

《农业水土资源监控研究》专题快报

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【动态资讯】

1. 解锁黑土地上的丰产“密码”——吉林省大力推进高标准农田建设

【中国农网】耕地是粮食生产的命根子，要“牢牢把饭碗端在自己的手里”，要做好高标准农田改造这篇农业“大文章”，这是吉林省近几年来在推进现代农业发展中，一步一个脚印蹚出来的“实路子”。要把昔日的低产田，变成如今的“生态田”“高产田”和“米袋子”。在吉林省大安市中科佰澳格霖农业土地整治现场，百余台大型机械齐上阵，一派热火朝天的施工景象。自接到复工指令后，迅速调运设备及人员，抢时间、赶进度，每天施工10个小时以上，表土剥离、土地平整、斗渠、毛渠等工程正在有序推进中。站在改造的田地边，望着面前正在平整土地、盐碱地改良的田野，附近的村民满怀希望。这让人们昔日望眼欲穿的“薄地”、靠天吃饭的“望天田”在不久后就将变成带领村民致富增收的“希望田”。

链接:

<http://agri.ckcest.cn/file1/M00/03/31/Csgk0YbeRZeAZhNpAAmLo3RLXAA593.pdf>

2. 全力以赴抓好小麦机收和“三夏”生产 确保夏粮颗粒归仓 夯实全年粮食生产基础

【农民日报】5月16日，农业农村部召开全国“三夏”生产视频调度暨小麦机收工作部署会，中央农办主任，农业农村部党组书记、部长唐仁健出席会议并讲话。会议强调，各级农业农村部门要认真学习贯彻习近平总书记重要指示精神，深入贯彻落实党中央、国务院决策部署，全力以赴打好小麦机收这场硬仗，抓实抓细夏收夏种夏管各项工作，确保夏粮颗粒归仓，夯实全年粮食生产基础。

链接:

http://agri.ckcest.cn/file1/M00/10/03/Csgk0GKHnBaAehISAEmgA1y_qrs069.pdf

3. 土地确权：承包地有了“身份证”

【农民日报】党的十八大以来，中国特色社会主义进入新时代。以习近平同志为核心的党中央统筹国内国际两个大局，推动党和国家事业取得历史性成就、发生历史性变革，中华民族伟大复兴进入不可逆转的历史进程。即日起，本报在“奋进新征程 建功新时代”栏目下开设“伟大变革”子栏目，从三农领域的变革性实践、突破性进展、标志性成果入手，回顾梳理党的十八大以来中央推进三农工作的战略考量、决策过程，通过三农领域的巨大变化反映党领导人民攻坚克难、推进变革的生动实践，展现人民踔厉奋发、笃行不怠的精神风貌。

链接:

<http://agri.ckcest.cn/file1/M00/03/31/Csgk0YbeS8eATXGLAB3mRYIUo80902.pdf>

4. 北大荒共青农场木本泥碳改良土壤效果明显

【中国农网】北大荒集团共青农场有限公司种养结合优化黑土地内在环境，使用了木本泥碳和土壤改良剂使耕地土壤有机质含量，作物产量和品质大幅提升。共青农场有限公司河北庄管理区种植户代淑清承包耕地180亩，2021年她在农场有限公司帮助下，与中国科学院南京土壤研究所进行为期三年的合作试验，通过以秸秆还田施入泥碳、有机肥施入泥碳、秸秆离田施入泥碳和常规种植施入泥碳等七种办法，不仅让她家耕地土壤有机质含量从2020年的26.32克提升至2021年的28.56克，同时也提高了作物产量，增加了经济效益。

链接:

