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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．马有祥强调：抢抓机遇 凝心聚力 打造国家农业战略科技力量

【中国农业科学院】3月1日，农业农村部副部长马有祥出席中国农业科学院强化国家战略科技力量建设研讨会并讲话。马有祥充分肯定了中国农科院建院65年来各项工作取得的显著成效。他指出，中国农科院认真贯彻习近平总书记重要指示批示精神，落实党中央国务院决策部署，紧扣农业农村发展大局，“顶天立地”搞科研、矢志不渝为“三农”，不断开创农业科技工作新局面，为推动我国从农业大国迈向农业强国作出了重要贡献。

链接:

http://agri.ckcest.cn/file1/M00/03/26/Csgk0YZ4dwKAJzG0AAQhje5wzTY532.pdf

2．种养连接更紧密 绿色循环更顺畅

【农民日报】发展生态农业需要大量的优质有机肥，农民更希望它价廉物美。可市场上的有机肥有的养分不够，有的发酵不透易导致烧根烧苗，质量好的价格又太高。为什么会出现这样的局面？众所周知，畜禽粪污可以转化成有机肥。但有机肥企业与养殖场之间的松散关系，决定了有机肥生产过程中会存在大量的内部腾挪、处理处置、对外运输方面的重复成本，导致有机肥的市场价格偏高。而种植企业、中小型农场一般都没有能力自建规范的有机肥厂，一些粗制滥造、以次充好的肥料就有了生存空间。有机肥能否优质廉价，取决于有机肥企业能否掌握有效的资源获取模式。养殖场和有机肥企业如果形成“你给我方便，我为你省钱”的互利关系，种养之间的良性通道就豁然打开了，这必须有改变传统生产流程的技术为前提。以金宝贝干撒生态发酵床养殖技术和与之相关联的发酵斗塔为代表的新型成套设备工艺流程及商务运营模式，就是实现这种紧密关系所依赖的重大核心技术体系之一。从目前一些试点的经验看，正像有机肥代替化肥的趋势一样，以仿生态为特征的发酵床养殖和相关配套的垫料有机肥生态智能发酵处理模式，

将成为养殖户环保、有机肥厂省钱、种植户受益的“多赢”种养结合生态循环新模式，势不可当。

链接:

http://agri.ckcest.cn/file1/M00/0F/F8/Csgk0GIhv2GAVr07ADgPqep4u9Q876.pdf

3．小田变大田 大田变良田

【农民日报】“以前这里都是撂荒地，望天田，靠老天吃饭。”渠县农业农村局高级农艺师王卫兵介绍高标准农田改造，“现在这里已经建成了高标准农田，田平了，路通了，能排能灌。还安装了高清摄像头、温度湿度传感器，可以通过网络实时监测查看。”放眼望去，以前零零散散的田块，已然变成了“田成方、路成网、渠相连”的现代高效农田。

链接:

http://agri.ckcest.cn/file1/M00/0F/F8/Csgk0GIhxUmAElqaADWdwArjgO8390.pdf

4．普洛斯金融以科技助力金融机构深入大宗农产品产业链

【中国农网】近日，2022年中央一号文件正式公布，连续19年聚焦“三农”。众所周知，农业是国家经济的基石，也是老百姓生活的保障，但大宗农产品产业链的融资需求，却一直没能得到充分满足。作为以科技为驱动，验真风控为核心的数字供应链金融科技服务平台，普洛斯金融凭借自身在“场景+科技”领域的优势，联合金融机构解决各产业链上中小企业的融资难题。以大宗农产品行业为例，普洛斯金融可为传统粮食贸易、加工环节的中小企业提供一站式数字供应链金融产品解决方案，并引导金融机构资金注入产业，解决企业周转资金不足等痛点，助力大宗农产品产业链转型升级。截至目前，普洛斯金融服务的大宗农产品资产超过20万吨，并帮助产业链上的中小企业对接超过10亿元的银行授信。

链接:

http://agri.ckcest.cn/file1/M00/0F/F8/Csgk0GIhyoqAYweNAAkIolimIqE130.pdf

5．智慧科技赋能 守护大国粮仓

【中国农网】中央一号文件《中共中央 国务院关于做好2022年全面推进乡村振兴重点工作的意见》日前正式发布。文件提出要从加强智能粮库建设，促进人防技防相结合，强化粮食库存动态监管；深入推进产运储加消全链条节粮减损等方面统筹做好重要农产品调控，全力抓好粮食生产和重要农产品供给。我国作为世界人口大国，农产品需求量庞大，保障粮食等重要农产品安全更是确保国家安全的必然要求，是经济社会稳定发展的重要基础。因此，为应对面临的挑战，稳定宏观经济大盘，推动我国经济高质量发展，

