中国工程科技知识中心
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《智慧农业发展战略研究》专题快报

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【动态资讯】

1．天津市北辰区种养循环模式推进农业绿色发展

【农业农村部】年来，北辰区坚持绿色发展理念，结合本地产业发展实际，积极探索高效循环农业，推行"种养一体化"发展，有效促进了土地资源循环利用和农业经济持续发展。日前，记者在北辰区市级农业产业化重点龙头企业金亚麻农业科技有限公司看到，标准化的养鸡厂房一字排开，孵化区、养殖区、饲料区等功能区应有尽有，在距离养鸡厂房不远处是谷物种植基地、蔬菜大棚和亚麻籽油生产园区，一幅蓬勃发展的现代循环农业图景呈现在眼前。

链接:

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFhoKARvqKAAPSxnIl0i0135.pdf

2．中国农业科学院发布10大使命78项任务清单

【中国农网】9月16日，中国农业科学院正式发布重大使命和"十四五"重点任务清单，围绕"推进高水平科技自立自强、支撑乡村全面振兴"核心使命，凝练提出粮食安全、营养健康、耕地保护、疫病防控、绿色发展、智慧农机、基础研究、前沿交叉、资源数据、区域发展10项具体使命，并围绕十大使命提出"十四五"期间78项重点任务清单。"使命清单"是中国农科院党史学习教育的一项成果，是国家农业科技创新工程的重大制度创新实践。据介绍，中国农科院将以使命清单为统领，以系列科技行动为抓手，以农业科技创新工程为支撑，大力改革科研组织、资源配置、成果评价方式，持续实施院所团队三级任务，加快基础性、前瞻性、关键性科技攻关，促进创新、创造、创业"三创协同"发展，努力发挥国家农业科技自立自强排头兵、科技支撑乡村全面振兴主力军的作用。

链接:

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFg3iAAL-UAAiieKa8VzQ802.pdf

3．专家齐聚助力"中国棉"高质量发展

【中国农科院】9月9日，全国棉花科研单位专家齐集中国农业科学院棉花研究所共商"十四五"我国棉花产业发展规划，共谋"中国棉"高质量发展。此次会议进一步凝聚了共识，为我国棉花科技创新和产业发展指明了方向。与会人员围绕我国棉花科技创新和产业发展面临的问题进行了研讨，为提高我国棉花品质，提升我国棉花国际话语权提出了建设性意见和建议。会议一致认为，全国棉花科研单位应进一步落实协作模式，聚焦我国棉花产业"卡脖子"问题，瞄准从0到1的原始创新，依托国家棉花产业联盟等平台，大力推动棉花全产业链融合、农机农艺农技配套、符合生产需求的高品质棉花发展、我国棉花认证体系建设、棉副产品综合利用等方面快速发展，促进我国棉花产业提质增效，保障棉花生产安全。

链接：

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFh3uADYUwAALZl0PM5Co327.pdf

4．税惠赋能 千里戈壁生态农业"点石成金"

【新华网】近年来，张掖市坚持把发展戈壁农业作为打造现代丝路寒旱农业产业集群的突破口，积极探索智慧农业、观光农业等新型农业发展模式，着力构建一二三产业融合发展的新格局。自2017年印发戈壁农业发展五年规划以来，全市累计发展戈壁农业11.76万亩，"生金"25亿，带动11万人增收，预计到2022年，戈壁农业生产规模将达到12.7万亩。这一切，得益于大自然赋予的地理优势、离不开政府支持和优渥的政策支撑，其中就有税力量的一路护航。

链接：

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFhUWAZHdYAAagy-an_Rc971.pdf

【文献速递】

1．Recent advancements and challenges of Internet of Things in smart agriculture: A survey

文献源：ScienceDirect,2022-01-01

摘要：The Internet of Things (IoT) is an evolving paradigm that seeks to connect different smart physical components for multi-domain modernization. To automatically manage and track agricultural lands with minimal human intervention, numerous IoT-based frameworks have been introduced. This paper presents a rigorous discussion on the major components, new technologies, security issues, challenges and future trends involved in the agriculture

domain. An in-depth report on recent advancements has been covered in this paper. The goal of this survey is to help potential researchers detect relevant IoT problems and, based on the application requirements, adopt suitable technologies. Furthermore, the significance of IoT and Data Analytics for smart agriculture has been highlighted.