<http://agri.ckcest.cn/file1/M00/10/03/Csgk0GKHIVuAFbFUAApBahgeTjA711.pdf>

5. 左右江革命老区——红土地上谋振兴 乡村处处换新颜

【农民日报】近年来，广西崇左市龙州县上龙乡充分挖掘红色旅游资源，着力打造“红军村”红色教育精品，经过多年的发展，乡村风貌焕然一新。眼下正值左右江畔桂芒挂果时。左右江革命老区广西百色市，如今已是全国最大的芒果生产基地，2021年全市芒果产量约占全国总量的24%，年产值超过50亿元，10余万农户从中受益。“高铁通过村，产业路修到家。”田东县林逢镇东养村党总支书记、村委会主任陆秀缎说，凭借气候、土壤等自然资源优势，当地将芒果打造成巩固拓展脱贫攻坚成果、实施乡村振兴战略的支柱产业之一。包括百色在内的左右江革命根据地，曾在中国革命战争史上留下浓墨重彩的一笔。2015年《左右江革命老区振兴规划》获得批复，2020年底，左右江革命老区230.3万建档立卡贫困人口全部脱贫，28个贫困县全部摘帽。党的十八大以来，老区各族人民赓续红色精神踔厉笃行，立足独特区位优势，围绕林果蔬畜糖等特色资源，打造

出一批特色农业产业集群，持续推动脱贫安边、致富守边，昂首阔步迈向振兴新发展。

链接:

http://agri.ckcest.cn/file1/M00/10/03/Csgk0GKHmgOAH_9SABofNTDgvdc189.pdf

6. 河南省西峡县：用高质量发展守好源头碧水

【中国农网】河南西峡，山林深而水清冽，伏牛高而泉流长。其境内鹮河纵贯全境，直注丹江口水库。作为南水北调中线工程的核心水源区，西峡县汇水区面积占河南省的40%，占整个丹江口库区的14%，肩负着“一河清水入丹江、一渠清水送京津”的使命。面对保护水质这一长期重任，如何做好“水”文章，实现产业发展与保护水源水质的双重任务？近年来，西峡县通过强化水源保护，坚持发展绿色，走出了一条高质量跨越式发展之路。

链接:

<http://agri.ckcest.cn/file1/M00/03/31/Csgk0YbeRtaAQnCPAA9wzIVYpXg013.pdf>

【文献速递】

1. Translating wastewater reuse for irrigation from OECD guideline: Tramadol sorption and desorption in soil-water matrices

文献源: sciencedirect,2022-05-20

摘要: Treated and untreated wastewater is often used for agricultural irrigation and, despite the many benefits of this practice, it poses the risk of biologically active chemical pollutants (such as pharmaceuticals, like tramadol) entering the environment. The partitioning of tramadol between soil/water at environmentally relevant concentrations is important to understand its environmental toxicity. Kinetics and isotherm sorption studies based on the Organisation for Economic Cooperation and Development (OECD) 106 Guideline were undertaken, ensuring comparability to previous studies. Studies were undertaken in three soils of different characteristics using aqueous concentrations of tramadol from 500 ng L⁻¹ (environmentally relevant) to 100 µg L⁻¹ (comparable to previous studies). Two of the soils presented a significantly ($p < 0.05$) higher sorption at a lower initial tramadol concentration (5000 ng L⁻¹), compared to 20,000 ng L⁻¹. Hysteresis was observed in all studied soils, indicating the accumulation of tramadol. Higher sorption to soils correlated with higher clay content, with soil/water partitioning coefficients (K_d) of 5.5 ± 13.3 , 2.5 ± 3.8 and 0.9 ± 3.0 L kg⁻¹ for soils with clay contents of 41.9%, 24.5% and 7.4%, respectively. Cation exchange was proposed as the main sorption mechanism for

tramadol to soils when the pH was below tramadol's pKa values (9.41 and 13.08). A comparative kinetics study between tramadol in soil/calcium chloride buffer and soil/wastewater effluent demonstrated significantly higher ($p < 0.05$) tramadol sorption to soil from wastewater effluent. This has the environmental implication that clay soils will be able to retain tramadol from irrigation water, despite the organic content of the irrigation water. Therefore, our studies show that tramadol soil sorption is likely to be higher in agricultural environments reusing wastewater than that predicted from experiments using the OECD 106 Guideline calcium chloride buffer.

