Advances in Agricultural Machinery and Technologies

Precision Agriculture Technology for Crop Farming

The Precision Agriculture Drone Sensfly | a54fbbd4c607a06c22333937d7b454c2

This book explores comprehensively the means of incorporating UAVs within the arena of air law while stimulating further research and debate on the topic. Analysis of the cross-border operations of UAVs focuses on aspects relevant to the future, and among the following: What current international legal framework adequate to ensure the operation and development of UAS while preserving high levels of safety? How regulations, geo-informatics and geomatics. The contributions, which were selected by means of a rigorous international peer-review process, highlight numerous exciting ideas that will spur novel research directions and foster multidisciplinary collaboration among different specialists. This volume synthesizes critical environmental and geo-environmental aspects relevant for South Asia, such as the protection of biodiversity, climate change, and disasters. It deals with spaceborne monitoring, climate, ecosystems, forests and biodiversity, land-use and land-cover change (LUCC), natural hazards, and disasters in order to contribute towards a sustainable future. The book presents the state-of-the-art information on the important innovations in the agricultural and horticultural industry. It reviews and presents different novel technologies and implementation of these technologies to optimize farming processes and food production. There are four sections, each addressing a specific area of development. Section I discusses the recent development of farm machinery and technology. Section II focuses on water and irrigation engineering. Section III covers harvesting and post-harvest technology. Section IV describes computer modelling and simulation. Each section highlights current industry trends and latest research progress. This book is ideal for those working in or are associated with the fields of agriculture, agri-food chain and conservation and ecological monitoring.
will artificial intelligence impact the civil operations of UAS? The author's analyses draw on relevant initiatives in existing and proposed Standards and Recommended Practices for the operation of UAS on cross-border flights, as well as States’ regulation of UAS within their national airspace. Also described are the means bilaterally and multilaterally agreed upon to respect to their application to the operation of UAS. Given the escalating need to adopt a comprehensive international regulatory framework for the operation of UAS aimed at facilitating its safe and efficient integration - even as the technology advances and continues to outpace law while the potential for incidents involving UAS grows - this book is well timed to meet the challenge for States and UAS Aviation Operators and planners. Its innovative analysis of airspace utilization and resolution of the management of the air traffic safety and security of UAS are sure to influence the development of regulations for civil UAS. The book will be welcomed by aviation regulators, interested international and regional organisations, research organisations, aviation lawyers, and academics in international law and air law. This book aims to further build capacity in the community in communication and inspire others for conservation technologies for aviation. While the military use of drones has been the subject of much scrutiny, the use of drones for humanitarian purposes has so far received little attention. As the starting point for this study, it is argued that the prospect of using drones for humanitarian and other life-saving activities has produced an alternative discourse on drones, dedicated to developing and publicizing the endless possibilities that drones have for “doing good”. Furthermore, it is suggested that the Good Drone narrative has been appropriated back into the drone warfare discourse, as a strategy to make war “more human”. This book explores the role of the Good Drone as an organizing narrative for political projects, technology development and humanitarian action. Its contribution to the debate is to take stock of the multiple logics and rationales according to which drones are “good”, with a primary objective to initiate a critical conversation about the political currency of “good”. This study recognizes the many possibilities for the use of drones and takes these possibilities seriously by critically examining the difference the drones’ functionalities can make, but also what difference the presence of drones themselves - as unmanned and flying objects - make. Discussed and analysed are the implications for the drone industry, user communities, and the areas of crisis where drones are deployed. Artificial Intelligence to Solve Pervasive Internet of Things Issues discusses intelligent techniques for the identification of areas and their applying techniques and challenges in developing discussions on architectures, frameworks, applications, best practices, methods and techniques required for integrating AI to resolve IoT issues. Chapters also provide step-by-step measures, practices and solutions to tackle vital decision-making and practical issues affecting IoT technology, including autonomous devices and cyber techniques. Such loopholes in the process of assessing, mitigating, maintaining and integrating AI and IoT infrastructure components such as scalability, sustainability, latency, system decentralization and maintainability. The book enables readers to explore, discover and implement new solutions for integrating AI to solve IoT issues. Resolving these issues will help readers address many real-world applications in areas such as scientific research, healthcare, defense, aeronautics, engineering, social media, and many others. Discusses intelligent techniques for the implementation of Artificial Intelligence in Internet of Things, providing researchers and specialists who are interested in the use and integration of IoT and Artificial Intelligence technologies. Agriculture is one of the most fundamental human activities. As the farming capacity has expanded, the usage of resources such as land, fertilizer, and water has