

《智慧农业发展战略研究》专题快报

2023年第5期（总第68期）

中国工程科技知识中心农业分中心

中国农业科学院农业信息研究所

2023年2月19日

【文献速递】

1. 农业大数据在现代农业经济发展中的重要作用分析

作者：李玮；秦瑞英

文献源：CNKI,2022-06-30

摘要：为促进农业经济发展，文章介绍了农业大数据的概念和特征，分析了农业大数据在农业经济管理中发挥的作用，而农业大数据的应用可以促进农业经济科学发展，优化完善农业产业结构，为农业管理和经济发展提供科学决策，准确预测涉农企业的生产计划。明确此过程中存在的问题和不足，并针对问题提出了解决措施，以期能够充分发挥农业大数据作用，提高农业管理效率，推动农业经济发展，为相关人员提供参考。

链接：

<http://agri.ckcest.cn/file1/M00/03/4C/Csgk0YhEQPuAa78PACbMEG-hR2Q502.pdf>

2. 农业大数据在农业经济管理中的应用

作者：杨秀阁

文献源：CNKI,2022-06-09

摘要：农业是我国的支柱性产业，大数据技术应用在农业当中，能有效提升农业资源利用率，提高农业经济效益，尤其是在农业经济管理中的应用，能够优化农业生产流程，提升农业生产效率。文章从农业大数据技术入手，分析农业大数据技术对农业经济管理的作用，探讨农业大数据在农业经济管理中的应用策略。

链接：

<http://agri.ckcest.cn/file1/M00/10/1E/Csgk0GPvJ7aAQyHDAAwyWhNdkoI086.pdf>

3. Applications of IoT for optimized greenhouse environment and resources management

作者: C. Maraveas a; D. Piromalis b; K.G. Arvanitis c ; T. Bartzanas a; D. Loukatos c

文献源: WOS,2022-06-05

摘要: The role of Internet-of-Things (IoT) in precision agriculture and smart greenhouses has been reinforced by recent R&D projects, growing commercialization of IoT infrastructure, and related technologies such as satellites, artificial intelligence, sensors, actuators, uncrewed aerial vehicles, big data analytics, intelligent machines, and radio-frequency identification devices. Even though the integration of intelligent technologies offers unlimited potential in precision commercial agriculture, optimal resource management remains a challenge considering that IoT infrastructure is unevenly distributed across the world and concentrated in high-income countries. The utilization of IoT technologies in smart greenhouses often involves a tradeoff between the cost of agricultural production, environmental conservation, ecological degradation, and sustainability. The installation of IoT infrastructure is capital-intensive and often translates to higher energy demand, that elevates the risk for climate change. The widespread use of IoT sensors and networks also increases new challenges in the management of electronic waste, depletion of finite resources, and destruction of fragile ecosystems, resulting in climate change. The integration of IoT systems in greenhouses would be augmented by the global deployment of advanced 5G technology and Low-Earth Orbit (LEO) constellation broadband internet with low latency and high speeds. Intelligent application of agrochemicals could yield significant savings (\$500/acre or more), while need-based irrigation and fertilizer application would help improve crop yields. Globally, the deployment of IoT infrastructure would yield about \$500 billion of added value to the GDP by 2030. The forecasted economic benefits affirm that the applications of IoT for optimized greenhouse environment and resources management were sustainable, and any potential risks are incomparable to the long-term benefits in commercial agriculture. The review article contributes new insights on the role of IoT in agriculture 4.0, the challenges, and future prospects for developing nations, which lacked the resources to invest in precision agriculture technologies.

链接:

http://agri.ckcest.cn/file1/M00/10/1E/Csgk0GPtn1-AD-hSAEaXRFQa_y0956.pdf

4 . 农业大数据背景下“互联网+智慧农机”分析

作者: 赵金霞

文献源: CNKI,2022-05-25

摘要:伴随互联网科技的突飞猛进,当前国内互联网研发领域渐渐有着智能化发展趋势,并且已经延伸至社会各个领域。针对国内农业大数据技术与应用下的农业机械发展情况进行研究,概述在“互联网+”时代下,智慧农机发展格局与未来潜力,同时对强化智慧农机的大数据应用,阐述相应的优化对策。

链接:

<http://agri.ckcest.cn/file1/M00/03/4C/Csgk0YhEPQaAeVRMAAxTyHW1UQI579.pdf>

5. 大数据时代人工智能技术在农业领域的应用

作者: 杨翠梅

文献源: CNKI,2022-05-25

摘要:民以食为天,农业是中国的基础产业,是重要的经济命脉。社会不断进步与发展,信息技术不断融合与突破,在新时代背景下,智能农业不断出现,改变农业方式,加强人工智能技术在农业领域的研究与应用,通过大数据的优势对农作物的栽培、生长、收割等环节进行有效的信息反馈,有针对性地解决农业领域中存在的问题,不断促进现代农业的智能化、机械化发展。为了进一步提高农业的发展水平,要将农业朝着现代化的方向发展,对科学技术进行有效的研究、应用、融合与突破,促进农业生产方式的新模式、新体系运用,推动中国现代农业的发展,紧紧把握当前国家经济可持续发展的节奏与方向。

链接:

<http://agri.ckcest.cn/file1/M00/10/1E/Csgk0GPtiEqAVLeKABtolvbg19M442.pdf>

6. 基于大数据平台的农业智能信息处理系统设计

作者: 蔡黎亚;李淑萍;田英杰

文献源: CNKI,2022-04-13

摘要:针对现有的农业生产经营中存在的信息处理问题,基于大数据平台开发了一种农业智能信息处理系统。介绍了智能信息处理系统的总体结构,分析了各功能模块的运行原理,搭建出一种能够围绕农业生产经营过程数据进行智能化存储、提取分析及决策的信息处理系统。采用多任务场景测试的方式进行系统测试,结果表明:农业智能信息处理系统的各项运行指标正常,性能达到设计要求,可有效提升农业生产经营过程中的信息处理水平。

链接:

http://agri.ckcest.cn/file1/M00/03/4C/Csgk0YhEOt6AF_SUAA11xklIPuY316.pdf

7 . 大数据技术在农业物联网中的实践应用

作者：梁敏

文献源：CNKI,2022-04-10

摘要：近年来，物联网技术在很多领域得到了广泛运用。物联网的快速发展与大数据技术的发展密不可分，大数据技术为物联网发展提供了活力。大数据技术在物联网中的运用，不仅提高了物联网的智慧程度，实现了自动化发展，而且提高了工作效率。农业发展是实现乡村振兴的重要手段，互联网技术的普及产生了智慧农业，农业的发展走进了数字化新阶段。物联网技术在农业中的运用，打破了传统农业发展的格局，在大数据技术的加持下，农业物联网系统得到了逐步完善，实现了农业信息的互通、过滤、筛选及农业数据的分析与查询。文章分析大数据技术在农业物联网中的优势，提出基于大数据的农业物联网应用系统，并提出一些发展策略。

链接：

<http://agri.ckcest.cn/file1/M00/10/1E/Csgk0GPtjamAUZZyAAKe5W5Bwr8954.pdf>

8 . 农业类大数据分类预测算法研究

作者：叶煜；李敏；文燕

文献源：CNKI,2022-03-20

摘要：论文在分析的极限学习机和遗传算法的基础上，提出通过遗传算法选择最优染色体，获得优化的极限学习机输入权值和阈值，提高网络稳定性，降低数据分类误差的方法。算法测试结果表明，基于遗传算法的极限学习机对于特征点较多的农业类数据的分类性能有较大提高。

链接：

http://agri.ckcest.cn/file1/M00/03/4C/Csgk0YhEQliATTI-ABHFA_NS8fc265.pdf

9 . Developing an IoT-Enabled Cloud Management Platform for Agricultural Machinery Equipped with Automatic Navigation Systems

作者：Fan Zhang；Wenyu Zhang；Xiwen Luo；Zhigang Zhang；Yueteng Lu；Ben Wang

文献源：WOS,2022-03-08

摘要：Smart farming uses advanced tools and technologies such as intelligent agricultural machines, high-precision sensors, navigation systems, and sophisticated computer systems to increase the economic benefits of agriculture and reduce the associated human effort. With the increasing demands of individualized farming operations, the internet of things is a crucial technique for acquiring, monitoring, processing, and managing the agricultural

resource data of precision agriculture and ecological monitoring domains. Here, an internet of things-based system scheme integrating the most recent technologies for designing a management platform for agricultural machines equipped with automatic navigation systems is proposed. Various agricultural machinery cyber-models and their corresponding sensor nodes were constructed in a pre-production phase. Three key enabling technologies-multi-optimization of agricultural machinery scheduling, development of physical architecture and software, and integration of the controller-area-network with a mobile network-were addressed to support the system scheme. A demonstrative prototype system was developed and a case study was used to validate the feasibility and effectiveness of the proposed approach.