首先必须要贯彻落实“全力抓好粮食生产和重要农产品的供给”这个重要任务。国家粮食和物资储备局规划建设司司长钱毅在介绍“十四五”时期，科技赋能粮食产业时表示，“十四五”时期，我们要聚焦“数字粮储”建设，进一步加快5G、人工智能、大数据等新一代信息技术与粮食的产、购、储、加、销深度融合，实施“上云用数赋智”，建设国家粮食和物资储备数据安全中心，推动数据赋能粮食全产业链协同转型。

链接:

http://agri.ckcest.cn/file1/M00/03/26/Csgk0YZ4fmiAXUiUAAjS6upWNHw873.pdf

【文献速递】

1．A classification-based spatiotemporal adaptive fusion model for the evaluation of remotely sensed evapotranspiration in heterogeneous irrigated agricultural area

文献源：ScienceDirect ,2022-03-04

摘要：Remotely sensed evapotranspiration (ET) with high spatial and temporal resolution is frequently required to understand the regional hydrological processes, particularly in agricultural areas with complex planting structures. Most of the existing spatio-temporal fusion models lacked the fusion of ET because they ignored the physiological characteristics of the vegetation moisture condition. Therefore, we propose a classification-based spatiotemporal adaptive fusion model (CSAFM) for the evaluation of remotely sensed ET in an irrigated agricultural area with a complex planting structure. This model combines the unmixing-based and weight-based fusion approaches to produce ET maps with high spatiotemporal resolution. It uses the mainstream weightbased fusion algorism—the spatial and temporal adaptive reflectance fusion model (STARFM)—in the fusion step. However, in contrast to the existing reflectance-based fusion algorithms, the CSAFM considers the effects of soil moisture and crop category on evapotranspiration rates. It replaces the unmixing window with an irregular hydrological response unit (HRU) containing homogeneous meteorological and irrigation conditions, and then unmixing the mixed pixels using a planting structure map. Moreover, an ET correction method was proposed in CSAFM to restore the spatial heterogeneity. The performance of CSAFM was compared to that of two mainstream fusion models using Landsat-ET and MODIS-ET based on the surface energy balance algorithm for land (SEBAL): the enhanced spatial and temporal adaptive reflectance fusion model (ESTARFM) and the flexible spatiotemporal data fusion method (FSDAF). The models were validated with ground-based ET monitored by eddy covariance observed ET and Landsat inverted ET. It was found that the CSAFM model (mean MAE: 0.40 mm/day) beat the ESTARFM model (mean MAE: 0.49 mm/day) and the FSDAF (mean MAE: 0.53

mm/day) in accurately fusion ET and reproduce the details of complex surface landscapes. Additionally, CSAFM (RMSE: 0.661.10 mm/day) is less sensitive to the update frequency of input data in the crop growing season than ESTARFM (RMSE: 0.791.36 mm/day) and FSDAF (RMSE: 0.791.17 mm/day), indicating its suitability in areas with limited input dataset. Overall, the proposed CSAFM model can greatly improve the ET fusion accuracy in irrigated agricultural areas.

链接:

http://agri.ckcest.cn/file1/M00/0F/F8/Csgk0GIh9s2AFfkAAMNSuVLRuRU915.pdf

2．Exploring the negative effects of biochars on the germination, growth, and antioxidant system of rice and corn