grown exponentially, and environmental pressures from monocultures have increased. Drones have been used for decades in agriculture to help farmers monitor crops and decrease input costs. However, drones are now being used to help farmers in many different ways, including crop monitoring, disease detection, and crop management. This book covers how Internet of Things (IoT) has a role in shaping the future of our communities. The author shows how the research and education ecosystem promoting impactful solutions-oriented science can help citizenry, government, industry, and other stakeholders to work collaboratively in order to make informed, socially responsibly, science-based decisions. Accordingly, he shows how communities can address complex, interconnected socio-ecological challenges. This book addresses the key issues that drive the development of disruptive technologies, such as the environment, climate change, mining, energy, agro-economic, water, and forestry that are limiting the development of a sustainable and resilient society -- each of these challenges are tied back to IoT based solutions. This open access book disseminates some of the results of the European H2020 AiRT Project (Technology transfer of RPAs for the creative industry). In particular, it presents findings related to mitigating safety and security concerns when civil drones are piloted by the service sector (mainly, the creative industry). European policies regarding drones generally focus on outdoor drones, but they are also used indoors. Moreover, a number of European countries have fragmented regulations on drone use, and as a result, European institutions are attempting to address these issues. This work is based on a detailed study of the European policies, a comprehensive analysis of the regulation in various European countries, an analysis of the drone sector in Europe, and primary data from members of the creative industry. The authors created focus groups in Spain, the UK and Belgium in order to discuss with the creative industry the concerns on safety and security when using civil drones for their work. Based on these results, the book offers advice to the European industry, as well as new insights for academics and policy. This book was published in 2020 by Saint Paul's Press pursuant to a multi-million euro permitting commercial use. All rights not granted by the work's license are retained by the author or authors. This important volume provides a plethora of information on aerial vehicles and their possible roles in revolutionaryizing agricultural procedures through spectral analysis of terrains, soils, crops, water resources, diseases, floods, drought, and farm activities. There are several semi-autonomous and autonomous (robotic) aerial vehicles that are examined for their efficiency in offering detailed spectral data about agrarian regions and individual farms. Among them, small drone aircrafts such as fixed-winged and copter models have already caught the imagination of farmers. They are spreading fast in every nook and corner of the farm world. However, there are many more aerial robots that are utilized in greater detail during farming. In this volume, the focus is on aerial vehicles such as parafoils, hot-air balloons, aerosats, and kites, and how they are being evaluated for use in experimental farms and fields. A few aerial vehicles, such as robotic parafoils, have been adopted to procure aerial spectral data and visual imagery to aid agronomic procedures. These aerial robots are expected to change and improve the use of the sky in agricultural endeavors and the way we conduct agronomic procedures in the very near future. This volume is a timely contribution for agricultural researchers, professors, and the agriculture public who are interested in aerial vehicles. This book covers how Internet of Things (IoT) is a role in shaping the future of our communities. The author shows how the research and education ecosystem promoting impactful solutions-oriented science can help citizenry, government, industry, and other stakeholders to work collaboratively in order to make informed, socially responsible, science-based decisions. Accordingly, he shows how communities can address complex, interconnected socio-ecological challenges. This book addresses the key issues that drive the development of disruptive technologies, such as the environment, climate change, mining, energy, agro-economic, water, and forestry that are limiting the development of a sustainable and resilient society -- each of these challenges are tied back to IoT based solutions. Present research into sustainable IoT with respect to wireless communications, sensing, and systems provides coverage of IoT technologies in sustainability, health, agriculture, climate change, mining, energy, water, management, and forestry. Relevant for academics, researchers, policy makers, city planners and managers, technicians, and industry professionals in IoT and sustainability unmanned aerial vehicles (UAV) have already become an affordable and cost-efficient tool to quickly map a targeted area for many emerging applications in the arena of ecological monitoring and biodiversity conservation. Managers, owners, companies, and scientists are using professional drones equipped with high-resolution visible, multispectral, or thermal cameras to assess the state of ecosystems, the effect of disturbances, or the dynamics and changes within biological communities inter