链接:

<http://agri.ckcest.cn/file1/M00/10/04/Csgk0GKHv-GAU8iBATelrCNVTvs644.pdf>

2. Bias correction of satellite soil moisture through data assimilation

文献源: sciencedirect,2022-05-20

摘要: Soil moisture exhibits great spatio-temporal heterogeneity and plays a critical part in land surface energy and water cycles, being identified as a terrestrial essential climate variable. Thus, it is urgently needed in a wide variety of environmental processes such as hydrology, meteorology, agriculture, and ecology. Microwave remote sensing has the potential to provide near real-time soil moisture estimates on large spatial scales according to the distinctive contrast between dielectric properties of water and dry soils. Thus, many space-borne microwave sensors have been launched for retrieving soil moisture. Especially, SMOS and SMAP at L-band frequency (1.4 GHz) supply an unprecedented opportunity for retrieving surface soil moisture due to their deeper penetration than instruments at other bands. However, these satellite soil moisture products need bias correction before application such as data assimilation. Two common correction methods require reliable land surface soil moisture simulations. However, the quality of these simulations relies heavily on model parameters, such as soil porosity and texture, which are almost unavailable in remote regions such as the Tibetan Plateau. In this study, a dual-cycle assimilation algorithm is taken to make on-line bias correction when assimilating SMAP soil moisture products. During the assimilation, a linear bias correction scheme is regarded as the observation operator to link the simulated soil moisture values and the satellite retrievals. In the inner cycle, a sequentially based assimilation algorithm is run with both model parameters and bias correction coefficients, which are provided by the outer cycle. At the same time, both the analyzed soil moisture and the innovation are reserved at each analysis moment. In the

outer cycle, the innovation time series kept by the inner cycle are fed into a likelihood function to adjust the values of both model parameters and correction coefficients through an optimization algorithm. A series of numerical experiments are designed and conducted, indicating that the soil moisture estimates by the presented algorithm are superior to those with the existing bias correction schemes.

链接:

<http://agri.ckcest.cn/file1/M00/10/04/Csgk0GKJCgOATBzaAPzqv1SH8ys162.pdf>

3. Historical and future Palmer Drought Severity Index with improved hydrological modeling

文献源: sciencedirect,2022-05-20

摘要: With the ongoing climate warming, changes in drought and the adverse effects on water resources, food production and ecosystem functioning have been key research topics of ever-increasing interest. The Palmer Drought Severity Index (PDSI) is among the most widely used indicators for drought monitoring and research. However, the two-layer bucket water balance model embedded in the original PDSI model has been criticized for being over-simplified to accurately quantify the surface water balance and therefore raising uncertainties in the subsequent PDSI estimates (PDSI_{original}). Here we improve the water balance calculations in the PDSI model by using direct hydrological outputs from physically-based, more sophisticated global hydrological models (GHMs) participated in the Inter-Sectoral Impact Model Inter-Comparison Project (ISIMIP). Validation results show that the estimated runoff (Q) and evapotranspiration (ET) from ISIMIP GHMs perform much better than those from the original PDSI two-layer bucket model in capturing the long-term trend and monthly variabilities of Q and ET, especially in cold regions and relatively dry areas, using observed Q (at 2191 catchments) and an independent satellite-based ET product (the Global Land Evaporation Amsterdam Model, GLEAM; over the entire terrestrial environment) as the reference. In addition, the new PDSI estimates with improved hydrological modeling (PDSI_{ISIMIP}) exhibit a significantly stronger correlation with observed Q than PDSI_{original} in nearly all studied catchments, suggesting that PDSI_{ISIMIP} is superior to PDSI_{original} in capturing hydrological droughts. We further compare the long-term PDSI trends and changes in drought using PDSI_{original} and PDSI_{ISIMIP} under both historical climate (1900-2005) and future climate change scenarios (2006-2099). We find that PDSI_{original} and the PDSI_{original}-identified land areas under drought generally show a

larger trend than those based on PDSI/SIMIP. For future climate change scenarios, the PDSI/original-projected increasing trend of land proportion under drought is about two times larger than that assessed with PDSI/SIMIP, implying that PDSI/original may largely overestimate future drought increases, as commonly done in existing studies. In this light, our approach of directly using hydrological outputs from physically-based, more sophisticated GHMs provide an effective, yet relatively simple approach to reduce uncertainties in PDSI estimates thereby achieving a better prediction of drought changes under warming.