文献源：ScienceDirect,2022-03-04

摘要：This study investigated the effects of biochars pyrolyzed at different temperatures on plant germination and growth and attempted to determine the mechanisms underlying those effects. The experimental results showed that phytotoxicity of biochar pyrolyzed at 500 or 800°C was significantly higher than that of biochar pyrolyzed at 200°C, especially at high dosages (200.0 and 300.0 g/L). However, concentrations of heavy metals and polycyclic aromatic hydrocarbon (PAHs) in biochar pyrolyzed at 500 and 800°C were lower than those in biochar pyrolyzed at 200 °C. The inhibitory effect of aqueous biochar extract on seed germination was significantly weaker than that of biochar. Electron paramagnetic resonance (EPR) signal intensity was enhanced with increasing pyrolysis temperature,which indicates the existence of a greater number of free radicals. Furthermore, •OH and $•O_2^-$ were the primary reactive oxygen species in the biochar system. It can be concluded that the phytotoxicity of biochar pyrolyzed at high temperatures (>500°C) enables to attributing free radical-induced oxidative damage, whereas that of biochar produced at low temperatures (200 °C) results in the presence of conventional contaminants (such as heavy metals and PAHs). The information obtained in this study provides a more comprehensive understanding of the potential risk of free radicals in plant system biochar.

链接:

http://agri.ckcest.cn/file1/M00/0F/F8/Csgk0GIh32eAAydZABu-VQvU7Iw667.pdf

3．Biochar, compost, iron oxide, manure, and inorganic fertilizer affect bioavailability of arsenic and improve soil quality of an abandoned arsenic-contaminated gold mine spoil

文献源：ScienceDirect,2022-03-04

摘 要： Arsenic (As) contaminated mining spoils pose health threats to environmental resources and humans, and thus, mitigating this potential risk is worth investigating. Here, we studied the impacts of biochar, compost, iron oxide, manure, and inorganic fertilizer on the non-specifically (readily bioavailable)- and specifically- sorbed As and soil quality improvement of an abandoned mine spoil highly contaminated with As (total As = 1807 mg/kg). Compost, iron oxide, manure, and biochar were each applied at 0.5%, 2%, and 5% (w/w) to the contaminated soil; and NPK fertilizer at 0.1, 0.2, and 5.0 g/kg. The non-specifically (readily bioavailable)- and specificallysorbed As were extracted sequentially and available P, total C and N, dissolved organic carbon, soil soluble anions, and exchangeable cations were extracted after 1- and 28-day incubation. Compost, manure, and biochar at 5% improved the total C and N and exchangeable K+, Mg2+ and Na+. However, manure, compost, and iron oxide at 5% reduced available P from 118.5 to 60.3, 12.6, and 7.1 mg/kg, respectively. As compared to the untreated soil, the addition of iron oxide doses reduced the readily bioavailable As by 93%; while compost, manure, inorganic fertilizers, and biochar increased it by 106-332%, 24-315%, 19-398%, and 28-47%, respectively, with a significantly higher impact for the 5% doses. Furthermore, compost reduced specificallysorbed As content (1437%), but the other amendments did not significantly affect it. The impacts of the amendments on the readily bioavailable As was stronger than on specifically-sorbed As; but these were not affected by the incubation period. Arsenic bioavailability in our soil increased with increasing the soil pH and the contents of Cl- , DOC, and exchangeable K+ and Na+. We conclude that iron-rich materials can be used to reduce As bioavailability and to mitigate the associated environmental and human health risk in such mining spoils. However, the carbon-, and P-rich and alkaline materials increased the bioavailability of As, which indicates that these amendments may increase the risk of As, but can be used to enhance phytoextraction efficiency of As in the gold mining spoil.

链接:

http://agri.ckcest.cn/file1/M00/03/26/Csgk0YZ4jmOAQ71uAEvandce2Ls044.pdf

4．Deep Learning for Proximal Soil Sensor Development Towards Smart Irrigation

文献源：ScienceDirect,2022-03-03

摘 要： Excessive agricultural water consumption threatens the safe access of billions of people to drinking water. Smart irrigation systems offer more efficient water use in irrigated

agriculture. Determining irrigation requirements of various soil texture classes in production fields requires more advanced sensing technologies such as deep learning. This study proposed a proximal sensing system using a color camera towards smart irrigation based on computer vision and deep learning to identify water requirements of three soil texture classes under different illumination conditions. An imaging station was composed to reduce the workload in obtaining training images required for training deep convolutional neural network models. Five deep learning architectures were employed to identify texture-water classes: AlexNet, GoogleNet, ResNet, VGG16, and SqueezeNet. Those models were experimented with and investigated to determine the best models in terms of detection performance and speed. By using crossvalidation rules, about 12214 images were studied individually for training and testing. The AlexNet model outperformed the other deep learning models with an F1-score of 0.9973 in identifying twelve soil texture-water classes. GoogleNet and ResNet showed the fastest detection speeds with an average processing time of 16.92 ms. The findings obtained from this study indicated that deep learning has a great potential in determining irrigation requirements of production fields under varying conditions.