The Precision Agriculture Sensing for agriculture and crop modeling, provide insight into the diversity and the complexity of developments of a mean to minimize the environmental impact, while increasing production and productivity. The eighteen papers developed for the retrieval of canopy state variables and soil properties from remote sensing data for assimilating remote sensing. The literature shows that many new remote sensing sensors and valuable methods have been estimation on local and regional scales, or worldwide, based on the simultaneous development of crop models and farming concepts and the tools of precision farming system. This book is not just about precision farming, but it decision making and modeling prescription maps for variable rate applications. It provides an overview of precision agriculture and ICT in agronomy. Precision Agriculture covers in detail the spatial data for recordkeeping, spatial analysis in and mobile computing; knowledge based and expert systems; applications in healthcare and wellness; e-learning; and Innovation, CITI 2017, held in Guayaquil, Ecuador, in October 2017. The 24 papers presented in this volume were carefully reviewed and selected from 51 submissions. The papers presents challenges of human-robot interaction to physical realization. This book constitutes the proceedings of the Third International Conference on Aerial Robots - Aerodynamics, Control, and Applications is an attempt to bring some of these topics related to UAVs together in just one book and to look at a selection of the most relevant problems of UAVs in a broader engineering perspective. This book provides a clear insight about IoT and its requirements, protocols, performance improvement, evaluation methods and challenging aspects, to the readers at one place. The recent enhancement of integrating drone with the Internet of things (IoT) technology promises tremendous global development. The top applications of the Internet of Drones (IoD) are expected to be infrastructure & building monitoring, fire service systems, insurance investigations, retail fulfillment, agriculture and forensic evidence collections. Conventional drone technology is enhanced with the Internet and other emerging technologies such as cloud computing, big data, artificial intelligence and communication networks which open up for enormous opportunities like ahead for on-demand service-oriented and user-friendly IoD applications. This book presents extensive knowledge about the role of remote sensing and emerging technology in drone networks. It focuses on major research areas of the Internet of Drones and its related applications. It provides a strong knowledge platform towards the Internet of Drones for graduates, researchers, scientists, engineers, and drone industries as well as the impact of Internet of Things on food security and foodborne infections. The book explores food products that organic, integrated and traditional farming systems are contributing to consumers. As the demand for organic food products grows faster than ever, this book discusses current and improved practices for safer products. Moreover, the book explores progressive directions, such as the agricloud generation of platforms, and algorithms to aid in the understanding and geolocation of the agro-environment and how farmer education can contribute to sustainable and safe food. Safety and Practice for Organic Food is a unique source of organic agricultural practices and food production for researchers, academics and professionals at agriculture-based universities and colleges who are involved in food science, animal sciences including poultry science, food safety, food microbiology, plant science and agricultural extension. This book is also an excellent source of information for regulators and federal government officials (USDA, FDA, EPA) and the food processing industry. Discusses limitations in pre-harvest and post-harvest level practices with specific information on risk and biosecurity, and guidelines for organic food production and future directions for safer and more sustainable management Presents microbial and other biological hazards at pre-harvest and post-harvest levelsThis book covers three main types of agricultural systems: the use of robotics, drones (unmanned aerial vehicles), and satellite-guided precision farming methods. Some of these are well refined and are currently in use, while others are in need of refinement and are yet to become popular. The book provides a valuable source of information on this developing field for those involved with agriculture and farming and agricultural engineering. The book is also applicable as a textbook for students and a reference. This book is a great source needed to enable its readers to keep up with the fast build-up of the industrial internet of things/manufacturing cyber-physical systems (IoT/M-CPS). Gathering contributions from leading experts in the field with years of experience in advancing manufacturing, it fosters a research community committed to advancing research and education in IoT/M-CPS and to translating applicable science and technology into engineering practice. Presenting the current state of IoT and the concept of cybermanufacturing, this book is at the nexus of research advances from the engineering and computer and information science domains. Readers will acquire the core system science needed to transform to cybermanufacturing that spans the full spectrum from ideation to physical realization. This book constitutes the proceedings of the Third International Conference on Interactive Collaborative Robotics, ICR 2018, held in Leipzig, Germany, in September 2018, as a satellite event of the 20th International Conference on Speech and Computer, SPECOM 2018. The 30 papers presented in this volume were carefully reviewed and selected from 51 submissions. The papers presents challenges of human-robot interaction, robot control and behavior in social robotics and collaborative robotics, as well as applied robotic and cyberphysical systems. This book constitutes the proceedings of the Third International Conference on Technologies and Innovation, BITS, TITI 2017, Ecuador, November 9-11, 2017. The 342 papers presented in this volume were carefully reviewed and selected from 68 submissions. They were organized in topical sections named: cloud and mobile computing; knowledge based and expert systems; applications in healthcare and wellness; e-learning; and ICT in agronomy. Precision Agriculture covers in detail the spatial data for recordkeeping, spatial analysis in decision making and modeling prescription maps for variable rate applications. It provides an overview of precision farming methods and the tools of precision farming. This book is not just about precision farming but it takes one important and difficult aspect of precision farming and puts it into an understandable and teachable format. Crop models and remote sensing techniques have been combined and applied in agriculture and crop estimation on local and regional scales, or worldwide, based on the simultaneous development of crop models and remote sensing. The literature shows that many new remote sensing sensors and valuable methods have been developed for the retrieval of canopy state variables and soil properties from remote sensing data for assimilating the retrieved variables into crop models. At the same time, remote sensing has been used in a staggering number of applications for agriculture. This book sets the context for remote sensing and modelling for agricultural systems as a mean to minimize the environmental impact, while increasing production and productivity. The eighteen papers published in this Special Issue, although not representative of all the work carried out in the field of Remote Sensing for agriculture and crop modeling, provide insight into the diversity and the complexity of developments of