链接:

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFi-KAS80lABk-Jwaamtc022.pdf

2．Design and development of an IoT-enabled portable phosphate detection system in water for smart agriculture

文献源：ScienceDirect,2021-10-15

摘要：This research proposes a novel low-cost, low-power planar interdigital phosphate sensor for smart agriculture. A 3D printed mould is used for sensor fabrication. The electrodes and substrate of the sensor are formed using Multi-Walled Carbon Nanotubes (MWCNTs) and Polydimethylsiloxane (PDMS), respectively. Electrochemical Impedance Spectroscopy (EIS) is applied to characterize the sensor for a wide range of temperature and phosphate detection. The proposed sensor can differentiate differently concentrated phosphate solutions from 0.01 ppm ～ 40 ppm. Validation of the experimental outcomes using the standard UVvis Spectrometry promotes the reliability of the sensor. An IoT-enabled portable smart phosphate detection system is also designed and developed. The Arduino-based system is trained with a machine learning model trains to predict phosphate concentration in actual water samples. This enables surveilling water quality from any place and getting experts opinion from any remote location. The portable phosphate detection system will be highly beneficial for continuous water quality monitoring and significantly impact smart agriculture.

链接:

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFi_yAA7WOAC2wr-QRMJI034.pdf

3．Coupling mechanism and development prospect of innovative ecosystem of clean energy in smart agriculture based on blockchain

文献源：ScienceDirect,2021-10-15

摘要：With the economic development of various countries in the world, the traditional energy supply has been unable to meet the demand of current economic development, and the environmental problems caused by the use of traditional energy are also a major issue

that needs to be urgently solved in all countries in the world, so the development and use of clean energy is an important measure to alleviate these two problems. This paper mainly studies the coupling mechanism and development prospect of the innovation ecosystem of clean energy under the smart agriculture based on blockchain. This paper first analyzes the coupling mechanism between the blockchain smart agriculture and the clean energy innovation ecosystem; secondly, it establishes the evaluation index system of the clean energy innovation ecosystem, and measures the development efficiency of the clean innovation ecosystem by using the SBM model, super efficiency SBM model and the global principal component method; thirdly, it uses the development efficiency of the clean energy innovation ecosystem through coupling and coordination The model calculates the coupling coordination of clean energy innovation ecosystem in different regions, and analyzes the spatial-temporal differences, regional differences and spatial agglomeration of the coupling coordination degree. The calculation results show that the average coupling coordination degree of green innovation development in the East, the middle, the West and the whole country is consistent with the development trend of provinces, autonomous regions and cities, showing an upward trend. The results show that the eastern region increases from 0.62 to 0.70; the average coupling coordination degree of the central region is lower than the national average coupling coordination degree, and the distance is gradually increasing; the western region has been in a serious maladjustment level, the global Moran index I value of the coupling coordination degree of clean energy innovation ecosystem is greater than 0, and the Z statistics are greater than the critical value of normal distribution function at the level of 5 %, P values are all less than 0.05 Local Moran index I and Z statistics have been growing steadily, and the significance of spatial positive correlation is getting higher and higher. The research results of this paper can provide a useful reference for the development of clean energy innovation ecosystem under the smart agriculture based on blockchain.

链接**:**

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFi7yALPiiACJAP6o1qsQ998.pdf

4．Review of the internet of things communication technologies in smart agriculture and challenges

文献源：ScienceDirect,2021-10-01

摘 要 ：The advent of Internet of Things (IoT) spurred a new direction of research in

agriculture, and various IoT communication technologies are used to connect with different devices in different layers. With the rapid increasing number of studies and projects about IoT-based smart agriculture, information got scattered and the involved communication technologies were not been analyzed and discussed before in other reviews. Intending to identify and review scientifically validated literature on IoT communication technologies in smart agriculture, this study critically summarizes the recent research pertinent to the smart agriculture with IoT communication technologies. The employed method was a thorough search from these three databases, namely: ScienceDirect, IEEE Xplore, and Scopus. Total 94 research articles were reviewed after the total of 886 titles being scanned for relevance. The monitored parameters by sensors and communication technologies associated with IoT-based smart agriculture applications are analyzed comprehensively, as well as some specific issues, challenges, and recommendations in IoT applications in agriculture. The study provides reference for researchers, and more burgeoning communication technologies should be applied in agriculture to realize the great-leap forward development in smart agriculture.