链接:

<http://agri.ckcest.cn/file1/M00/03/4C/Csgk0YhEUWKAHYaRARUTCT09wfo377.pdf>

10 . 简析大数据在构建智慧农业过程中对农业经济管理的重要价值

作者: 王宗学

文献源: CNKI,2022-02-25

摘要: 农业是国家经济发展的重要产业, 关乎国家粮食安全, 关乎人民粮食储备安全。农业经济的发展进步, 反映科学技术的变化, 反映种植行业的进步。现如今社会, 大数据渗透各行各业, 促进了整体社会的进步发展。在大数据时代, 应用智慧农业技术及设备, 科学有效管理农业, 合理规划农作物生长, 浇灌施肥农作物, 可以有效地提升农作物经济产量, 有效促进国家农业经济稳步健康发展。该文简要分析了大数据时代下, 构建智慧农业过程对农业经济管理的重要作用, 分析了相应的治理应用措施, 希望可以有效的保持农村农业经济稳序健康发展态势。

链接:

http://agri.ckcest.cn/file1/M00/10/1E/Csgk0GPtjs2AKvkvABn_-5npfSQ862.pdf

11 . 大数据在农业物联网中的应用研究

作者: 高嘉伟; 夏磊

文献源: CNKI,2022-02-20

摘要: 物联网是信息技术高度发展下的时代产物, 应用互联网、云计算等技术方式进行大数据信息集成、分析, 并用于实际问题的归纳总结与解决, 是技术手段推动产业发展的重要举措。农业物联网的产生, 将农作物自然生长特点与信息技术数据化有效融合, 通过农业数据的精准采集、辨别、分析、总结, 对农业生产举措进行有效调整, 用以促

进农业现代化进程的发展。实践证明，发达的现代化农业生产，必须与农业互网络相结合，充分利用信息化技术，引入大数据技术来推动农业物联网的发展。大数据在农业物联网的建设中扮演着关键的角色，发展农业的地区网速相对较慢，如果没有大数据的支持，农业物联网发展的速度也会很慢，同时在当前国内农业物联网建设中，仍然存在很多问题和需要改进的地方。

链接:

<http://agri.ckcest.cn/file1/M00/03/4C/Csgk0YhERASAPnOHABwRaR5a3B4897.pdf>

12 . 农业大数据背景下的“互联网+智慧农机”分析

作者: 马悦

文献源: CNKI,2021-12-25

摘要: 随着互联网与科技的不断发展进步,我国现代互联网的研究领域逐渐开始朝着智能化方向发展,因此智能化技术逐渐应用在各个领域中。通过对中国农业大数据下农业机械发展的分析,总结了大数据在智慧农机系统中的应用,并对如何加快智慧农机大数据应用提出建议。

链接:

<http://agri.ckcest.cn/file1/M00/10/1E/Csgk0GPtkHuAbEg3ADtJgwOuWW4348.pdf>

13 . Cost-Effective Modern Chemical Sensor System for Soil Macronutrient Analysis

Applied to Thai Sustainable and Precision Agriculture

作者: Sutasinee Apichai; Chalermpong Saenjum; Thanawat Pattananandecha

文献源: WOS,2021-09-04

摘要: A modern chemical sensor system (M-CSS) was developed for the cost-effective chemical analysis of Thai precision and sustainable agriculture (TPSA), which is suitable in rural Thailand and elsewhere. The aim of this study was to achieve precision and sustainable agriculture (P-SA). The M-CSS functions according to the International Union of Pure and Applied Chemistry (IUPAC) definition and incorporates information and communication technologies (ICTs). The developed chemical sensor in the M-CSS is based on a colorimetric determination by a smart device/smartphone. Additionally, the preparation of soil samples was investigated. Soil samples of optimal conditions were extracted using an acid extractant in the ratio of one to two (extract to soil sample). Then, phosphate-phosphorous and potassium were detected with the M-CSS, which showed an excellent correlation with the standard reference methods. Interestingly, it is noteworthy that the at-site analysis of the

developed method could detect a greater nitrate-nitrogen content than that of the standard reference method. The developed cost-effective analysis for the plant macronutrient content in the soil, including nitrate-nitrogen, phosphate-phosphorous, and potassium, was demonstrated for organic vegetable farms at the real P-SA research site in Northern Thailand. The obtained results can guide the management of the application of fertilizers. The proposed M-CSS exhibited the potential to be used for at-site soil macronutrient analysis and represents the starting point of Thai precision and sustainable agriculture (TPSA).