链接:

<http://agri.ckcest.cn/file1/M00/10/04/Csgk0GKHvdyAcWfOAgwTKU16HNw900.pdf>

4. 基于广义可加模型的广东省森林土壤有机质影响因子

文献源: 中国无机分析化学,2022-05-20

摘要: 有效钼是土壤质量评价不可缺少的指标,为准确高效测定土壤中的有效钼,样品采用Tamm溶液进行浸提,浸提液用硝酸(5%)稀释10倍,确定了分析元素钼的同位素⁹⁵Mo,¹⁰³Rh为内标,校正基体干扰和信号漂移,优化了仪器分析参数,利用电感耦合等离子体质谱仪(ICP-MS)碰撞模式(KED模式)下进行有效钼的测定,建立的标准曲线相关系数为1.00,方法的检出限(3 σ)为0.002 μ g/L,对3个国家一级标准物质样品进行土壤中有效钼含量的平行测定,相对误差小于2%,相对标准偏差(RSD)小于5%,对200余件实际样品进行不同方法外检比对,合格率为98%。方法具有操作简单、方便快捷,经济适用等特点,适合于各生产实验室各种类型土壤样品有效钼的大批量分析。

链接:

<http://agri.ckcest.cn/file1/M00/03/32/Csgk0YbeazeAUZZmAFx5quXrmTA536.pdf>

5. 新疆无膜棉不同灌溉条件下土壤水分时空变化特征

文献源: 西北农业学报,2022-05-19

摘要: 旨在研究新疆不同灌溉条件下无膜棉田土壤水分时空变化特征,以‘中棉619’为供试品种,新疆常规膜下滴灌模式为对照(CK),无膜棉田设置6次(wmm1)、8次(wmm2)、10次(wmm3)3个不同的灌水处理,开花前每个处理灌水量均为45mm,开花后灌水量均为69mm,wmm3最后一次灌水量为52.2mm。结果表明:灌水次数较少的处理wmm1、wmm2,土壤水分的垂直分布特征为随着土层深度的增加先增加后减少,wmm3及CK土壤水分垂直分布特征为先增加后减少再增加,CK与无膜处理相对湿润区域存在差异。初花期地膜覆盖保水效果明显,但是随着生育进程的推进以及灌水次数的增加,wmm3处理

10~50cm土层土壤含水量与CK持平,50~90cm土层土壤含水量明显高于其他处理,wmm1处理除50~70cm土层外,含水量下降速度最快、含量最低。盛花期前后各处理的耗水量差异显著,最大耗水量出现的日期差异显著,wmm3自开花后耗水量显著高于其他处理。因此,可通过优化灌水量及次数提高水分利用率。

链接:

<http://agri.ckcest.cn/file1/M00/10/04/Csgk0GKHuNWAJeS-AHnrm81oBa4326.pdf>

6. 不同干燥方式对喀斯特流域土壤氮形态测定的影响

文献源: 地球与环境,2022-05-18

摘要: 不同预处理方式对不同类型土壤样品氮含量的分析结果具有不同程度的影响,尤其是对喀斯特流域石灰性土壤氮含量测定影响的相关研究较少,其影响程度和机理尚不清楚。本研究通过采集喀斯特流域乌江中上游四种不同土壤质地表层土壤(0~20 cm),对比了实验室内不同干燥方式和野外现场提取对氮含量测定结果的影响。结果发现石灰性土壤在干燥过程中,不同氮形态含量总体均表现出烘干土>风干土>新鲜土,表明烘干和风干过程会造成氮含量的测定结果相对于现场提取有不同程度的增加。在不同温度烘干过程中,NH₄⁺-N和有机氮(Norg)的增加量与温度成正比,并且在不同的温度条件下可能受不同氮转化机理的控制,升温会促进土壤的矿化作用以及Norg的转化,而当温度较高(105℃)时,土壤中氮的增加还可能来自于微生物自身在高温条件下的分解;烘干过程中,不同温度处理下的NO₃⁻-N含量之间没有明显差异,但均显著高于现场提取测定的结果,其中40℃下的烘干土中NO₃⁻-N含量最高,表明在该温度条件下硝化作用和矿化作用达到峰值,造成了NO₃⁻-N的累积。不同质地的土壤在干燥过程中各氮形态的增加量也有差异,可能由于不同土壤中微生物种类和活性的差异在烘干过程中对氮的固定效率不同。本研究明确了喀斯特流域石灰性土壤中不同形态氮在不同预处理方式下具有区别于其它地区土壤的特征,研究结果可以为未来研究喀斯特地区土壤氮循环过程以及氮评价等提供参考和技术示范。