链接:

http://agri.ckcest.cn/file1/M00/03/26/Csgk0YZ4qHaAOF1eACGW0I39k-g226.pdf

5．Performance of the SSM-iCrop model for predicting growth and nitrogen dynamics in winter wheat

文献源：ScienceDirect,2022-03-02

摘 要： Process-based crop models are essential tools for representing the fundamental interactions between the cropping environment (weather, soil, and management) and plant development, growth, resource use, and yield formation. Due to these capabilities, crop models are considered as an integral component of smart farming tools for evaluating and improving crop management at field, farm, and regional scales. However, prior to application of a crop model in geospatial decision support tools, its robustness should be established by comparing model predictions with observations from the target cropping environment. The objective of this study was to assess the performance of the Simple Simulation Model (SSM-iCrop) for predicting growth and nitrogen (N) dynamics of winter wheat (Triticum aestivum) cultivars in a temperate environment. Detailed plant and soil data were collected from three field experiments conducted with four widely-grown

cultivars under four N application rates in Austria. Variation in N fertilisation and differences in soil properties and weather conditions in the three field experiments generated a wide range of observed crop total dry mass (585-2034 g m^{-2}), N uptake (5-32 g N m^{-2}), and grain yield (211-898 g m^{-2}). The SSM-iCrop model required parameterisation of a relatively small number of plant input parameters. As these parameters could be directly calculated from the experimental data, except for two phenology-related coefficients, there was no need for calibrating the model. In initial simulations, SSM-iCrop was not able to predict the response of leaf area index (LAI) to decreasing N supply. Introducing an additional parameter defining the minimum stem N concentration from emergence to begin grain growth improved the model performance substantially. The simulated time-course of crop attributes through the growing season showed good overall correspondence with observed data. Across the three field experiments, the model performed well in simulating above-ground dry mass (CV=5.9, RMSE=115.6 g N m^{-2}), grain yield (CV=1.9, RMSE=60.5 g N m^{-2}), total crop N uptake (CV=4.5, RMSE=1.9 g N m^{-2}), and grain N content (CV=1.1; RMSE=2.2 g N m^{-2}). Overall, The results of this study confirmed the robustness of SSM-iCrop for predicting wheat development, growth, N dynamics, and yield in the target cropping environments. The relatively simple structure and high degree of transparency make the SSM-iCrop suitable for integration in smart farming tools for improving tactical decision making in crop production. This study also highlights the essential role of high-quality detailed experimental data for adequate parameterisation and evaluation of crop models..

链接:

http://agri.ckcest.cn/file1/M00/0F/F8/Csgk0GIh-vGAOaaBAFaqUBAvu9Q392.pdf

6．贵州湄潭茶区土壤-茶叶系统中微量元素富集规律与产地溯源

文献源：浙江农业学报,2022-02-25

摘要：为了解贵州湄潭茶区土壤-茶叶系统中微量元素的迁移与特征规律,采集湄潭县洗马镇、鱼泉镇等12个村镇的茶叶与土壤,利用电感耦合等离子体发射光谱仪（ICP-OES）测定茶叶、土壤中11种微量元素（Ce、Co、Fe、La、Mg、Mn、Na、Ni、Pr、Se、Zn）的含量。结果表明:上述地区土壤Ni、Zn等重金属的平均含量低于国家限定标准,所测重金属中单项污染指数（P_i）≤1,地累计指数(I_{geo})≤0,表明这些地区土壤均未受到污染,且湄潭茶区达到富硒土壤要求;但Co、Pr、Ni的污染指数接近污染值界限,建议茶区减少含有Co、Pr、Ni 3种元素的有毒有害物质排放,以便解决未来元素污染的隐患,保持土壤清洁状态;对照国家标准,湄潭茶叶重金属含量未超标,且湄潭部分茶区符合富硒茶叶要求;茶