链接:

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFjCGAKfy9AC1wMoj0VlU488.pdf

5．Innovation of agricultural economic management in the process of constructing smart agriculture by big data

文献源：ScienceDirect,2021-09-17

摘要：With the introduction and popularization of the concept of smart agriculture, smart agriculture has become the future direction of agricultural development, and how to promote the construction and development of smart agriculture has become the focus of research. At present, many achievements have been made in the systematic framework of smart agriculture, but the measures to promote the construction of smart agriculture from the aspect of agricultural economic management have not been studied in depth. In order to innovate agricultural economic management, promote the construction and development of smart agriculture, and realize the transformation of agriculture, this study proposes to apply big data in the field of agriculture, taking the egg price of a city's wholesale market as the research object, to analyze the influencing factors and price fluctuations of egg price, first mining and analyzing the relevant agricultural big data, and then visualizing the big data, so as to make it relevant scientific basis is provided for the

innovative economic management of enterprises. The results show that agricultural big data provides a strong data support for agricultural economic management innovation and makes a great contribution to the construction of smart agriculture.

链接:

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFjDGAapqdABUyU45K2D8134.pdf

6．基于区块链的畜牧养殖资产身份认证研究

文献源：农业机械学报,2021-09-16

摘要：针对畜牧养殖资产监管系统数据采集源头设备不可信，牲畜个体身份标识识别复杂，养殖敏感数据机密性差等问题，提出一种基于区块链技术和聚合签名算法的畜牧资产身份认证方案，实现资产监管系统中数据采集源头、数据存证展示的全流程真实可信及监管系统各节点、各物联网设备间身份验证的可信可溯，有效保障了畜牧资产监管系统从区块链网络到节点及物联网设备间细粒度的身份验证。在此基础上对方案进行混淆性分析和通信数据量分析,结果表明,加密过程的扩散性测试密文改变率平均为93.61%，相关性测试密文改变率平均为93.28%，具有较高的混淆性，并将通信量由线性级降低为常量级，验签耗时平均节省40.01%，有效低数据传输通信量和系统验证开销，具有高效的批量身份验证性能，满足畜牧资产监管过程中设备身份认证需求。

链接:

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFjlSANf6WAA4VRmWdODk362.pdf

7．基于物联网的浮标水质监测系统与预测模型研究

文献源：农业机械学报,2021-09-15

摘要：为促进近海养殖业信息化发展，更好地实现对近海养殖环境的监控，设计了基于浮标平台的环境监测系统。利用STM32L4微控制器定时采集光照、温度、pH值、溶解氧浓度等信息，通过物联网技术将数据传输至云监测平台，实现了多区域环境信息远程监测和多终端访问。提出了改进的基于BP神经网络的溶解氧预测模型，实现对近海养殖环境的预测；根据所采集的数据，利用改进遗传算法对初始权重和阈值进行优化得到最优参数，在此基础上构建BP神经网络溶解氧预测模型。通过试验验证了该系统海洋环境信息采集的准确性与可靠性和溶解氧预测模型的有效性；与传统的神经网络预测模型相比，平均误差由0.0778mg/L降至0.0178mg/L，能够满足近海养殖的实际需求。

链接:

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFjGmABXOyAA420g13GG0205.pdf

8．无人机成像高光谱的马铃薯地上生物量估算

文献源：光谱学与光谱分析,2021-09-14

摘要：地上生物量（AGB）的精准监测是农田生产管理的重要环节,因此快速准确地估算AGB,对于精准农业的发展十分重要。传统上,获取AGB的方法是采用破坏性取样法,这使得大面积、长期的测量变得困难。无人机高光谱遥感因具有机动性强、光谱分辨率高和图谱合一的优势,成为当前估算大面积作物AGB最有效的技术手段。该研究通过无人机平台搭载成像高光谱传感器分别获取马铃薯块茎形成期、块茎增长期、淀粉积累期的冠层高光谱影像以及利用烘干称重法获取相应生育期实测AGB数据。然后,采用相关性分析法（CAM）、随机蛙跳算法（RFM）和高斯过程回归波长分析工具（GPR-BAT）分别筛选冠层原始光谱（COS）和一阶导数光谱（FDS）的敏感波长,结合偏最小二乘回归（PLSR）和高斯过程回归（GPR）构建各生育期的AGB估算模型,并对比不同模型的估测效果。结果显示:（1）基于同种方法分别筛选COS和FDS的特征波长,结合2种回归技术估算AGB的效果均从块茎形成期到淀粉积累期由好变差。（2）基于FDS分别通过3种方法筛选的特征波长,通过同种回归技术构建的模型效果要优于基于COS的相应效果。（3）基于COS和FDS使用CAM, RFM和GPR-BAT方法筛选的特征波长个数在块茎形成期分别为28, 12, 6个和12, 23, 10个,在块茎增长期分别为32, 8, 2个和18, 28, 4个,在淀粉积累期分别为30, 15, 3个和21, 33, 5个。（4）各生育期基于COS和FDS通过3种方法筛选的敏感波长估算AGB效果由高到低依次均为GPR-BAT, RFM和CAM。（5）各生育期基于FDS通过GPR-BAT方法筛选的敏感波长,结合PLSR建立的模型精度更高、稳定性更强,R^2分别为0.67, 0.73和0.65,NRMSE分别为16.63%, 15.84%和20.81%。研究表明利用无人机高光谱成像技术可以准确地估算AGB,这为实现马铃薯作物长势动态监测,提供科学指导和参考。

链接:

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFjKaASRCeADlNIz8s7u4142.pdf

9．基于无人机可见光影像与生理指标的小麦估产模型研究

文献源：麦类作物学报,2021-09-14

摘要：为及时、准确地掌握小麦产量动态信息,基于无人机遥感平台,分别分析了小麦4项生理指标[地面实测叶面积指数、叶片含氮量、叶片含水量及叶片叶绿素相对含量（SPAD值）]及10项植被指数与产量的相关性,以筛选出与产量最为敏感的生理指标与植被指数,并比较了3种建模方法（一元回归UR、多元逐步回归SMLR和主成分回归PCAR）在小麦各生育时期估产的适用性,进而得到小麦最优估产模型。结果表明:（1）不同生育时期两类变量与产量的相关性变化特征一致,均表现为抽穗期>灌浆期>成熟期;不同生理指标、植被指数与产量的相关性在各生育时期均存在差异,生理指标表现为叶片含氮量

>LAI>SPAD>叶片含水量;（2）以生理指标与植被指数为自变量,采用SMLR模型构建的抽穗期估产模型拟合精度最高,R²、RMSE和nRMSE分别为0.828、362.53kg·hm^{-2}和12.35%;（3）小麦估产模型在各生育时期的预测精度表现为抽穗期>灌浆期>成熟期。

链接:

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFjJKAd_hWAAqgXRgCQz0529.pdf

10．Use of Remote Sensing to Assess the Water-Saving Effect of Winter Wheat Fallow

文献源：Sustainability,2021-09-13

摘要：Winter wheat fallow policy has a greater effect on water resource management, and the water-saving effect in the fallow process of winter wheat can provide data support for precise water resource utilization planning. In order to evaluate the water resource consumption of winter wheat and the related effect from winter wheat fallow, this study searched the changing trends of cultivated land evapotranspiration under five different scenarios through the object-oriented extraction method and a SEBS model based on multi-source data. The results indicated that the evapotranspiration during winter wheat growing period was higher than that of winter wheat fallow land, and there was no big difference in evapotranspiration between the fallow land during harvesting and the emergence of new crops. The evapotranspiration of winter wheat was higher than that of various fallow land, and the evapotranspiration of abandoned land was higher than other fallow land in the winter wheat growing season. From this point, this study concludes that the fallow land policy can effectively reduce evapotranspiration during the growing of winter wheat, which is conducive to the sustainable exploiting of water resources.

