中国工程科技知识中心
China Knowledge Centre for Engineering Sciences and Technology

《智慧农业发展战略研究》专题快报

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中国工程科技知识中心农业分中心

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【动态资讯】

1．农行台州分行：金融赋能乡村产业发展

【农民日报】近日，椒江支行客户经理和柜员在大陈岛上门为渔民办理贷款业务，做好全面开渔后金融服务。8月31日，农行浙江台州玉环支行以信用的方式向龙溪镇凤凰村股份经济合作社发放300万元美丽乡村贷，用于支持无尘山庄、东山头民宿、大坝餐饮整合提升等项目工程，为村集体发展产业经济注入了金融活水。近年来，农行台州分行立足服务乡村振兴国家队、主力军的战略定位，大力扶持村集体发展产业经济，通过对民宿、农家乐、综合体、小微园等“造血型”村级项目的金融支持，帮助村级经济实现可持续发展。截至8月末，该行向台州区域发放村集体产业相关贷款21.4亿元，帮助387个村发展产业经济。

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYGJSAD3MIAEUX1cJjWdE625.pdf

2．加强国家生物安全风险防控和治理体系建设 提高国家生物安全治理能力

【农民日报】中共中央政治局9月29日下午就加强我国生物安全建设进行第三十三次集体学习。中共中央总书记习近平在主持学习时强调，生物安全关乎人民生命健康，关乎国家长治久安，关乎中华民族永续发展，是国家总体安全的重要组成部分，也是影响乃至重塑世界格局的重要力量。要深刻认识新形势下加强生物安全建设的重要性和紧迫性，贯彻总体国家安全观，贯彻落实生物安全法，统筹发展和安全，按照以人为本、风险预防、分类管理、协同配合的原则，加强国家生物安全风险防控和治理体系建设，提高国家生物安全治理能力，切实筑牢国家生物安全屏障。

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYF8-AWcV9AGDwlLNXAAo048.pdf

3．第24届中国农产品加工业投资贸易洽谈会暨农产品加工业高质量发展论坛在河南省驻马店市举办

【农民日报】9月26日，由农业农村部和河南省人民政府主办的第24届中国农产品加工业投资贸易洽谈会开幕式暨农产品加工业高质量发展论坛在河南省驻马店市举办。本届洽谈会以“提升农产品加工业 打造农业全产业链”为主题，聚焦农产品加工业高质量发展，通过线上线下全渠道模式，搭建名优精品展台、合作交流平台和宣传推介舞台。河南省省长王凯宣布大会开幕，中央农办副主任，农业农村部党组副书记、副部长刘焕鑫讲话，河南省副省长武国定致辞，河南省人民政府秘书长刘世伟主持会议。

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYGRGAHNpKADdQJgrq3CU618.pdf

4．机器人“牵手”青花椒 中国移动四川公司5G+智慧农业助力乡村振兴

【新华网】凉山州金阳县聚力打响“青花椒”这一金字招牌，将“青花椒”作为实现乡村振兴的支柱产业。中国移动四川公司充分利用网络资源及信息化优势，抽调骨干员工30余名，投入软件、硬件、网络资源累计超2000余万元，整合信息化产品，以“1+3+N”为总体思路，即“建立一个中心平台，提供三大服务，提供N种物联网设施及5G应用功能”，在金阳万亩青花椒核心区域推动5G+智慧农业发展，以科技手段推动金阳青花椒现代产业园区的高质量发展，为支持脱贫地区乡村特色产业发展添加了“互联网+”时代的新利器，助力实现乡村振兴。

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYFv2ALsqtABR2b--nENc959.pdf

【文献速递】

1．浅析低空智联网与无人机产业应用

文献源：地理科学进展,2021-10-28

摘要：无人机正处于技术快速突破与应用快速增长的重要时期,将成为低空经济发展的重要推手。低空智联网是无人机产业发展的基石,是在低空空域实现"人—机—物"三元融合万物智能互联的重要基础设施。低空智联网体系架构就是依托天空地海网络基础设施,实现传统互联网络向万物智能互联网络演进,形成适合低空业务数字化、智能化运营的实体网络空间,可为无人机产业发展提供一个网络化、数字化、智能化的运营环境,对促进低空经济发展具有重要意义。

