Method for Optimal Water Usage	46
<i>Yu Kang Hu, Ren En Wu, Hsin I Wu, Ren Song Tsay, Chun Te Wu</i>	
In-Line Grain Moisture Sensor for Vertical Silos	51
<i>Diego Barrettino, Liliana Roscaneanu</i>	
Single Platform, Dual Readout: Comparing EIS and EGFET Modes for Quercetin Sensing	56
<i>Giulia Elli, Ahmed Rasheed, Shamim Torkian, Sahira Vasquez, Paolo Lugli, Luisa Petti, Pietro Ibba</i>	
Monitoring and Control System for an Indoor Cannabis Cultivation	61
<i>Diego Alonso, Carlos Menoni, Felipe Saravia, Nicolás Pérez, Leonardo Steinfeld</i>	
A neuromorphic continuous soil monitoring system for precision irrigation	66
<i>Mirco Tincani, Khaled Kerouch, Umberto Garlando, Mattia Barezzi, Alessandro Sanginario Giacomo Indiveri, Chiara De Luca</i>	
Dielectric Properties of Breadnut (Artocarpus Camansi) Latex	71
<i>Jeevan Persad, Carina Rampersad, Sean Rocke, Oral Daley, Megan Mahadeo, Aaron Roopnarine</i>	

GPU-Accelerated Reaction-Diffusion Modelling for Optimal Nutrient-Driven Root Biomass Growth	75
<i>Georgios Kleitsiotis, Athanasios Passias, Ioannis Tompris, Karolos-Alexandros Tsakalos</i> <i>Konstantinos Rallis, Xanthoula Eirini Pantazi, Andrew Adamatzky, Georgios Ch. Sirakoulis</i>	
Lightweight CNN Architectures for Edge-Based Post-Harvest Quality Control in Organic Tomatoes	80
<i>Athanasios Passias, Karolos-Alexandros Tsakalos, Konstantinos Rallis, Xanthoula Eirini Pantazi</i> <i>Georgios Ch. Sirakoulis</i>	
Design and Evaluation of a Low-Power Communication Protocol for Wireless Sensor Networks in Environmental Monitoring	85
<i>Ronny García-Ramírez, Alfonso Chacón-Rodríguez, Renato Rimolo-Donadio, Pablo Alvarado-Moya</i>	
Advancing Meter Resolution Crop Simulation Model as a Testbed for Precision Agricultural Applications	90
<i>Sneha Jha, James V. Krogmeier</i>	
Lightweight On-Device Pre-processing for Agri-food Classification	95
<i>Mohamed Riad Sebti, Karim Laabassi, Mariateresa Russo, Massimo Merenda</i>	
Apple Strain(ge) Measurement: Bringing Printed Electronics into the Orchard	100
<i>Michele Gullino, Albert Heinrich Lanthaler, Pietro Ibba, Sahira Vasquez, Mohammad Yusuf Mulla</i> <i>Niko Münzenrieder, Giuseppe Cantarella, Paolo Lugli, Walter Guerra, Luigi Manfrini, Luisa Petti</i>	
A Systematic Review on Spectral Control and Automation of LED Lighting Systems for Smart Agriculture	105
<i>Alessandro Lugo-Figueroa, Ivonne Ruiz-Gutiérrez, Moises Nuñez, Juan Mauricio Villanueva</i>	
Tiny-PMDeT: A Lightweight Edge-AI Detector for AIoT CMOS Sensor Based Real-Time Powdery Mildew Detection on Grapevine	110
<i>Nanxin Zeng, Qiang Tong, Songtao Wu, Kuanhong Xu</i>	
A Multimodal Data Fusion Approach for Early Detection of Fusarium Head Blight in Wheat	115
<i>Xanthoula Eirini Pantazi, Christos Tsitsopoulos, Antonios Morellos, Baraa Almoujahed, Zita Kriauciuniene</i> <i>Marius Kazlauskas, Egidijus Šarauskis, Abdul Mounem Mouazen</i>	
Path Loss Modeling in Underground Wireless Channels with Spatial Soil Texture Variability	120
<i>Fabio A. Castiblanco, Sneha Jha, Ly V. Nguyen, David J. Love, James V. Krogmeier</i>	
Weather Pattern Analysis for Corn Yield Explainability	125