链接:

<http://agri.ckcest.cn/file1/M00/03/32/Csgk0YbeaOeAIlxRALQoes9NDEU474.pdf>

7. 灌溉方式对石灰性褐土团聚体分布特征、稳定性及养分含量的影响

文献源: 中国生态农业学报(中英文),2022-05-18

摘要: 为探明不同灌溉方式对石灰性褐土团聚体分布特征、稳定性及养分含量的影响,于2016—2021年在山西农业大学小麦研究所韩村实验基地开展大田定位试验。设连续微喷灌(SI)、连续滴灌(DI)、连续漫灌(FI)和第1、2、5年漫灌与第3、4年微喷灌轮

换 (RI) 4个处理。定位5年后, 测定 >0.25 mm团聚体重量百分含量(DR0.25、WR0.25)、平均重量直径(MWD)、几何平均直径(GMD)、破坏率(PAD)、分形维数(D)等土壤团聚体粒径分布、稳定性指标, 以及土壤水稳性团聚体有机碳、有效磷、速效钾含量等养分指标, 并对水稳性团聚体分布特征、稳定性及养分含量进行了相关分析。主要结果: 1)机械稳定性团聚体在0~10 cm土层SI、DI和RI处理均以0.5~1 mm为优势粒径(FI为 <0.25 mm), 在10~20 cm土层DI、FI和RI处理均以 >5 mm为优势粒径(SI为0.5~1 mm), 在20~50 cm土层各灌溉处理的优势粒径则均为 >5 mm; 水稳性团聚体在0~50 cm土层4种灌溉处理均以 <0.25 mm为优势粒径, 但FI处理的重量百分比最高。2) SI和DI处理在0~50 cm土层有效提高了WR0.25、降低了D, 且MWD、GMD总体上高于FI和RI处理, 并在30~50 cm土层显著降低了PAD, 而FI、RI处理的这些稳定性指标受土层深度影响较大。3)与其他2个处理相比, SI、DI处理在0~50 cm土层提高了土壤水稳性大团聚体(>0.25 mm)有机碳、有效磷、速效钾含量, 尤其在提高0~30 cm土层有效磷含量和30~50 cm土层速效钾含量上效果更为显著。4)相关性分析表明, 土层、WR0.25、MWD、GMD、PAD、D、水稳性大团聚体养分含量(有机碳、有效磷、速效钾)之间的相关性均达到显著($P<0.05$)或极显著($P<0.01$)水平。综上所述, 微喷灌、滴灌水肥一体化更有利于改善土壤结构和性状, 促进土壤大团聚体形成, 提高水稳性团聚体稳定水平及养分含量, 应值得推广应用。

链接:

<http://agri.ckcest.cn/file1/M00/10/03/Csgk0GKHt3GAfxK3ABJBZbrh90Q844.pdf>

8. 植物无土栽培技术研究进展

文献源: 中国农业大学学报,2022-05-05

摘要: 为了解植物无土栽培技术的发展, 以“无土栽培”、“基质栽培”、“雾培”和“水培”为关键词, 依据Web of Science、Pub-Med和知网等数据库, 检索了1989—2021年发表的相关文献, 对无土栽培发展历程、主要技术以及未来趋势进行了总结和分析。结果表明: 1)无土栽培包括水培、雾培、基质栽培等, 其中成本低、操作简单的基质栽培是主要方式, 而操作、成本均更高的雾培和水培在高效植物栽培工厂建设上潜力巨大; 2)探索高效、节水、可持续有机种植技术, 融合人工智能和物联网技术, 发展适配常规环境和恶劣环境的智慧农业是发展趋势之一; 3)针对室内及楼宇空间等个体化种植需求, 发展小型化、家庭化、精致化、智能化无土栽培技术是发展趋势之二; 4)密闭空间种植和太空种植技术的研究也将受到更多关注。