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYEx6ADuqWAB8ynKR5-GA777.pdf

2．不同农业土地利用方式对土壤重金属含量影响及生态风险评价

文献源：北方园艺,2021-09-30

摘要：以撂荒地、水稻田和旱田为研究对象,分别测定其土壤As、Cd、Cu、Pb含量变化特征,结合单项污染指数法和潜在生态风险指数法,对研究区土壤进行生态风险评价,了解不同农业土地利用方式对土壤重金属污染状况及其生态风险,以期为农用地土地利用方式的选择提供参考依据。结果表明:0～50 cm土层中,土壤As含量平均值表现为旱田（26.96±11.52）mg·kg^{-1}>水稻田（11.05±3.72）mg·kg^{-1}>撂荒地（9.04&±6.87）mg·kg^{-1};土壤Cd含量平均值表现为旱田（0.64±0.03）mg·kg^{-1}>水稻田（0.44±0.18）mg·kg^{-1}>撂荒地（0.25±0.11）mg·kg^{-1};土壤Cu含量平均值表现为旱田（34.11±14.83）mg·kg^{-1}>水稻田（20.44±6.62）mg·kg^{-1}>撂荒地（13.90±6.64）mg·kg^{-1};土壤Pb含量平均值表现为水稻田（39.26±9.85）mg·kg^{-1}>旱田（38.87±7.10）mg·kg^{-1}>撂荒地（21.94±9.68）mg·kg^{-1}。单项污染指数分析结果表明,4种重金属在水稻田和撂荒地中均无污染,而在旱田中As和Cd为轻度污染。潜在生态风险指数分析结果表明,4种重金属单因子潜在风险指数均属于轻微生态危害,Er值为Cd>As>Cu>Pb,综合潜在生态风险指数RI均小于150,为轻微生态危害,其中以旱田土壤RI值最大,土壤重金属以Cd的贡献率最大。可见不同农业土地利用方式下,旱田对重金属的积累能力最强,水稻田次之,撂荒地最弱。农业活动虽一定程度上起到降低土壤pH的作用,但促进了土壤对重金属的积累。

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYErSAfMA8ACNIQqiqsxU843.pdf

3．区块链技术突破智慧农业发展瓶颈的应用方向研究

文献源：湖北农业科学,2021-09-29

摘要：在分析了智慧农业发展过程中的特点和遇到的一些问题的基础上，利用区块链技术的可溯源、去中心化、难篡改、公开透明等特性来探讨解决的方法。综合运用对比法、案例分析法、归纳与演绎法等方法从智慧农业产业链的生产、流通、加工、金融服务、消费等不同环节探究区块链技术如何应用于智慧农业及如何更好地服务于智慧农业。运用流程图剖析区块链技术解决智慧农业发展瓶颈的逻辑过程，同时探讨了如何利用区块链技术结合智慧农业助力解决精准扶贫实践过程中遇到的一些问题。最后总结了区块链技术应用于智慧农业中可能遇到的一些挑战并提出了针对性的对策。

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYLsyAJesgAAp4_KgYrcA047.pdf

4．基于无人机激光雷达的人工林碳储量线性与非线性估测模型比较

文献源：北京林业大学学,2021-09-29

摘要：森林碳储量是生态系统结构与功能的重要指标，掌握森林碳储量现状有利于森林资源管理。激光雷达能够用于监测森林资源，但是存在森林参数估测的模型多、变量不确定和缺乏林分三维结构解析意义的变量等问题，因此，需要选择合适的林分解析变量和模型。借助无人机激光雷达点云数据与样地调查数据，以内蒙古自治区赤峰市喀喇沁旗旺业甸人工林为研究对象，分别使用多元线性模型与多元乘幂模型以不同变量对林分碳储量进行估测，选出最优模型并进行精度评价。研究表明：（1）模型方法而言，非线性模型的检验效果优于线性模型的检验效果：非线性模型（R^2为0.66～0.86,rRMSE为23.51%～9.91%），线性模型（R^2为0.52～0.85,rRMSE为27.70%～12.38%）。（2）模型使用平均高、郁闭度为基础变量，以穷举法筛选出来的变量组合，估算森林参数得出最佳模型，其中非线性模型以激光点云平均高、郁闭度、高度变动系数和叶面积变动系数的估算精度最高（R^2=0.86,rRMSE=9.91%）。通过激光雷达估测人工林碳储量时，加入垂直结构变量可以提高模型拟合效果，非线性模型比线性模型更适合人工林碳储量的估测。