<i>Md. Samiul Basir, Dennis Buckmaster, James V. Krogmeier</i>	
A Long-Range Low-Power Modular Platform for Plant Health Monitoring in Climate-Smart Agriculture Scenarios	130
<i>Alessandro Sanginario, Mattia Barezzi, Luca Rolle, Federico Cum, Umberto Garlando</i>	
Preliminary Analysis of Trunk Electrical Bio-Impedance in Professional Apple Orchards	135
<i>Federico Cum, Mattia Barezzi, Danilo Demarchi, Umberto Garlando</i>	
Towards Improved Weed Detection in Native Grasslands Using High-Resolution Drone Imagery and Artificial Intelligence	140
<i>Amparo Quiñones, Jean V. Savian, Andrés Hirigoyen, João Valente</i>	
Wireless Sensor Network for Environmental Monitoring in Pitaya Farming	144
<i>Adrian Hinojosa, Jimmy Tarrillo, Moises Nuñez</i>	

Calibration Repeatability of Soil Moisture Sensors in Biochar Amendments under Changing Salinity	149
<i>Maria Jose Gomez-Astorga, Karolina Villagra-Mendoza, Federico Masis-Melendez</i> <i>Renato Rimolo-Donadio</i>	
Adaptive machine modeling using neural networks to encode spatially correlated measurements	154
<i>Benjamin Kazenwadel, Marina Graf, Marcus Geimer</i>	
Image-Based Measurement of Aggregate Size Distribution Using Machine Learning Algorithms	159
<i>Marina Graf, Benjamin Kazenwadel, Martin Waldschmidt, Simon Becker, Marcus Geimer</i>	
Digital twins as a tool for data-driven decision making in pasture-based livestock production	164
<i>Diego Fernando Quiroga, Juan Pablo Franco, Yazmin Bentancour, Alicia Waller, Rocio Martinez</i>	
Smart agriculture with magneto-stimulation in tomato seeds: embedded system solutions for data collection in the process	169
<i>Diego Fernando Quiroga, Hernando Jimenez, Pablo Rios, María Laura Umpierrez, María Victoria Panzl</i> <i>Darío García</i>	
Model-Driven Approach to Data Collection in Greenhouse Cultivation Systems	174
<i>Diego Fernando Quiroga, Jesús David Martinez, Mariano Arbiza, Camila Hernandez</i>	
Temperature Compensation in RF Reflectometry for Crop Quality Assessment	179
<i>Adeoluwa Oyinlola, Temitope Odedeyi</i>	
Non-invasive Sucrose Monitoring in Sugarcane Using Bioimpedance Spectroscopy for Precision Agriculture	184
<i>Megan Mahadeo, Sean Roche, Jeevan Persad, Aaron Roopnarine</i>	
Comparing Robotic Mobile Solutions for Commercial Greenhouse Field Mapping	189
<i>Ricardo-Franco Mendoza-Garcia, David-Eduardo Santander-Marquez, Yi-Sheng Lau-Cortes</i>	
RGB-D Photogrammetry of French Lettuce in PFAL Systems	194
<i>Luis Gerardo Chávez Covarrubias, Raquel Salazar Moreno, Luis Arturo Soriano, Irineo López Cruz</i>	
Hardware-Centric IoT Education for Agrifood Applications	199
<i>Jorge Marin, Lucas Irribarra, Jostin Agustin Luis, Cecilia Jiménez, Higinio Carmona, Melissa Diago</i> <i>Alejandro Weinstein, Luis Arturo Soriano, Christian A. Rojas</i>	
3D Reconstruction of a Prickly Pear Using Structure from Motion with COLMAP	204
<i>Luis Herrera Ubaldo, Juan Pablo Espejel, Luis Arturo Soriano, Max Fernando Flores Jimenez</i> <i>Leonardo Guevara</i>	
Design and Adaptation of a Cutting-Gripping End Effector for Robotic Grape Harvesting	209
<i>Gladys Garcia, Yael N. Vicente, Keily D. Barragan, Raul Ceme, Luis Arturo Soriano</i>	