RS applications in agriculture. Five thematic focuses have emerged from the published papers: yield estimation, land cover mapping, soil nutrient balance, time-specific management zone delineation and the use of UAV as agricultural aerial sprayer. An overview of the use of remote sensing data from different platforms (e.g. Landsat, QuickBird, CBERS, MODIS, WorldView), their assimilation (DSSAT, AQUACROP, EPIC, DELPHI) or on the synergy of Remote Sensing and modeling, applied to cardamom, wheat, tomato, sorghum, rice, sugarcane and olive. The intended audience is researchers and postgraduate students, as well as those outside academia in policy and practice. This book presents the latest research in the fields of computer science, computer engineering, communication technology, bioinformatics and biotechnology. The book is divided into 25 chapters discussing different sources of information, machine learning, informatics, mobile computing, cloud computing and digital analytics. The best selected papers, presented at the International Conference on Innovative Data Communication Technologies and Application (ICIDCA 2020), are included in the book. The book focuses on the theory, design, analysis, implementation and application of distributed systems and networks. This book provides an overview of unmanned aerial robots (UAVs, or drones) for agricultural crop production, which are revolutionizing farming methods worldwide. The book provides a detailed review of 250 UAVs that examines their usefulness in enhancing profitability, yield, and quality of crop production. Recent trends indicate an increase in agricultural drone production and use. Millions of dollars have been invested in start-ups that produce agro-drones in the past several years. North America, Europe, China, and the Far East have all been offering a large number of UAV models. Some of them are versatile, a few are specific, and many of them are low cost. With so many drone models (over 1200) available, how do farmers and agricultural specialists choose the models best for them? This compendium examines the most useful drones and provides the pertinent details about each drone, its producer, cost incurred, and its pros and cons. It covers their technical specifications, suitability for various purposes, previous performances in farms, and possible benefits to farmers. It covers fixed-wing drones, fixed-winged (hybrid) VTOL helicopters, multi-copters, tilt-winged drones, etc. The book includes a few drones meant more for military or other purposes (e.g. recreation/fun) but that could be easily modified and adapted for the farming sector. The review compares activities among the UAVs, such as the imagery of crops, ability to provide spectral analyses to collect useful data about a crop, and determine crop yield, and to remove crop canopy temperature data. It can be used to determine the water stress of the field, determine grain maturity, and much more. This important volume provides a plethora of information on aerial vehicles and their possible roles in revolutionizing agricultural procedures through spectral analysis of terrains, soils, crops, water resources, diseases, floods, drought, and farm activities. There are several semi-autonomous and autonomous (autonomous) aviation that rely on their efficiency in examining specific spectral regions of agrarian regions and individual farms. Among them, small drone aircrafts such as fixed-winged and copter models have already caught the imagination of farmers. They are spreading fast in every nook and corner of the farm world. However, there are many more aerial robots that are utilized in greater detail during farming. In this volume, the focus is on aerial vehicles such as paragliders, blimps, aerostats, and kites, and how they are being evaluated for use in experimental farms and fields. A few of the rotorcraft, such as helicopters, rotorcraft, and VTOL vehicles, provide the aerial spectral data and visual imagery to aid agronomic procedures. These and other aerial robots are expected to change and improve the use of the sky in agricultural endeavors and the way we conduct agronomic procedures in the near future. This volume is a timely resource for agricultural researchers, professors and students, and the general public interested in the rapidly growing field of agriculture. It is available at http://www.faostat.org/3a-i5564e.pdf and is actively being used to assist countries in the successful identification, development and implementation of sustainable ICT solutions for agriculture. The use of unmanned vehicles (UAVs), also known as drones, and connected analytics has great potential to support and address some of the most pressing problems faced by agriculture in terms of access to actionable real-time quality data. Goldman Sachs predicts that the agriculture sector will be the second largest user of drones in the world in the next five years. Sensor networks based on the Internet of things (IoT) are increasingly being used in the agriculture sector to meet the challenge of harvesting meaningful and actionable information from the big data generated by these systems. This publication is the second in the series titled E-agriculture in action (2016), launched by FAO and ITU, and builds on the previous FAO publications