叶-土壤-pH值系统中,茶叶与土壤上下层大部分元素含量有正或负相关关系,上下层土壤pH值与其部分元素含量也有正或负相关关系,茶树中Mn元素富集能力较强,Mn元素的吸收与Mg、Na、Ni、Pr、Co、Se元素的吸收具有一定拮抗作用;采用主成分分析与典则判别分析探讨湄潭茶区土壤上下层以及茶叶特征规律,发现主成分分析和典则判别分析均可将12个茶区的茶叶、土壤各自区分,其不仅实现了不同茶区土壤的区分,而且相同茶区土壤上下层也得到区分,且典则判别分析结果图中数据点的聚集性更好,以上结果证实,湄潭茶区不同地域茶叶与土壤微量元素含量特征存在差异性,特征规律明显。系统地对湄潭茶区土壤-茶叶体系中微量元素的特征规律进行探究,可为贵州省湄潭茶区土壤-茶叶体系中微量元素富集、迁移规律,以及产地溯源提供依据。

链接:

http://agri.ckcest.cn/file1/M00/0F/F8/Csgk0GIh2AWANWgVAA_tPOCOUuU761.pdf

7．玉米重要农艺性状的基因组预测分析

文献源：玉米科学,2022-02-15

摘要：以玉米自交系郑683-1为轮回亲本,ZPH1388、ZPH5和东237为供体亲本构建BC3F5群体,对穗部和株型性状进行基因组预测分析,研究2种交叉验证方式、6种GS方法和显著数量性状位点（QTL）作为固定效应对预测准确性的影响。结果表明,相比5折交叉验证,10折交叉验证可以提高穗粒数、行粒数、株高和穗位高的预测准确性,降低穗行数和叶夹角的预测能力。相比随机效应模型,穗粒数、穗行数、行粒数和叶夹角将1～2个QTL作为固定效应可以提高基因组估计育种值的准确性,将1～5个QTL作为固定效应会降低穗位高的预测能力。对于株高,贝叶斯A和再生核希尔伯特空间将1～5个QTL作为固定效应可以提高预测的准确性,其他4种方法多数情况固定效应的加入会降低株高的预测能力。在穗粒数和株高中,基因组最佳线性无偏预测的准确性最高,略高于4种贝叶斯方法,再生核希尔伯特空间的准确性最低。对于其他4个性状,最优预测方法受不同交叉验证方式和固定效应模型的影响表现不一。

链接:

http://agri.ckcest.cn/file1/M00/03/26/Csgk0YZ4iE-AQZzyABCpG8wIogQ179.pdf

8．氮沉降对土壤微生物影响研究热点与趋势分析——基于Citespace可视化分析

文献源：土壤通报,2022-02-06

摘要：随着大气氮沉降现象加剧,其对生态系统的影响也日益严重;氮沉降改变了土壤氮库的特征,也影响了土壤中微生物群落组成和功能。采用文献计量学方法总结了近20年来国际上有关氮沉降对土壤微生物影响方面研究的特征、前沿、热点及其变化趋势。采

用Citespace软件,自Web of Science核心数据库中选取2001～2020年间发表的有关大气氮沉降对土壤微生物影响方面的研究论文,从国家、学术机构、作者、期刊、关键词和学科类别等方面进行可视化分析,以阐明该研究领域的发展趋势和研究热点。结果表明,大气氮沉降对土壤微生物影响研究发文量最大的国家为美国,而发文量最大的学术机构为中国科学院,研究领域集中在环境科学、生态学和农学等学科,研究内容呈现出多学科融合趋势。目前有关大气氮沉降对土壤微生物影响方面的研究趋向于探究氮沉降影响土壤养分循环和土壤微生物对大气氮沉降响应机制。

链接:

http://agri.ckcest.cn/file1/M00/03/26/Csgk0YZ4igGAWAn-ABmEXF_oH_w597.pdf

9．融合多源时空数据的冬小麦产量预测模型研究

文献源：农业机械学报,2022-01-25

摘要：为提高大尺度冬小麦产量预测精度,以2005—2019年河南省遥感数据、气象数据、土壤含水率等多源时空数据为特征变量,分析其与小麦单产的相关性,并基于随机森林算法对特征变量进行了重要性分析,构建了融合多源时空数据的冬小麦产量预测模型。结果表明:增强型植被指数（Enhanced vegetation index, EVI）、日光诱导叶绿素荧光（Solar-induced chlorophyll fluorescence, SIF）与高程为小麦产量预测的重要因子,与小麦产量呈高度正相关,对小麦产量预测的重要性指标均超过0.45,远大于土壤含水率、降水量、最高温度、最低温度等因子;基于随机森林算法构建的小麦不同生长阶段产量预测模型中,以10月—次年5月和10月—次年4月为特征变量的产量预测模型精度较高,R^2分别为0.85和0.84,RMSE分别为821.55、832.01 kg/hm^2,在空间尺度上,豫西和豫南丘陵山地模型预测相对误差高于平原地区。该研究结果可为大尺度作物产量预测提供参考。