链接:

<http://agri.ckcest.cn/file1/M00/10/1E/Csgk0GPToWWAPX3UACMTA7xYX8w504.pdf>

14 . 大数据时代农村经济发展的瓶颈及突破

作者: 王慧玉

文献源: CNKI,2021-06-21

摘要: 农村经济振兴是发展三农的重中之重,农业产业的发展需要创新驱动。大数据与农村经济的协同发展,是一种趋势也是一种探索。目前农村仍存在基础设施不完善、法律体系不健全、农民参与度和数据共享度低等一系列问题。新形势下,迫切需要借助大数据手段进行突破,努力培育农业农村经济发展新动能。促进大数据与农村经济全面深度融合,实现农村经济优质高效的可持续发展,需要政府的资金支持、国家立法的保障以及农民参与度的提高。

链接:

<http://agri.ckcest.cn/file1/M00/03/4C/Csgk0YhERXeAbKZTABstMQf1ycQ794.pdf>

15 . 农业大数据分析平台建设的研究

作者: 任孟霞

文献源: CNKI,2021-01-28

摘要: 随着云计算、物联网及信息技术的飞速发展,社会中出现各种各样的数据,且其数量还在呈几何倍数增长,这也是大数据时代的重要特征。我国是农业大国,农业大数据的建立和发展成为现代农业发展的战略需求,相关的数据分析平台也成为农业大数据服务农业的重要载体。基于此,文章从农业大数据的概念出发,分析农业大数据分析平台特点与当前发展现状,对如何建设和开发农业大数据分析平台的相关事项进行研究,为设计精确的农业大数据分析平台提供一定的参考。

链接:

http://agri.ckcest.cn/file1/M00/10/1E/Csgk0GPtITSAGPnxAA-ml_VqQbo182.pdf

16 . 基于大数据环境下农业信息管理与应用体系构建

作者: 武倩

文献源: CNKI,2020-09-25

摘要: 大数据技术与现代农业的结合已逐渐深入,如何深度掌握大数据对农业经济的影响成为我国这一农业大国未来必须面对的经济和技术发展关键问题。文章基于大数据环境下农业信息管理对农业经济的影响,如内涵和重要性进行了分析,对大数据背景下现代农业信息管理与应用的体系进行构建。文章所构建的现代农业信息管理和应用体系包含了现代农业信息管理的整体系统框架、现代农业信息ABC管理对象分解等,能够为我国未来进一步构建现代农业信息大数据应用模型提供平台框架支持和理论依据。

链接:

<http://agri.ckcest.cn/file1/M00/03/4C/Csgk0YhEShqAOMQsABQ8vowdVTY002.pdf>

17 . 农业大数据的应用及发展建议

作者: 林羽; 刘斌琼

文献源: CNKI,2020-05-20

摘要: 近年来,我国农业大数据的研究和应用发展取得了长足进步,催生了一批新产业、新模式,大幅度提高政府管理能力和企业的经营管理水平,促进了农业粗放分散式发展向精准化和智能化转变。文中概述农业大数据的特点、应用,并对其发展提出建议。

链接:

<http://agri.ckcest.cn/file1/M00/03/4C/Csgk0YhES8KABEzUABuIxYJIF6I169.pdf>

18 . Smart agriculture for food quality: facing climate change in the 21st century