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYE9GARWYAAA1Pnq6NH1E916.pdf

5．Agricultural business and product marketing effected by using big data analysis in smart agriculture

文献源：Soil & Plant Science,2021-09-29

摘 要： To expand agricultural business and upgrade the effects of product marketing, supported by the concept of smart agricultural, this paper introduces us the methods to undertake agricultural business promotion and build up product marketing system in combination with big data technology and machine learning technology, put forward the application of fuzzy c-means algorithm in the agricultural marketing data. The algorithm is a clustering algorithm that uses degree of membership function to determine which cluster each data point belongs to; thus to build up a basic model of smart agriculture based on actual situation, and integrate the agricultural business promotion and agricultural products marketing, as important function modules, into the agricultural products marketing system; and then the process of this system is analysed before the frame of the overall system is shaped; based on which, system performance verification is conducted by designed test.

From the research, the agricultural business promotion and products marketing system based on smart agriculture have some positive effect.

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYCv-AMXulAB64edQw1Z8501.pdf

6．财政分权、环境规制与农业生态效率

文献源：统计与决策,2021-09-24

摘要：文章基于包含两种非期望产出的超效率DEA-SBM模型测算了我国30个省份2012—2018年的农业生态效率，采用固定效应模型和门槛效应模型，揭示财政分权、环境规制与农业生态效率之间的内在机理。研究表明：财政分权对农业生态效率具有显著负向抑制作用，命令控制型环境规制和激励性碳排放交易规制均对农业生态效率具有显著正向促进作用；财政分权对激励性碳排放交易规制与农业生态效率间的调节作用显著为负；财政分权对命令控制型环境规制与农业生态效率间的调节作用存在单一门槛效应，财政分权低于门槛阈值时其调节作用显著为负，反之为正。基于此，建议加大环境规制力度，优化财政分权结构，完善绿色考核机制，从而促进农业高质量发展。

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYEjqAHEeOABsxBQUEHs8905.pdf

7．农业经济发展实施“互联网+”战略途径分析

文献源：中国集体经济,2021-09-18

摘要：文章围绕农业经济发展实施"互联网+"战略途径展开研究,通过分析"互联网+"战略应用于农业经济生产和销售等环节的意义,结合当前农村经济发展过程中存在的问题和未来发展优势,探究在农业经济发展过程中更好地利用"互联网+"战略的措施,为农民创造更高的生产效益,推动农业经济发展迈上新的台阶,更好地为国家经济发展做贡献。

链接:

https://kns.cnki.net/kcms/detail/detail.aspx?dbcode=CJFD&dbname=CJFDAUTO&filename=ZJTG202129009&uniplatform=NZKPT&v=dJ5XyQPFR1vvfpyCl%25mmd2BBYQ29cdfZPpzBQk4StpZdJQYWJj2UHUIDE%25mmd2FFjSxoHfoUzPhttp://agri.ckcest.cn/file1/M00/02/FB/Csgk0WFe90aAWTs1ABh9FXQmn8w550.pdf

8．农业大数据应用发展现状及其对策研究

文献源：江苏农业科学,2021-08-20

摘要：农业精准高效发展是我国现代化发展的重要战略目标,是新时期进行农业新旧动

能转化及实施乡村振兴战略的必然要求。农业领域具有较大的数据基础,为农业大数据发展提供了无尽源泉,且随着智能信息技术广泛在农业上的应用,利用大数据在农业方面进行相关研究,具有重要的现实意义。为此,使用文献调查法,阐述大数据的发展背景与研究现状,及其关键技术,并分析大数据在农业上的需求、主要应用在哪些领域及其在农业方面发挥的重要作用。同时针对我国大数据在农业的应用发展中存在的问题,提出对策建议,以期能为农业大数据的发展提供参考依据。

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYLeiAKf7dAANt9rcFdWY696.pdf

9．Is big data used by cities? Understanding the nature and antecedents of big data use by municipalities