链接:

<http://agri.ckcest.cn/file1/M00/10/04/Csgk0GKHuvSAP7ZUABqbGaxtp-g239.pdf>

9. Microplastics in soil: Impacts and microbial diversity and degradation

文献源: sciencedirect,2021-12-08

摘要: Microplastics (MPs) are plastic particles less than 5 mm in size that have become a major environmental pollutant due to their ubiquitous and persistent nature. Microplastic contamination of the aquatic environment has received the most attention so far, whereas the current understanding of MP prevalence and its impacts in the terrestrial environment is largely limited. The MP contamination of soil can cause bioaccumulation and toxicity in terrestrial animals and plants, which can consequently affect human health. This review is aimed towards combining the available information on the occurrence, sources, and effects of MPs on the different aspects of the terrestrial environment and to highlight the limitations in our knowledge regarding the nature and impacts of MPs in soil. The review also highlights microbial degradation of MPs as an advancing research area, with numerous microorganisms being identified as capable of efficiently degrading this persistent contaminant.

链接:

http://agri.ckcest.cn/file1/M00/03/32/Csgk0Ybebc2AGW5sAH92UDf_Pyc192.pdf

【会议论文】

1. Towards Hybrid Smart Irrigation for Mixed-Cropping

发布源: IEEE

发布时间: 2022-05-17

摘要: Agricultural countries are facing water shortage problems. Due to mismanagement of the water distribution system and selection of inappropriate irrigation methods, water could be over-utilized that will affect crop production. Consequently, the economy of these countries could be badly affected. Moreover, water shortage problems also occur and the agriculturists bear financial losses as a result of this water scarcity. Existing irrigation systems are designed for specific crops cultivated in a season but that is not useful for other crops planned to be grown in the next season. Currently, the practice of mixed cropping is being used in the same agricultural field to gain more income in which farmers are growing vegetables with regular crops. For this practice, computerized systems are required for water scheduling among both crops. To cope up with these challenges, several Irrigation systems i.e. using WSNs, cloud-based, rule mining based and mobile-oriented solutions

using GPRS have been proposed in the literature. These systems are functioning on unidirectional data focusing on a single irrigation system at a time, hence are unable to address factual solutions. There is a fundamental need to develop smart context-aware irrigation systems with the ability to deal with multicropping/mixed cropping in a particular field. In this paper, a smart context-aware irrigation system has been presented to deploy automated hybrid irrigation methods for mixed cropping practices to achieve more yield production. The system entails three major parts: 1) WSNs based data acquisition systems, 2) Decision Support System and 3) Context-aware water scheduling. This system will help farmers in intensive farming of mixed cropping and cultivate large areas with less amount of water by applying three standard methods of irrigation according to the type and requirements of crops, land condition/soil types with context-awareness.

链接:

http://agri.ckcest.cn/file1/M00/10/03/Csgk0GKHoNmAMum_AAdFgJsSHes381.pdf

2. Wheat Crop Field and Yield Prediction using Remote Sensing and Machine Learning

发布源: IEEE

发布时间: 2022-05-17

摘要: Agriculture plays an important role in the growth of a country's economy. Crop area and yield predictions using machine learning are important investigation domains in current research fields. Wheat is the most important food crop in Pakistan which is cultivated in the Rabi season. Weather conditions, Remote Sensing (RS) data, and Machine learning (ML) technologies can be used to forecast wheat yield before actual harvesting to assist the management of wheat production, trade, and storage. In this paper, a supervised ML based framework is proposed that extracts features/Vegetation Indices (VIs) including Enhanced Vegetation Index (EVI), Normalized Difference Vegetation Index (NDVI), Red Edge Normalized Difference Vegetation Index (RENDVI), and Normalized Difference Moisture Index (NDMI) from Sentinel-2 Satellite images and contributes for: estimation of wheat area, and identification of most effective VIs in wheat area estimation, prediction of wheat yield, and identification of most effective VIs and meteorological parameters in wheat yield prediction. In the initial experimental setup, good performance output obtained using the Random Forest (RF) machine learning algorithm therefore in this framework RF machine learning algorithm is focused on wheat area estimation and generation of Land Use Land Cover (LULC) maps which is capable of estimating area with an accuracy of 84%, consumer's