链接:

http://agri.ckcest.cn/file1/M00/0F/F8/Csgk0GIh1sWAQ0NxAC4uOgi22dk898.pdf

10．智能化技术在水稻生产全程机械化中的应用研究与发展趋势

文献源：华中农业大学学报,2022-01-05

摘要：智能控制是水稻生产全程机械化向智能化发展的关键核心技术。本文从水稻作业环节中的耕整地、种植、田间管理和收获四个方面概述分析了国内外水稻生产机具使用情况和机械化作业情况,着重阐述了智能化技术在水稻生产全程机械化中的应用研究,涵盖了耕深智能调节与自动平地技术、工厂化育秧移栽与精量直播技术、田间管理智能化技术（灌溉、施肥、除草和病虫害防治）、收获机在线监测和智能控制技术、自动导航与无人驾驶技术等。指出了制约水稻生产全程机械化向智能化发展的技术难点,并展望

了其未来发展趋势,以期为智能化技术在水稻生产全程机械化中的应用提供参考。

链接:

http://agri.ckcest.cn/file1/M00/0F/F8/Csgk0GIh2kmAINPPADmcVgmXLKk996.pdf

【会议论文】

1．Agricultural product B2C e-commerce supply chain management based on the intelligence of United Logistics Information

发布源：IEEE

发布时间：2022-02-25

摘要： my country is a big country in agricultural production. Affected by factors such as geography, population, and natural environment, my country's agricultural production is mainly based on the small-scale peasant economy. In this way, the level of productivity is low, the efficiency and benefits are relatively backward, and the response to market information is relatively slow. In order to build a modern agricultural production system, the acquisition of agricultural product market information is important, and the emergence of the Internet, especially the rapid development of e-commerce in other industries, has brought new opportunities to the modernization of agriculture. This paper studies the agricultural product B2C e-commerce supply chain management based on the intelligentization of e-commerce and logistics information.

链接:

http://agri.ckcest.cn/file1/M00/0F/F8/Csgk0GIh1JCAGjZ3ABiAzQgMGwM469.pdf

2．A comparative study of various techniques for crop Disease Detection and segmentation

发布源：IEEE

发布时间：2022-02-25

摘要：Plant diseases have always been a major concern with food security in particular, the quality assurance of the agricultural products usually depends on the appropriate identification of the diseases, if any, in the crops used in their production. Moreover, since a vast majority of world’s economy usually depends on the agriculture, it becomes more important to cut short on the losses incurred with the traditional methods of crop disease detection that involves human supervision and observations taken with naked eyes which are often inaccurate, time consuming and error prone. Since food production and its

consumption could have consequence that spans multiple spheres ranging from a country's economic growth to health of its denizen, it becomes more than relevant to establish a rather reliable and automatic process for crop disease detection. This study proposes a comparative study underlying the various researches involving computer vision in particular, Machine Learning and Deep Learning, for crop disease detection automation, as a part of underlying framework, this study intends to present the necessary methods and techniques such as acquiring data, feature extraction, image segmentation, etc., that withstood the test of the time in the required context.

链接:

http://agri.ckcest.cn/file1/M00/03/26/Csgk0YZ4hK2AGcI2AAWcWXNsNvg831.pdf

3．Micronutrient Classification in IoT based Agriculture using Machine Learning (ML) Algorithm

