

1. Record Nr.	UNISA996472038903316
Titolo	Information and communication technologies for agriculture - Theme I : Sensors // edited by Dionysis D. Bochtis, [and four others]
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2022] ©2022
ISBN	3-030-84144-8
Descrizione fisica	1 online resource (331 pages)
Collana	Springer Optimization and Its Applications ; ; v.182
Disciplina	630.2085
Soggetti	Agricultural informatics Enginyeria agronòmica Detectors Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Intro -- Preface -- Contents -- Part I: Overview -- Emerging Sensing Technologies for Precision Agriculture -- 1 Introduction -- 1.1 Planting -- 1.2 Soil Management -- 1.3 Plant Health Management -- 1.4 Pests and Disease Management -- 1.5 Yield Harvesting and Post-Harvest -- 2 Types of Sensors -- 2.1 Remote Sensing -- 2.2 Computer Vision -- 2.2.1 RGB -- 2.2.2 Multispectral -- 2.2.3 Hyperspectral -- 2.2.4 Thermal -- 2.2.5 LiDAR -- 2.3 Synthetic Aperture Radar -- 3 Wireless Sensor Networks -- 4 Sensor Fusion -- 5 Conclusions -- References -- Soil Reflectance Spectroscopy for Supporting Sustainable Development Goals -- 1 Introduction -- 2 The Important Role of Soil in Supporting SDGs -- 2.1 Monitoring Soils for Optimization of Precision Agriculture -- 3 Earth Observation Supporting SDGs -- 3.1 Extracting Soil Information from Earth Observation -- 3.2 Estimating Essential Agricultural Variables with EO Techniques the Cases of Soil Organic Carbon and Soil Moisture -- 3.2.1 Approaches for Soil Moisture and Soil Organic Carbon/Matter Estimation Using EO Techniques -- 3.2.2 Estimating Other Agronomic Variables (pH, Clay, and Others) -- 3.2.3 Methods Exploiting Ancillary Information -- 4 Remote Sensing for Soil Monitoring: Limitations and Ways Forward -- 5 Conclusions

and Recommendations -- References -- Proximal Sensing Sensors for Monitoring Crop Growth -- 1 Introduction -- 1.1 General Scope -- 2 Problems in Fields That Can Be Detected by Proximal Sensing -- 2.1 Problems in Crop Emergence -- 2.2 Agrotechnical Mistakes -- 2.3 Overwintering Damage to the Crop Field -- 3 Precision Agriculture -- 3.1 Fertilization Effect on Environment -- 3.2 Variable Rate Fertilization (VRF) -- 3.3 Sensors for Precision Fertilization -- 4 Proximal Measurement Sensors -- 4.1 Soil Characteristics -- 4.2 Proximal Soil Sensors -- 4.3 Proximal Crop Sensors. 4.4 Chlorophyll Meters -- 4.5 Reflectance Sensors for Nitrogen (N) -- 4.6 High-Resolution Spectrometers -- 4.7 Yara N-Sensor -- 5 Autonomous Platforms in Precision Agriculture -- 6 Estonian Use Case of N-Fertilization with GreenSeeker Handheld Crop Sensor -- 7 Experience of Precision Farming in Lithuania - Use Cases -- 7.1 Measurement of Soil Electrical Conductivity -- 7.2 Automated Soil Sampling -- 7.3 Changes of Mineral Fertilizer Elements in Soil Using VRF -- 7.4 Nitrogen Fertilization at a Variable Rate Using Yara N-Sensors -- 7.5 VRF Maps for N-Fertilization Using Proximal Sensors -- 7.5.1 N-Fertilization Maps for Winter Wheat -- 7.5.2 N-Fertilization Maps for Winter Rapeseed -- 7.6 N-Fertilization with Yara N-Tester -- 8 Adoption of Precision Agricultural Technologies -- 9 Conclusions -- References -- Part II: Wireless Network Systems Applications -- Experimental Performance Evaluation Techniques of LoRa Radio Modules and Exploitation for Agricultural Use -- 1 Introduction -- 2 Design Overview -- 3 Implementation Details and Measurement Methodology -- 4 Evaluation of Methods, Results and Discussion -- 5 Conclusions and Future Work -- References -- Evaluating the Performance of a Simulated Softwarized Agricultural Wireless Sensor Network -- 1 Introduction -- 2 Related Work -- 2.1 IoT in the Agricultural Domain -- 2.2 Routing Protocols -- 2.2.1 Collection Tree Protocol (CTP) -- 2.2.2 IPv6 Routing Protocol for Low Power and Lossy Networks (RPL) -- 2.3 Software-Defined Networking (SDN) -- 3 Methodology -- 4 Results -- 5 Discussion -- 6 Conclusions -- References -- Smart Agriculture: A Low-Cost Wireless Sensor Network Approach -- 1 Introduction -- 2 Wireless Sensing Technologies in Smart Agriculture -- 2.1 Related Work -- 2.2 Equipment Overview -- 2.3 Selected Low-Cost Equipment -- 2.3.1 Arduino -- 2.3.2 Arduino Wireless SD Shield and XBee. Zigbee Protocol -- Coordinator -- Routers -- End Devices -- 2.3.3 Raspberry Pi 3 -- 2.3.4 Sensors and Others -- 3 Synchronized Monitoring -- 3.1 Related Work -- 3.2 A Simple Synchronization Scheme -- 3.3 Experimental Evaluation in Olive Groves -- 4 Advanced Monitoring Architecture -- 4.1 Related Work -- 4.2 Cloud/Fog Architecture -- 4.3 Evaluation -- 4.4 Potential Future Applications: The Case of Wildfires -- 5 Conclusions and Future Directions -- References -- Part III: Remote Sensing Applications -- Potential of Sentinel-2 Satellite and Novel Proximal Sensor Data Fusion for Agricultural Applications -- 1 Introduction -- 1.1 Satellite-Based Sensors -- 1.2 Airborne- and Drone-Based Sensors -- 1.3 Ground-Based Proximal Sensors -- 1.4 Vegetation Indices -- 1.5 Inter-Comparison -- 2 Materials and Methods -- 2.1 Plant-O-Meter -- 2.2 Sentinel-2 -- 2.3 Data Analysis -- 3 Results and Discussion -- 4 Conclusions -- References -- Trends in Satellite Sensors and Image Time Series Processing Methods for Crop Phenology Monitoring -- 1 Introduction -- 2 Satellite Sensors for Crop Phenology Monitoring -- 3 Time Series Processing for Crop Seasonality Monitoring -- 3.1 Gap-Filling -- 3.2 LSP Calculation -- 4 Demonstration Cases Time Series Processing -- 4.1 Study Area and Data Acquisition -- 4.1.1 Crop Data