文献源：ScienceDirect,2021-07-08

摘 要： It is estimated that by 2050, 70% of the population will be urban (Nations Unies, 2014). This massive urbani-zation has created unprecedented challenges for cities and city managers which has led many of them to look for technological solutions to address them, including the use of Big Data, which is among the most considered technological support to help improve the overall operational and service delivery of cities. It is estimated that around 7 billion connected objects will soon be implemented in cities worldwide which will produce an un-precedented and massive amount of real-time data that will have to be managed, used, and analyzed effectively. If this massive amount of data is effectively managed and used, it can provide important benefits and produce real positive impacts on the functioning of cities. Nonetheless, despite these benefits, only a few cities are able to use and exploit big data, and some studies have shown that less than 0.5% of all the available data has been explored. The objective of this study is to understand the factors that influence cities to use big data and the nature of such use. Based on a field survey involving 106 municipalities, this study investigates the antecedents of big data use by cities and shows how different sets of antecedents influence three different types of big data use by cities.

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYCBWANq5rABjmLmOeHb4433.pdf

10．Blockchain and smart contract for IoT enabled smart agriculture

文献源：PeerJ Computer Science,2021-03-31

摘要：The agricultural sector is still lagging behind from all other sectors in terms of using the newest technologies. For production, the latest machines are being introduced and adopted. However, pre-harvest and post-harvest processing are still done by following traditional methodologies while tracing, storing, and publishing agricultural data. As a result, farmers are not getting deserved payment, consumers are not getting enough information before buying their product, and intermediate person/processors are increasing retail prices. Using blockchain, smart contracts, and IoT devices, we can fully automate the process while establishing absolute trust among all these parties. In this research, we explored the different aspects of using blockchain and smart contracts with the integration of IoT devices in pre-harvesting and post-harvesting segments of agriculture. We proposed a system that uses blockchain as the backbone while IoT devices collect data from the field level, and smart contracts regulate the interaction among all these contributing parties. The system implementation has been shown in diagrams and with proper explanations. Gas costs of every operation have also been attached for a better understanding of the costs. We also analyzed the system in terms of challenges and advantages. The overall impact of this research was to show the immutable, available, transparent, and robustly secure characteristics of blockchain in the field of agriculture while also emphasizing the vigorous mechanism that the collaboration of blockchain, smart contract, and IoT presents.

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYDgSAIWKcAFJ2h9ykyfw147.pdf

11．Use and Adaptations of Machine Learning in Big Data—Applications in Real Cases in Agriculture

文献源：electronics,2021-02-26

摘 要： The data generated in modern agricultural operations are provided by diverse elements,which allow a better understanding of the dynamic conditions of the crop, soil and climate, which indicates that these processes will be increasingly data-driven. Big Data and Machine Learning (ML) have emerged as high-performance computing technologies to create new opportunities to unravel, quantify and understand agricultural processes through data. However, there are many challenges to achieve the integration of these technologies. It implies making some adaptations to ML for using it with Big Data. These adaptations must consider the increasing volume of data, its variety and the transmission speed issues. This paper provides information on the use of Big Data and ML for agriculture,

identifying challenges, adaptations and the design of architectures for these systems. We conducted a Systematic Literature Review (SLR), which allowed us to analyze 34 real cases applied in agriculture. This review may be of interest to computer or data scientists and electronic or software engineers. The results show that manipulating large volumes of data is no longer a challenge due to Cloud technologies. There are still challenges regarding (1) processing speed due to little control of the data in its different stages, raw, semi-processed and processed data (value data); (2) information visualization systems, which support technical data little understood by farmers.

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYDICAV3SwAHW_jvOP-LU182.pdf

12．Smart and Climate-Smart Agricultural Trends as Core Aspects of Smart Village Functions

文献源：sensors,2020-10-22

摘要：Attention has shifted to the development of villages in Europe and other parts of the world with the goal of combating ruralurban migration, and moving toward self-sufficiency in rural areas. This situation has birthed the smart village idea. Smart village initiatives such as those of the European Union is motivating global efforts aimed at improving the live and livelihood of rural dwellers. These initiatives are focused on improving agricultural productivity, among other things, since most of the food we eat are grown in rural areas around the world. Nevertheless, a major challenge faced byproponents of the smart village concept is how to provid a frame work for the development of the term,so that this development is tailored towards sustainability. The current work examines the level of progress of climate smart agriculture, and tries to borrow from its ideals, to develop a framework for smart village development. Given the advances in technology, agricultural development that encompasses reduction of farming losses, optimization of agricultural processes for increased yield,as well as prevention, monitoring, and early detection of plant and animal diseases, has now embraced varieties of smart sensor technologies. The implication is that the studies and results generated around the concept of climate smart agriculture can be adopted in planning of villages, and transforming them into smart villages. Hence, we argue that for effective development of the smart village framework, smart agricultural techniques must be prioritized, viz-a-viz other developmental practicalities.