作者: Caterina Agrimonti; Marta Lauro; and Giovanna Visioli

文献源: WOS,2020-04-28

摘要: Climate change, with increasing temperatures and atmospheric carbon dioxide levels, constitutes a severe threat to the environment and all living organisms. In particular, numerous studies suggest severe consequences for the health of crop plants, affecting both the productivity and quality of raw material destined to the food industry. Of particular concern is the reduction of proteins and essential micronutrients as iron and zinc in crops. Fighting this alarming trends is the challenge of Climate-Smart Agriculture with the double goal of reducing environmental impacts (use of pesticides, nitrogen and phosphorus

leaching, soil erosion, water depletion and contamination) and improving raw material and consequently food quality. Organic farming, biofertilizers and to a lesser extent nano-carriers, improve the antioxidant properties of fruits, but the data about proteins and micronutrients are rather contradictory. On the other hand, advanced devices and Precision Agriculture allow the cultivations to be more profitable, efficient, contributing more and more to reduce pest diseases and to increase the quality of agricultural products and food safety. Thus, nowadays adoption of technologies applied to sustainable farming systems is a challenging and dynamic issue for facing negative trends due to environmental impacts and climate changes.

链接:

http://agri.ckcest.cn/file1/M00/03/4C/Csgk0YhEWDCAF7VsABWEGc_-ylk241.pdf

19 . A review of social science on digital agriculture, smart farming and agriculture 4.0:

New contributions and a future research agenda

作者: Laurens Klerkx; Emma Jakku; Pierre Labarthe

文献源: WOS,2019-12-01

摘要: While there is a lot of literature from a natural or technical sciences perspective on different forms of digitalization in agriculture (big data, internet of things, augmented reality, robotics, sensors, 3D printing, system integration, ubiquitous connectivity, artificial intelligence, digital twins, and blockchain among others), social science researchers have recently started investigating different aspects of digital agriculture in relation to farm production systems, value chains and food systems. This has led to a burgeoning but scattered social science body of literature. There is hence lack of overview of how this field of study is developing, and what are established, emerging, and new themes and topics. This is where this article aims to make a contribution, beyond introducing this special issue which presents seventeen articles dealing with social, economic and institutional dynamics of precision farming, digital agriculture, smart farming or agriculture 4.0. An exploratory literature review shows that five thematic clusters of extant social science literature on digitalization in agriculture can be identified: 1) Adoption, uses and adaptation of digital technologies on farm; 2) Effects of digitalization on farmer identity, farmer skills, and farm work; 3) Power, ownership, privacy and ethics in digitalizing agricultural production systems and value chains; 4) Digitalization and agricultural knowledge and innovation systems (AKIS); and 5) Economics and management of digitalized agricultural production systems and value

chains. The main contributions of the special issue articles are mapped against these thematic clusters, revealing new insights on the link between digital agriculture and farm diversity, new economic, business and institutional arrangements both on-farm, in the value chain and food system, and in the innovation system, and emerging ways to ethically govern digital agriculture. Emerging lines of social science enquiry within these thematic clusters are identified and new lines are suggested to create a future research agenda on digital agriculture, smart farming and agriculture 4.0. Also, four potential new thematic social science clusters are also identified, which so far seem weakly developed: 1) Digital agriculture socio-cyber-physical-ecological systems conceptualizations; 2) Digital agriculture policy processes; 3) Digitally enabled agricultural transition pathways; and 4) Global geography of digital agriculture development. This future research agenda provides ample scope for future interdisciplinary and transdisciplinary science on precision farming, digital agriculture, smart farming and agriculture 4.0.

链接:

<http://agri.ckcest.cn/file1/M00/03/4C/Csgk0YhEVGKAQriTABKnlLnqqt8493.pdf>

20 . Prospects for "Smart Agriculture" in Russia

作者: V. P. Yakushev; V. V. Yakushev

文献源: WOS,2019-02-19

摘要: The authors justify the use of precision agriculture as a key vector in the development of the smart agriculture segment of the FoodNet platform of the national technological initiative. A prospectless extensive agriculture, based on exploitation of natural soil fertility, prevails in Russia; therefore, perennial field research has highlighted the economic and ecological advisability of using the information technologies of precision agriculture. Against the background of a significant increase in crop yields, the payback on fertilizers and plant-protecting agents increased 1.5-1.7 times; the agrochemical load on the environment decreased by 35-60%; and the quality of crop production improved noticeably. The transition to new crop production technologies is justified. Attention is paid to the need to create a domestic physico-technical and software-hardware basis for precision agriculture, its absence being a major hindrance to the development of smart agriculture in Russia.

链接:

<http://agri.ckcest.cn/file1/M00/10/1E/Csgk0GPTmwKAR1MxABY6FAfhzkw893.pdf>

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