农业与资源环境信息工程专题

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学术文献

1．Digital Agricultural Extension for Development（数字农业推广促进发展）

简介：Providing information at scale about improved agricultural practices to smallholder farmers remains a challenge in most developing countries. Traditional dissemination methods like in-person meetings or radio programming can be costly to scale or offer too generic information. Moreover, while most agronomic recommendations focus on maximizing crop yields, farmers weigh multiple other factors when making farming decisions, such as the profitability of investments and risks. The proliferation of mobile phones has shifted these trends. Mobile agriculture extension can cost-effectively provide tailored suggestions to farmers and improve their use of information. This case study describes the use of digital extension technologies to support farmers in a number of contexts. We draw insights from various studies and the experience of Precision Development on the importance of human-centered design, monitoring, and continuous experimentation. The chapter also discusses the ecosystem of stakeholders for digital agriculture, concerns relating to privacy and financing, and how mobile services can be used to facilitate social learning.

来源：Introduction to Development Engineering

发布日期：2022-09-09

全文链接：http://agri.ckcest.cn/file1/M00/10/10/Csgk0GMhgZSAIIntABpRXvkPZ80626.pdf

2．Statistical and machine learning methods for crop yield prediction in the context of precision agriculture（精确农业背景下作物产量预测的统计和机器学习方法）

简介：It is of critical importance to understand the relationships between crop yield, soil properties and topographic characteristics for agricultural management. This study's objective was to compare techniques to quantify the relationship between soil and topographic characteristics for predicting crop yield using high-resolution data and analytical techniques. The study was conducted on a multiple field dataset located in Southwestern Ontario, Canada, where few studies have assessed the impact of applications for precision agriculture and machine learning (ML) to the soil property-yield relationship in this region. The dataset included 145,500 observations of corn and soybean yield, topographic and soil nutrient characteristics. The attributes considered for this study included pH, soil organic matter (OM) content, cation exchange capacity (CEC), soil test phosphorus, zinc (Zn), potassium (K), elevation and topographic wetness index. Multiple linear regression (MLR), artificial neural networks, decision trees and random forests were compared to identify methods able to relate soil properties and crop yields on a subfield scale (2 m). Random forests were the most successful at predicting yield with an $R2$ value of 0.85 for corn and 0.94 for soybeans. MLR was the least successful with an $R2$ of 0.40 for corn and 0.45 for soybeans. Cross-validation experiments showed that random forest models in most cases could predict low- and high-yield areas from fields excluded from training datasets, but this was not possible in all cases. Techniques tested the models and identified significant soil and topographic attributes when predicting yield, though the identification was subject to some uncertainty. These results suggest that ML techniques might be used to predict high yield areas of fields without existing yield maps, if those fields have similar relationships of soil properties to yield.

来源：Precision Agriculture

发布日期：2022-03-30

全文链接：<u>http://agri.ckcest.cn/file1/M00/03/3E/Csgk0Yd4MZyARBfWAA6hcXy0iEQ612.pdf</u>

3．农产品供应链区块链追溯技术研究进展与展望

简介：农产品供应链具有链条长、生产分散、信息多源异构等特点，极易造成供应链上下游信息断链和不透明。传统追溯数据存储于各节点企业在供应链上下游数据传递过程中存在协作信任度低、真实性差等问题，造成消费者对追溯信息的真实性产生信任危机。区块链追溯系统通过建立多方参与、共同维护的分布式数据库，并利用密码学和共识机制建立信任关系具有数据无法篡改、共享可信度高等优势近年来成为国内外研究的热点。本文系统总结了国内外农产品区块链追溯系统的研究进展从区块链追溯链上链下数据协同、区块链追溯共识机制和区块链追溯数据隐私保护等方面详细分析了区块链追溯关键技术的研究进展；对区块链追溯技术的未来发展进行了展望。

来源：农业机械学报

发布日期：2021-05

全文链接：<u>http://agri.ckcest.cn/file1/M00/03/3E/Csgk0Yd4LpKAc-ZEAAkg9cjqjww546.pdf</u>

➤ 行业报告

1．Opinion on the Farm Sustainability Data Network (FSDN)（欧盟数据保护专员公署对农场可持续数据网络的意见）

简介：On 22 June 2022, the European Commission issued a Proposal for a Regulation of the European Parliament and of the Council amending Council Regulation (EC) No 1217/2009 as regards conversion of the Farm Accountancy Data Network into a Farm Sustainability Data Network.

The Proposal aims to regulate the processing of personal data in the context of the collection of farm level economic, environmental and social data as well as the further management and use of such data in the Farm Sustainability Data Network ('FSDN'). In this regard, the EDPS welcomes the explicit references to the need to comply with both the GDPR and with the EUDPR. The EDPS also welcomes that the Proposal contains references to the GDPR and EUDPR when providing definitions of relevant terms such as 'personal data' and 'processing'. However, in the interest of legal certainty, the EDPS strongly recommends revisiting the proposed definitions to ensure that both the GDPR and EUDPR are referenced in a systematic and consistent manner and to avoid introducing definitions of concepts already covered by those instruments.

The EDPS positively notes that in case individual data will be shared by the Commission or liaison agencies, the data of the farmers and all other individual details obtained pursuant to the Proposal would be anonymised or pseudonymised. Both anonymisation and pseudonymisation are important techniques to mitigate data protection risks. That being said, the EDPS considers it important to preserve a clear distinction between these concepts, as pseudonymous data can still be related to an identifiable individual and therefore qualifies as personal data.

来源：欧盟

发布日期：2022-08-11

全文链接：

2．中国数字乡村建设报告 2021：基于媒体大数据的评估

简介：北京大学政府管理学院、北京大学公共治理研究所联合四川农业大学等机构共同发布《中国数字乡村建设报告2021：基于媒体大数据的评估》。报告针对当前全国数字乡村建设需求，通过以主流媒体大数据为依据的评估方法，提供覆盖全国并细化至地级行政单位的数字乡村建设进展评估，可为各地相关工作提供及时参考。

由于数字乡村建设内容繁多、相关数据可获取性参差不一，全国性、系统性的数字乡村建设评估面临较大挑战。对此，报告选取人民网、新华网、中国新闻网等13家综合性或农业农村领域主流新闻网站为大数据来源，采用一系列文本分析方法对上述网站相关报道进行筛选识别（截至2021年12月），并以中央网信办等七部门印发的《数字乡村建设指南1.0》中的"5+21"领域为评估框架，得到我国全部地级行政单位在数字乡村细分领域的建设成果报道情况。在此基础上，报告对当前我国数字乡村建设的区域格局、细分领域状况以及各省市进展进行了深入分析。

来源：北京大学

发布日期：2022-06-02

全文链接：