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYEWiAENfPAAbGDc5lno0319.pdf

13．Arrowhead Technology for Digitalization and Automation Solution: Smart Cities and Smart Agriculture

文献源：sensors,2020-03-06

摘要：The Internet of Things (IoT) concept has met requirements for security and reliability indomains like automotive industry, food industry, as well as precision agriculture. Furthermore,System of Systems (SoS) expands the use of local clouds for the evolution of integration and communication technologies. SoS devices need to ensure Quality of Service (QoS) capabilities including service-oriented management and different QoS characteristics monitoring. Smart applications depend on information quality since they are driven by processes which require communication robustness and enough bandwidth. Interconnectivity and interoperability facilities among different smart devices can be achieved using Arrowhead Framework technology via its core systems and services. Arrowhead Framework is targeting smart IoT devices with wide applicability areas including smart building, smart energy, smart cities, smart agriculture, etc. The advantages of Arrowhead Framework can be underlined by parameters such as transmission speed, latency, security,etc. This paper presents a survey of Arrowhead Framework in IoT/SoS dedicated architectures for smart cities and smart agriculture developed around smart cities, aiming to outline its significant impact on the global performances. The advantages of Arrowhead Framework technology are emphasized by analysis of several smart cities use-cases and a novel architecture for a telemetry system that will enable the use of Arrowhead technology in smart agriculture area is introduced and detailed by authors.The Internet of Things (IoT) concept has met requirements for security and reliability in domains like automotive industry, food industry, as well as precision agriculture. Furthermore,System of Systems (SoS) expands the use of local clouds for the evolution of integration and communication technologies. SoS devices need to ensure Quality of Service (QoS) capabilities including service-oriented management and different QoS characteristics monitoring. Smart applications depend on information quality since they are driven by processes which require communication robustness and enough bandwidth. Interconnectivity and interoperability facilities among different smart devices can be achieved using Arrowhead Framework technology via its core systems and services. Arrowhead Framework is targeting smart IoT devices with wide applicability areas including

smart building, smart energy, smart cities, smart agriculture, etc. The advantages of Arrowhead Framework can be underlined by parameters such as transmission speed, latency, security,etc. This paper presents a survey of Arrowhead Framework in IoT/SoS dedicated architectures for smart cities and smart agriculture developed around smart cities, aiming to outline its significant impact on the global performances. The advantages of Arrowhead Framework technology are emphasized by analysis of several smart cities use-cases and a novel architecture for a telemetry system that will enable the use of Arrowhead technology in smart agriculture area is introduced and detailed by authors.

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYD2KAbiO8AJCvKsV3aV8224.pdf

14． In the starting blocks for smart agriculture: The internet as a source of knowledge in transitional agriculture

文献源：ScienceDirect,2019-12-01

摘要：The work described here has sought to define the role of the Internet in knowledge acquisition among Polish farmers, as well as the diversity characterising their professional activity conducted online. Relevant discussion is in this way broadened to reflect the conditioning underpinning smart agriculture, most especially in the context of states emerging from a period of economic transition. Particular attention is here paid to the factor of choice of source of information assisting with the running of a farm. Analyses relating to this matter are founded upon questionnaires supplied by almost 2500 farmers. The results show that the Internet does not constitute the most important information source for Polish farmers, though there is a close link between use of the Internet and their basic social characteristics, as also associated with structural features of Polish agriculture. On that basis, it can be considered that Polish farming still finds itself at the preliminary phase of entry into smart agriculture. The Polish case shows that we cannot assume that there is a readiness for smart farming in all places.