accuracy of 81 %, producer's accuracy of 83% and kappa statistics of 0.80. LULC maps are used for wheat yield prediction. Multivariate regression forward stepwise technique is applied for yield prediction and selection of effective VIs and meteorological parameters. The adjusted coefficient of determination (R^2) between reported and predicted yield found 0.84 with an error of 46.14 Kg/ha for yield prediction.

链接:

<http://agri.ckcest.cn/file1/M00/03/31/Csgk0YbeUKOAWj59AAm-Vnj-BW8012.pdf>

3. A Deep Learning Approach to Mapping Irrigation Using Landsat: IrrMapper U-Net

发布源: IEEE

发布时间: 2022-05-16

摘要: Accurate maps of irrigation are essential for understanding and managing water resources. We present a new method of mapping irrigation based on an ensemble of convolutional neural networks that use reflectance information from Landsat imagery to classify irrigated pixels. The methodology does not rely on extensive feature engineering and does not condition the classification with land use information from existing geospatial datasets. The ensemble does not need exhaustive hyperparameter tuning and the analysis pipeline is lightweight enough to be implemented on a personal computer. Furthermore, the proposed methodology provides an estimate of the uncertainty associated with classification. We evaluated our methodology and the resulting irrigation maps using a highly accurate novel spatially-explicit ground truth data set, using county-scale USDA surveys of irrigation extent, and using cadastral surveys. We demonstrate the accuracy of the method by mapping irrigation over the state of Montana from years 2000- 2019. We found that our method outperforms other methods that use satellite remote sensing information in terms of overall accuracy and precision. We found that our method agrees better statewide with the USDA National Agricultural Statistics Survey estimates of irrigated area compared to other methods, and has far fewer errors of commission in rainfed agriculture areas. This methodology has the potential to be applied across the entire United States and for the complete Landsat record.

链接:

<http://agri.ckcest.cn/file1/M00/03/31/Csgk0YbeU2KAXo2yAFOmNdgeWQw919.pdf>

4. AN ENHANCED APPROACH FOR CROP YIELD PREDICTION SYSTEM USING LINEAR

SUPPORT VECTOR MACHINE MODEL

发布源: IEEE

发布时间: 2022-05-12

摘要: Smart Agriculture is an emerging progressing field which is used for the management of farming to increase the yield of the crops. Since India is a populated country, urge of food production also increases. This situation is one of the reasons that hindering the development of country. At present farmers get more yield for their crop, but the market price for that crop is very less. To conquer these problems, a machine learning technology is used. The prediction will assist the farmers to select whether the specific crop is suitable for certain season and crop price values. Prediction techniques like linear regression, SVM, KNN method and decision tree of machine learning is widely used in the field of agriculture. This paper proposes a novel method that would deliver suitable support vectors for a SVM classification based on auxiliary information. This optimized method is applied to a real time agricultural application situation which utilize accuracy classification in turn aid production management. The proposed SVM method gives an accuracy of 91% than the existing system. This method can be implemented in several government sectors like APMC, kisan call centre etc., by which the government and farmers can get the information of the future crop yield and the market price.

链接:

<http://agri.ckcest.cn/file1/M00/10/03/Csgk0GKHo4mAjyHGACLYjs5b9Y456.pdf>

5. A Time-Series Based Yield Forecasting Model Using Stacked Lstm To Predict The Yield Of Paddy In Cauvery Delta Zone In Tamilnadu