Layer -- 4.1.2 MODIS and Sentinel-2 Surface Reflectance Time-Series -- 4.2 Time Series Processing Over Croplands -- 4.3 LSP Calculation Over Croplands -- 5 Discussion -- 6 Conclusions -- References -- Drone Imagery in Support of Orchards Trees Vegetation Assessment Based on Spectral Indices and Deep Learning -- 1 Introduction -- 2 Methodology -- 2.1 Tree Crown Detection and Classification -- 2.2 Vegetation Indices (VIs) -- 2.2.1 VARI - Visible Atmospherically Resistant Index -- 2.2.2 GLI - Green Leaf Index -- 2.3 Tree Health Assessment -- 3 Study sites.
3.1 Romanian Study Site (No 1) -- 3.2 Greek Study Site (No 2) -- 3.3 Drone Images Acquisition -- 4 Results and Discussion -- 4.1 Trees Detection Using Deep Learning -- 4.2 Trees Vegetation Health Assessment -- 5 Conclusions -- References -- Part IV: Proximal Sensing Applications -- What Does the NDVI Really Tell Us About Crops? Insight from Proximal Spectral Field Sensors -- 1 Introducing the Normalized Difference Vegetation Index (NDVI) -- 2 Methods -- 2.1 Sites, Sensors and Supporting Observations -- 2.2 Data Processing and Analysis -- 3 Results and Discussion -- 3.1 Temporal Variability at Site 1 -- 3.2 Spectral-Spatial Variability at Site 2 -- 4 Conclusions and Outlook -- References -- Geophysical Sensors for Mapping Soil Layers - A Comparative Case Study Using Different Electrical and Electromagnetic Sensors -- 1 Introduction -- 2 Materials and Methods -- 2.1 Site Characteristics -- 2.2 Data Acquisition -- 2.2.1 ECa Mapping with DUALEM-21 -- 2.2.2 ECa Mapping with Geophilus -- 2.2.3 DC Measurements with Static Electrodes Along Reference Transects -- 2.2.4 Ground-Penetrating Radar -- 2.3 Data Processing -- 2.4 Soil Sampling and Soil Texture Analysis -- 3 Results -- 3.1 Lateral Soil Heterogeneity -- 3.2 Information About Soil Stratification -- 3.3 Two-Dimensional Conductivity Models Along Reference Transects -- 3.4 GPR Transects -- 3.5 Soil Texture as Ground-Truth Data -- 4 Discussion -- 5 Conclusion -- References -- Geoinformation Technologies in Pest Management: Mapping Olive Fruit Fly Population in Olive Trees -- 1 Introduction -- 2 Experimental Set Up -- 3 Methods -- 4 Results & Discussion -- 5 Conclusions -- References -- In-field Experiments for Performance Evaluation of a New Low-Cost Active Multispectral Crop Sensor -- 1 Introduction -- 2 Materials and Methods -- 2.1 Field Trials and Experimental Design.
2.2 Sensor Measurements and Sensor Description -- 2.3 Harvest -- 2.4 Data Analysis -- 3 Results and Discussion -- 3.1 Descriptive Statistics and Analysis of Variance -- 3.2 Weather -- 3.3 Correlation Analysis -- 3.4 Linear Regression Analysis -- 4 Future Prospects for Development -- 5 Conclusions and Outlook -- References.