链接:

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFEpMSAOGlqAFuig04weII325.pdf

11．智慧农业的发展现状与未来展望

文献源：华南农业大学学报,2021-09-06

摘要：为探究我国智慧农业未来发展的目标、任务与政策，本文基于系统工程学视角，阐释了智慧农业的概念与内涵，介绍了国外智慧农业相关战略布局与行动计划，分析了我国智慧农业发展现状、特点以及与国际上的差距,提出了我国智慧农业未来发展目标、重点任务与政策建议。美、德、英、日等国在农业传感器、农业大数据智能、农业智能装备等智慧农业科技领域占据国际前沿；中国在政策引领与规模经营趋势下，常用环境类农业传感器、农业遥感技术、农业无人机、农机北斗导航、农业大数据与智能算法等

智慧农业技术研发应用取得长足进步，部分产品基本实现国产替代。发展智慧农业是"十四五"时期乃至2035年我国农业高质量发展的重要内容，针对我国农田地块细碎化、农业机械化水平不高、农村基础设施薄弱、智慧农业技术有效供给不足、政策体系与市场机制不健全等问题，未来智慧农业的发展亟需在技术攻关、应用示范、政策试验和社会试验等方面共同发力。

链接：

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFjFeAHcwZAAmsxAKJoSc152.pdf

12．山东省智慧农业生产效率空间格局及影响因素分析

文献源：山东农业科学,2021-08-30

摘要：智慧农业是物联网、大数据等现代信息技术与农业深度融合的新型农业发展方式，在促进农民增收、转变农业发展方式以及推动农业高效可持续发展等方面都有重要意义。本研究选取山东省2009—2019年各地区的面板数据,运用超效率SBM模型测算山东省智慧农业生产效率,并采用ESDA方法分析空间演化趋势,再建立Tobit模型探讨其影响因素。结果显示:山东省各地区智慧农业发展不均衡,且存在明显空间差异特征,整体呈现"东西方向和南北方向先下降后升高"的空间格局变化趋势。技术进步与智慧农业生产效率之间存在"倒U型"库兹涅茨曲线关系,农业机械密度、农业规模化水平、城镇化率、工业化水平对山东省智慧农业生产效率具有显著促进作用,财政支农水平和种植结构具有显著负向效应,不同地区农业生产效率之间存在溢出或集聚效应。最后根据相应的结论提出山东省应加快落后地区农业基础设施建设、加强科技研发投入等政策建议。

链接：

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFjEqANmFqAAeV5wU4xcw655.pdf

13．我国智慧农业的发展现状、路径与对策建议

文献源：农业现代化研究,2021-08-24

摘要：智慧农业作为信息技术与农业深度融合的新兴领域，已成为我国现代农业发展的必然趋势，但目前关于智慧农业的研究尚处于起步阶段，需要对其整体发展情况进行科学分析与精准把脉。本文基于对智慧农业概念、特征科学界定，利用宏观统计数据和2019年全国智慧农业发展情况调查数据，分析我国智慧农业发展的现状与问题，探讨未来发展的战略路径与对策建议。结果表明，智慧农业发展具有信息感知数字化、管理决策科学化、装备控制智能化、要素投入精准化和信息服务个性化特征。聚焦智慧农业基础设施、智慧种植业、智慧养殖业、农产品智慧供应链等领域，我国农业新基建取得初步成效，在农情自动化监测、水肥一体化、精准饲喂、农产品采后自动化处理等得到较好应

用，但也面临信息化基础设施薄弱、关键技术受制于人、数据资源共享不足、人才与资金缺乏等问题。据此，围绕农业产前、产中和产后推动我国智慧农业发展，提出强化智慧农业顶层设计、研究制定配套政策机制、加强关键技术研发与推广、推进农业全产业链数字化、健全信息化人才培育体系等对策建议，以期为加速我国智慧农业发展进程提供启示与借鉴。

链接:

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFjD2AaLqjAAz3Rx-tyxo647.pdf

14．人工智能对水土保持信息化监管技术支撑

文献源：水土保持学报,2021-07-20

摘要：生产建设项目水土保持信息化监管是全国各地水土保持强监管、保护生态环境的重要职责和重点工作,面对覆盖全国、数量巨大、年度多次的监管重任,监管工作及技术方法遇到了人工复核工作量大、识别分析难、快速精准监管效能低等瓶颈制约,迫切需要以人工智能为核心的高新技术支撑,破解技术难题。通过对遥感影像光谱信息、纹理结构等特征分析,影像特征增强技术,各类项目占地、土石方挖填量与弃渣量、建设工期、水土流失影响程度等级等大数据辅助,经过全面、精细、智能深度学习,同时运用发改、国土资源、城乡建设、环保、林业、水利、交通、电力等部门的相关信息大数据,通过关联分析,实现对生产建设项目的智能化识别。通过对项目特定的必备配套设施智能关联分析判别、相关图斑的归集,智能分析同一项目相关图斑的判别与归集。综合应用人工智能、大数据、云计算、互联网、物联网等高新科技,提高对"未批先建""未验先投""未批先弃"等违法违规行为的智能化、精准化判别率。为提升精准监管效率与效能,应加强水土保持重要敏感区的大数据智能支持,重点监管项目的智能跟踪,水土流失危害重点问题监控,细化项目开工前期、施工过程、工程完工3个时段的关键水土保持措施跟踪监管,更加及时、有效地全面支撑水土保持检查、监督、执法,全面提升监管效率与水平,促进生态优先、绿色发展,为国家高质量发展提供重要支撑和保障。

链接:

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFjHaActuPAAz6shz_8wk976.pdf

15．A Systematic Survey on the Role of Cloud, Fog, and Edge Computing Combination in Smart Agriculture

文献源：sensors,2021-07-20

摘要：Cloud Computing is a well-established paradigm for building service-centric systems. However, ultra-low latency, high bandwidth, security, and real-time analytics are limitations

in Cloud Computing when analysing and providing results for a large amount of data. Fog and Edge Computing offer solutions to the limitations of Cloud Computing. The number of agricultural domain applications that use the combination of Cloud, Fog, and Edge is increasing in the last few decades. This article aims to provide a systematic literature review of current works that have been done in Cloud, Fog, and Edge Computing applications in the smart agriculture domain between 2015 and up-to-date. The key objective of this review is to identify all relevant research on new computing paradigms with smart agriculture and propose a new architecture model with the combinations of CloudFogEdge. Furthermore, it also analyses and examines the agricultural application domains, research approaches, and the application of used combinations. Moreover, this survey discusses the components used in the architecture models and briefly explores the communication protocols used to interact from one layer to another. Finally, the challenges of smart agriculture and future research directions are briefly pointed out in this article.

链接**:**

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFEsTeAGWGIAAqFFdLNWyc437.pdf

【相关专利】

1．一种智慧农业用可远程控制的水肥一体化播种设备

发布源：中国专利

发布时间：2021-09-07

摘要：本发明公开了一种智慧农业用可远程控制的水肥一体化播种设备,包括牵引车、牵引组件、支撑动力机构以及一体化播种机构,所述牵引车通过所述牵引组件与所述支撑动力机构连接,所述支撑动力机构由支撑框架以及动力包构成,所述支撑框架上设有牵引组件；本发明的有益效果是,该智慧农业用可远程控制的水肥一体化播种设备,按照模块化的设计理念,将播种的动力整合到动力包内,采用远程无线通信控制,并且分设了一体化动作的播种、施肥以及洒水的联合动作方式,一次性完成播种作业,不仅操作方便,极大的方便了使用者而且可以远程精准控制,辅助牵引车的驾驶员完成播种,作业效率大大提高。

链接**:**

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFgbmAA9FsAA9pWgo5_vQ722.pdf

2．一种提高准确度的农业大数据分析系统

发布源：中国专利

发布时间：2021-08-27

摘要：本发明属于物联网大数据技术领域,尤其为一种提高准确度的农业大数据分析系统,针对现有的物联网大数据系统不便于对种类繁多、数据量大的数据进行采集和分析的问题,现提出如下方案,其包括大数据分析系统、物联网平台系统、算法模型系统、土壤质量传感器、日照传感器、空气质量传感器和水质传感器,大数据分析系统分别与的算法模型系统和物联网平台系统,物联网平台系统分别与大数据分析系统和算法模型系统相连。本发明通过多种传感器对种类繁多的监测数据进行获取,并通过大数据分析系统、物联网平台系统和算法模型系统对其进行分析和整合处理,便于对农作物环境进行统一调控,保证农作物生产状况。

链接:

http://agri.ckcest.cn/file1/M00/0F/C9/Csgk0GFFgp6AYDnFAAhYXlZU_94943.pdf