发布源: IEEE

发布时间: 2022-05-10

摘要: Cauvery delta zone in Tamilnadu is called as "Nerkazhanchiyam" (the land of Paddy) of the state, as it has the potential to produce paddy in huge quantity that can be suffice the need of the state. This zone includes the districts such as Thanjavur, Tiruvarur, Nagapattinam, Trichy and Cuddalore. These districts account for about 53% of production of paddy in the state. Increasing the production of paddy in Cauvery Delta Zone would satisfy the requirement of rice in the state on the whole. This will also have a substantial influence on both the farmer's and the nation's economy. Forecasting the production of crops beforehand could assist the farmers in improving their productivity. This necessitates the

design of a precise crop yield prediction model. Crop production in agriculture is primarily determined by a variety of factors that falls under three categories: technological (agricultural techniques, managerial decisions, etc.), biological (diseases, insects, pests, etc.), and environmental (climate change, etc.). Among these factors environmental factors pose a great challenge to the decision makers in developing a precise prediction model. Hence, it is proposed to develop a suitable yield prediction model to predict the yield of paddy in Cauvery delta region considering the environmental factors along with the supplied nutrients. The proposed prediction model makes use of Long Short Term Memory (LSTM) algorithm which is a popular deep learning algorithm, to forecast the yield of paddy. LSTM is well known for its better prediction using time series data. Performance of the proposed prediction model is measured using the training loss and validation loss.

链接:

<http://agri.ckcest.cn/file1/M00/03/31/Csgk0YbeVUiATVPQACv6RWjjRVc633.pdf>

6. IoT based Smart Irrigation Module for Smart Cultivation

发布源: IEEE

发布时间: 2022-05-09

摘要: Majority of the ranchers utilize enormous parts of cultivating area and it turns out to be exceptionally hard to reach and track each edge of huge terrains. At some point, there is a chance of lopsided water monetary misfortunes. Smart Irrigation system modules utilizing the latest IoT based sensors with optimal communication will be very much useful for efficient cultivation. The Smart irrigation-based system module is one such useful module, which has pulled in the interest of numerous specialists in this emerging area. Recent developments are focused on the development of IoT based smart irrigation modules for Controlled Environment Agriculture (CEA). An affordable and simple type of system module is developed by using Arduinobased modules for the irrigation controller system framework. These Arduino-based irrigation modules are helpful to manage different ecological factors like dampness, temperature, and measure of water needed by the harvests. Different sensors like water stream sensors and soil dampness sensors are used as part of the system module prototype development. Reports are gathered and analyzed by the Arduino-based controller for the standard estimations of various factors needed by harvest. In this paper, a NodeMCU based smart irrigation module is developed using sensors like Soil moisture sensor, Temperature sensor, and ESP8266 WiFi Module and tested.

链接:

<http://agri.ckcest.cn/file1/M00/10/03/Csgk0GKHpWiAB2cXACViKNza3bY683.pdf>

7. Crop Suitability Prediction Model for Malaysian Crop Diversification

发布源: IEEE

发布时间: 2022-05-02

摘要: Crop diversity is one of the important perspectives to be observed in agriculture. The crop diversity is significant for production stability as well as nutrition security. However, the crop diversity in Malaysia is inadequate as the agricultural activities are devoted to oil crop plantation. Therefore, this research aims to discover the suitable new tropical crops to be cultivatable in Malaysia for crop diversification. FAOSTAT was selected as data source, while Decision Tree, Random Forest and Artificial Neural Network were chosen for predictive model training. The Random Forest is having the highest accuracy among the modelling techniques. Therefore, Random Forest models were chosen as crop suitability predictive models to discover the suitable crop with Malaysian environmental data as input. There are nine tropical crops subjected to investigation. The crops are dates, sorghum, yams, avocados, kola nuts, chickpeas, lentils, sisal and fonio. Dates, sorghum, yams, avocados and kola nuts were predicted to be not suitable to the Malaysian environment. Whereas chickpeas, lentils, sisal and fonio were predicted to be cultivatable with the Malaysian environment. Unlike other crop diversification research that done on other countries, which are soybean cultivation in Europe, red kidney bean in Iraqi and Cassava in Thailand. This research investigated the potential of nine tropical crops besides soybean, red kidney bean and cassava. At the same time, the crop suitability was predicted with respect to Malaysian environment. Future works are suggested to investigate the procedure of new crop cultivation and the tactic to release the crop to the market.

链接:

<http://agri.ckcest.cn/file1/M00/03/31/Csgk0YbeVtuAO8vsAA-q7DOPnrc253.pdf>

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