农业与资源环境信息工程专题

本期导读

➤ 政策法规

1. 农业农村部办公厅关于印发《农业现代化示范区数字化建设指南》的通知及指南解读

➤ 前沿资讯

1. 智慧农业-与耐热植物一起对抗气候变化

2. 利用光照和人工智能技术有效选择未成熟大豆种子

➤ 会议论文

1. 基于物联网的智能农业深度学习和智能合约辅助的安全数据共享

2. 大数据时代农业遥感技术应用研究

中国农业科学院农业信息研究所
联系人：孔令博
联系电话：010-82106786
邮箱：agri@ckcest.cn
2022年9月12日

➤ 政策法规

1．农业农村部办公厅关于印发《农业现代化示范区数字化建设指南》的通知及指南解读

简介：为深入贯彻党中央、国务院关于建设网络强国、数字中国的战略部署，落实《"十四五"推进农业农村现代化规划》《"十四五"数字经济发展规划》等要求，推动农业现代化示范区（以下简称"示范区"）在数字技术与现代农业深度融合上先行突破，用数字化引领驱动农业现代化，农业农村部制定了《农业现代化示范区数字化建设指南》。

数字化发展是建设社会主义现代化强国的基础性先导性工作，当前，数字经济已成为不可阻挡的世界潮流。党中央、国务院高度重视农业数字化发展，国家出台的"十四五"规划《纲要》、推进农业农村现代化规划、数字乡村发展行动计划等规划性、指导性文件，都强调了数字化是农业现代化的制高点和发展方向，把智慧农业、数字乡村摆在突出重要的位置。建设农业现代化示范区，是党中央、国务院作出的决策部署，对全面推进乡村振兴、加快农业农村现代化具有重要的示范带动作用。在数字化与农业农村现代化形成历史性交汇背景下，农业现代化示范区应优先运用数字技术对农业产业进行全方位、全链条的改造，提高农业全要素生产率，发挥数字技术对农业农村经济发展的放大、叠加、倍增作用，实现农业高质量发展。

《指南》的印发实施，顺应了数字化发展趋势，契合了农业现代化发展方向，突出了农业数字化转型在乡村振兴中的重要地位，对加快实施网络强国、数字中国战略，推进农业农村现代化，具有十分重要的意义。

来源：农业农村部

发布日期：2022-09-05

全文链接：http://agri.ckcest.cn/file1/M00/10/0F/Csgk0GMZvVCAZGDWAAckr9vi79M242.pdf

➤ 前沿资讯

1．Smart farming - Fighting climate change with heat-tolerant plants（智慧农业-与耐热植物一起对抗气候变化）

简介：Our summers keep becoming hotter. Just this summer, Germany experienced a heatwave with temperatures of up to 40 C. The resulting drought also affected plants. Given an ample supply of water, these plants can cool themselves via evaporation. However, they cannot do this when under drought stress. This is why plant breeders hope to develop heat-tolerant, drought-resistant plants that can survive with less water and yet still produce a good yield while requiring the smallest possible amount of fertilizer and pesticides.

The breeders have been receiving support from researchers at Fraunhofer EZRT, where for many years research has been carried out into technologies for determining plant phenotypes. This refers to their external appearance, which includes a multitude of factors such as leaf size, leaf arrangement, root thickness and yield. "People have been selecting crops based on external characteristics for thousands of years," explains Dr. Stefan Gerth, Head of Department AMS of the Fraunhofer Development Center for X-ray Technology. "We're developing technologies to objectively measure these phenotype characteristics and optimize breeding based on this data."

来源：SeedQuest

更多资讯 尽在农业专业知识服务系统：http://agri.ckcest.cn/

2．Technique using light and artificial intelligence is effective in selecting immature soybean seeds（利用光照和人工智能技术有效选择未成熟大豆种子）

简介：Historically based on tradition and experience, the decision-making process in agriculture has been transformed in recent years by technological innovations that scale up production and provide solutions to the challenges posed by pests, natural limitations on arable land and the effects of climate change.

Brazilian researchers have developed a technique to help select seeds of soybeans and other legumes in accordance with maturity stages, assuring physiological quality without destroying samples.

The scientists used light and artificial intelligence (AI) to show that chlorophyll fluorescence is an effective and reliable indicator of soybean seed maturity. They validated the results by means of machine learning algorithms. The novel technique can be used to classify commercial seeds.

来源：EurekAlert

➤ 会议论文

1．Deep Learning and Smart Contract-Assisted Secure Data Sharing for IoT-Based Intelligent Agriculture（基于物联网的智能农业深度学习和智能合约辅助的安全数据共享）

简介：The recent development of Internet of Things (IoT) and Unmanned Aerial Vehicles has revolutionized traditional agriculture with intelligence and automation. In a typical Intelligent Agriculture (IA) ecosystem, massive and real-time data are generated, analyzed, and sent to the Cloud Server (CS) for the purpose of addressing complex agricultural issues, such as yield prediction, water feed calculation, and so on. This helps farmer and associated stakeholders to take correct decision that improves the yield and quality of agricultural product. However, the distributed nature of IA entities and the usage of insecure wireless communication open various challenges related to data sharing, monitoring, storage, and further makes the entire IA ecosystem vulnerable to various potential attacks. In this article, we exploit deep learning and smart contract to propose a new IoT-enabled IA framework for enabling secure data sharing among its various entities. Specifically, first we develop new authentication and key management scheme to ensure secure data transmission in IoT-enabled IA. The encrypted transactions are then used by the CS to analyze and further detect intrusions by a novel deep learning architecture. In CS, the smart contract (SC)-based consensus mechanism is executed on legitimate transactions that verifies and adds the formed blocks into blockchain by a peer-to-peer CSs network. In comparison to existing competing security solutions, a rigorous comparative research demonstrates that the proposed approach

provides greater security and more utility characteristics.

来源：IEEE Intelligent Systems

发布日期：2022-08-31

全文链接：http://agri.ckcest.cn/file1/M00/03/3D/CsgkOYdwca2ACtCpACF_imMcrXw254.pdf

2．Research on Application of Agricultural Remote Sensing Technology in Big Data Era（大数据时代农业遥感技术应用研究）

简介：Agricultural information is urgently needed by F AO, governments, grain trading enterprises and farms. In the era of big data, the global Agricultural Remote Sensing Technology is developing rapidly, and it is applied to comprehensive agricultural land management, agricultural production application, disaster emergency evaluation and digital agricultural development plan. It has the advantages of high scientificity, considering time and space breadth and content accuracy, low cost, etc., and can realize the monitoring of main crop yield, global environmental change and agricultural production trend analysis, etc. In the future, it is necessary to focus on promoting the application of remote sensing, the construction of global agricultural monitoring system, and the innovation of new practical technologies of agricultural remote sensing, so as to strengthen the application of agricultural spatial information and improve the level of agricultural digitalization.

来源：2022 IEEE 2nd International Conference on Electronic Technology, Communication and Information (ICETCI)

发布日期：2022-07-25

全文链接：http://agri.ckcest.cn/file1/M00/10/0F/CsgkOGMZwpqAFcmSADgJ6NWZ_jE223.pdf