发布源：IEEE

发布时间：2022-02-25

摘 要： Agriculture appears to be the demographically most important economic area in India's socioeconomic structure. People are now unaware of crop cultivation's proper timing and location. As a result, they cause food insecurity since seasonal climatic settings dependent on agriculture practices are changing against essential assets such as air, water, and soil. As a result, Machine Learning (ML) techniques are the best option for agriculture and are being tested to predict agricultural growth. This paper proposed horticulture IoT monitoring sensor board to develop an IoT architecture in agriculture industry for monitoring the Micro and Macro Nutrients of Soil and analyze various soil parameters present in the Thiruvarur District in Tamil Nadu. The framework aids in generating right decisions based on data collected from IoT sensors and saved on the server before being evaluated using ML algorithms. The ML model is used to categorize the dataset based on the micro and macronutrient threshold values acquired from the National Food Security Mission (NFSM). The evaluation can be done by using various ML classification algorithm such as Naive Bayes (NB), Logistic Regression (LR), Random Tree (RT) and KNearest Neighborhood (KNN). The classification method is compared and evaluated through accuracy, Relative Absolute Error (RAE), Root Mean Square Error (RMSE), Root Relative Squared Error (RRSE), Mean Absolute Error (MAE). The KNN classifier attains lower MAE, RMSE and RRSE value of 0.2398, 0.3908, and 94.1845 and outperforms the other three

classifier but RT algorithm attains lower RAE value of 66.24 than KNN.

链接:

http://agri.ckcest.cn/file1/M00/0F/F8/Csgk0GIh00GAfiUgABPFzUhKRrg394.pdf

4．Smart Farming: The IoT based Future Agriculture

发布源：IEEE

发布时间：2022-02-25

摘要：Agriculture is backbone of any country. About 60% of our country's population works in agriculture or the primary sector. It contributes more to our country's GDP. It employs the majority of India's population. The internet of things research presents a framework in which farmers may obtain extensive information on the soil, crops growing in specific areas, and agricultural yield and productivity. By utilizing resource optimization and smart planning, this technology-based farming solution will assist farmers in making wise agricultural decisions. The development of IOT based intelligent Smart Farming using smart devices is changing the agriculture production by not only increasing the quality and yield but also to make farming cost effective. The goal of this smart Agriculture or farming is to get live data like temperature, soil moisture and humidity to monitor the surrounding environment. All of this is accomplished with the use of temperature, humidity, and moisture sensors. The system being proposed by this paper is done using microcontroller and various sensors. This system is capable of monitoring the parameters in various soil conditions.

链接:

http://agri.ckcest.cn/file1/M00/03/26/Csgk0YZ4g3WASl7gABTCjvaXNfc863.pdf

5．Blockchain and Trusted Computing Technology in the Construction of Smart Agriculture System with Modelling

发布源：IEEE

发布时间：2022-02-25

摘要：Blockchain and trusted computing technology in the construction of smart agriculture system with modelling is studied in the paper. Intelligent agriculture is the highly comprehensive system engineering, and it is becoming a new trend of world agricultural development. It can be seen that intelligent agriculture is the best choice for low-consumption, high-efficiency, high-quality, environmental protection and intensification of agriculture. Unmanned aerial vehicle remote sensing platform as a new information

acquisition method has also begun to be applied to precision agriculture, hence, this paper adopts the latest technologies to design the novel model with the robust framework. The blockchain and the trusted computing models are combined to serve for the data collection and processing units, the smart system is implemented with the IoT. Through the testing under different models, the designed framework is proven to be efficient.

链接:

http://agri.ckcest.cn/file1/M00/0F/F8/Csgk0GIhzz6AMZZ1ABQ-NdRom7E513.pdf

6．IoT-Equipped and AI-Enabled Next Generation Smart Agriculture: A Critical Review, Current Challenges and Future Trends

发布源：IEEE

发布时间：2022-02-17

摘要：Smart agriculture techniques have recently seen widespread interest by farmers. This is driven by several factors, which include the widespread availability of economically-priced, low-powered Internet of Things (IoT) based wireless sensors to remotely monitor and report conditions of the field, climate, and crops. This enables efficient management of resources like minimizing water requirements for irrigation and minimizing the use of toxic pesticides. Furthermore, the recent boom in Artificial Intelligence can enable farmers to deploy autonomous farming machinery and make better predictions of the future based on present and past conditions to minimize crop diseases and pest infestation. Together these two enabling technologies have revolutionized conventional agriculture practices. This survey paper provides: (a) A detailed tutorial on the available advancements in the field of smart agriculture systems through IoT technologies and AI techniques; (b) A critical review of these two available technologies and challenges in their widespread deployment; and (c) An in-depth discussion about the future trends including both technological and social, when smart agriculture systems will be widely adopted by the farmers globally.

链接:

http://agri.ckcest.cn/file1/M00/03/26/Csgk0YZ4hfqAAO3LAGE6_Bgfox8273.pdf