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYCY2AfIt0AAoCCD3oCOQ119.pdf

【会议论文】

1． Pests & weed control autonomous robot using machine vision

发布源：IEEE

发布时间：2021-08-04

摘要：To create a future in which both people and nature can survive? This is the biggest question of our time! In the next few decades, we need to do something and find a sustainable coexistence on the earth. During the past years, we have grown with nature and learned to tame the wild, during the process, our population boomed so did our demands. So, the ecological footprints tend to rise. This can be addressed by upgrading to efficient food production and reducing our consumption of meat. We would require far less land and resources for ourselves and leave more land for the grasslands and reduce deforestation. So, we decided to take a small step forward for efficient food production in agriculture by helping the farmers to reduce the usage of pesticides and improve the efficiency of production. Hence, we planned an autonomous robot which uses deep learning algorithm to find the difference between weed and plant so we could use the pesticides wisely and remove the weeds properly with less human effort and we decided to make this robot connected through cloud(internet) to make the robot lite and simple. The algorithm helps to identify the pests and the crops precisely and the process is actuated via internet.

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYK82AYwFVAAvGyojr9Qo423.pdf

2．Is Conservation Agriculture Adoption a Blessing or a Curse for Famers' Agricultural Income?

发布源：IEEE

发布时间：2021-07-26

摘要：China has made great achievements in agricultural development since the "open and reform policy". However, due to the long time high intensity development mode of farmland,its soil fertility has been seriously deteriorated during the past few decades, which lead to the decline of agricultural products quality, loss of biodiversity and deterioration of environment.Conservation agriculture (CA),which is claimed to generate a number of agronomic, economic and environmental benefits, has been increasingly promoted world widely. Farmers' adoption behaviors of CA technologies and their influencing factors have been widely explored in both developed and developing countries, but the effect on farmers' income has been still in fierce debated, of which, the endogeneity caused by farmers' adoption behavior in developing countries has attracted the most attention. Based on a face to face field survey with 454 rice growers in Jianghan Plain, China, this study aims

at shedding some light on the potential impact of CA adoption on farmer's agricultural income by applying propensity score matching method (PSM) and endogenous switching regression model (ESR). The empirical results showed that: (1) Households in Jianghan Plain showed high participation rate in CA technologies adoption, which consisted of straw returning field and crawfish-rice system in this paper. 91.90% of the interviewed farmers have adopted the at least one of the two above technologies. (2) The average treatment effect (ATT) of the ESR for those who have adopted CA was -1.638, and the average treatment effect of non-adopters (ATU) was -1.244. These indicated that the income effects have a negative feedback to farmers' decision on CA adoption (43.09%).Further, farmers with deeper cognition of CA, less level of agricultural subsidy were more likely to adopt conservation agricultural technologies. (3) After capturing the endogeneity caused by unobservable factors in ESR results, the average treatment effect (ATT) was -8.681 and the average treatment effect (ATU) of non-adopters was -0.314, which indicated that adopting CA technologies reduced farmers' agricultural income by 78.68%. Additionally, cognition level of CA supporting policies significantly improved the adoption rate of CA, while traditional agricultural subsidies imposed significantly negative effect on the adoption of CA. Therefore, to help farmers benefit from the CA technologies adoption, policy makers in Jianghan Plain should design more targeted CA supporting policies such as ecological compensation mechanism and CA technology promotion training program. Particularly, due to the CA technologies were adopted involuntarily in Jianghan Plain and the determinants of the CA technologies vary considerably among the regions, the above results can only provide policy implication for regions with similar situations.

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYLOeAZPAUAAQnGkYbEYQ999.pdf

【相关专利】

1．一种基于霍尔计数的农用推杆电机行程控制方法及系统

发布源：中国专利

发布时间：2021-09-21

摘要：本发明涉及智慧农业领域,公开了一种基于霍尔计数的农用推杆电机行程控制方法及系统,包括设置两个相互垂直的霍尔传感器；根据A相输出信号和B相输出信号建立霍尔计数模块,获取行程实际值；建立行程控制接口模块,获取行程设定值；建立电机自动停止检测模块,获得电机自动停止检测结果；通过电机驱动模块提供控制农用推杆电机的若干不同基本驱动函数；利用行程判断模块根据行程设定值和实际值调用电机驱动

模块中的若干不同基本驱动函数对农用推杆电机进行驱动控制。本发明解决了传统推杆电机无发自动控制行程的问题,能够实现精准控制和远程控制。可靠性高,成本低,适合在大田智慧农业中推广使用,实施方式灵活,可大大提高农业信息化水平。

链接:

http://agri.ckcest.cn/file1/M00/0F/CC/Csgk0GFYFWuAHfF-ABoLrwD0xNI881.pdf

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