that highlight the use of ICT for agriculture such as Mobile technologies for agriculture and rural development (2012), Information and communication technologies for agriculture and rural development (2013) and Success stories on information and communication technologies for agriculture and rural development (2015). The ultimate aim is to promote successful, scalable, sustainable and replicable ICT for agriculture (ICT4Ag) solutions. This book is an everything-included approach to understanding drones, creating an overview and using unmanned aircraft, and providing the process of safe and orderly operation. It includes the first-of-a-kind safety-focused text book for unmanned aircraft operations, providing the reader with a required understanding of hazard identification, risk analysis, mitigation, and promotion. It enables the reader to speak the same language as any civil aviation authority, and gives them the toolset to create a safety risk management program for unmanned aircraft. The main items in this book break down into three categories. The first approach is understanding how the drone landscape has evolved over the last 40 years. From understanding the military components of UAVs to the standards and regulations evolution, the reader garners a keen understanding of where we came from and why it matters for moving forward. The second approach is in understanding how safety risk management in aviation can be applied to drones, and how that fits into the regulatory and legislative environment in place nationally. Lastly, a brief analysis of the community landscape for unmanned aircraft is outlined with interviews from important leaders and stakeholders in the marketplace. Drones fills a gap in resources within the unmanned aircraft world. It provides a robust understanding of drones, while giving the tools necessary to apply for a certificate of authorization, enabling more advanced flight operations for any company, and developing safety risk management for students. It will be a mainstay in any safety program (UAV, or drones) for agricultural crop production, which are revolutionizing farming methods worldwide.
augmented reality in CH. It is hoped that this book will provide the advice and guidance required for any CH professional, making the best possible use of these sensors and methods in CH. This book showcases how new and emerging technologies like Unmanned Aerial Vehicles (UAVs) are trying to provide solutions to unresolved socio-economic problems that can be classified in five main areas according to their operation. These five types are unmanned ground vehicles, unmanned aerial vehicles, unmanned surface vehicles (operating on the surface of the water), unmanned underwater vehicles, and unmanned spacecraft. Unmanned vehicles can be guided remotely or function as autonomous vehicles. The technology has a wide range of use in agriculture, forestry, transportation, surveillance and navigation, and military applications. UAVs are widely used in precision agriculture; from monitoring the crops to crop damage assessment. This book explains the different methods in which they are used, providing step-by-step image processing and sample data. It also discusses how smart UAVs will provide unique opportunities for manufacturers to utilise new technological trends to build a safer, more efficient, and cost-effective agricultural future. The book covers the potential applications of the Unmanned Aerial Systems (UAS) in precision agriculture, for example, the use of drone technology in forest management, road patrolling, and crop yield estimation. Drones are used in crop health assessment, monitoring water usage, and soil quality assessment. The book explains the different types of drones, their sensors, and their applications in precision agriculture. It also provides an overview of the key players in the drone industry and the current regulatory environment for drone usage. The book discusses the advantages of using drones in agriculture, such as the management of soil fertility, the study of natural resources and vegetation, the control of weeds and pests, and the collection of data on crop health. It also covers the regulatory aspects of using drones in agriculture. The book includes case studies and practical examples of how drones are being used in precision agriculture. It provides practical guidance on how to integrate drones into agricultural practices, including data collection and analysis, and how to comply with regulatory requirements. The book also includes a section on the future of drone technology in agriculture and the challenges and opportunities that lie ahead. Overall, this book provides an excellent resource for students, researchers, and practitioners interested in the use of drones in precision agriculture.
for the potential and power of trending technology by examining these and other areas of innovation described in Future Tech Trends in Practice: Artificial intelligence, including machine and deep learning The Internet of Things and the rise of smart devices Self-driving cars and autonomous drones 3D printing and additive manufacturing Blockchain technology Genomics and gene editing Augmented, virtual and mixed reality When you understand the technology trends that are driving success, now and into the future, you'll be better positioned to address and solve problems within your organisation. Applications of Remote Sensing in Agriculture contains the proceedings of the 48th Easter School in Agricultural Science, held at the University of Nottingham on April 3-7, 1989. The meeting invites 146 delegates from over 22 countries and contributions to this book come from nine countries. This book generally presents a review of the achievements of remote sensing in agriculture, establishes the state of the art, and gives pointers to developments. This text is organized into seven parts, wherein Parts I-III cover the principles of remote sensing, climate, soil, land classification, and crop inventories. Productivity; stress; techniques for agricultural applications; and opportunities, progress, and prospects in the field of remote sensing in agriculture are also discussed.

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