中国工程科技知识中心

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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．从污染治理到减碳增汇 绿色兴农呈现良好态势

【农民日报】在全面推进乡村振兴的历史阶段，绿色发展既是基本要义，也是重要引领。尤其近年来，全球气候变化挑战突出，"碳达峰、碳中和"重大战略目标的提出，将绿色发展之路提升到新的高度。今年中央一号文件再次强调农业农村绿色发展，从推进面源污染治理、农业碳汇价值实现、乡村生态振兴指导等方面，提出了2022年推进农业农村绿色发展的工作思路和主要举措。

链接：

http://agri.ckcest.cn/file1/M00/03/35/Csgk0YcFurmAUAZiAAv6uDE9NS0022.pdf

【文献速递】

1．Hydrothermal carbonization improves the quality of biochar derived from livestock manure by removing inorganic matter

文献源：ScienceDirect,2022-06-19

摘要：The application of hydrothermal carbonization to improve biomass-derived energy sources is crucial because of insufficient supplies of fossil fuels and concerns associated with the impact of fossil fuels on the environment. Hydrothermal carbonization technology has been developed to circumvent the energy-intensive drying step required for the thermal conversion of high-moisture organic feedstocks into fuel. In this study, the quality of livestock manure was upgraded, and its energy density was increased through hydrothermal carbonization at various temperatures. The evolution of waste biomass under hydrothermal carbonization was chemically analyzed. The increased carbon content of the resulting biochar upgraded its fuel properties, leading to energy savings in the treatment process. After hydrothermal carbonization, the H/C and O/C ratios were lower owing to chemical

conversion. The optimal temperature for hydrothermal carbonization was approximately 220 ℃.. The inorganic content resulted in a lowered degree of agglomeration and reduced the likelihood of fouling during combustion. The thermogravimatric analysis also provided the changing combustion characteristics due to the increased fixed carbon content. Fourier transform infrared spectra revealed that hydrothermal carbonization reaction reduced the numbers of CO and CH functional groups and increased the number of aromatic CH functional groups. The equilibrium moisture content decreased rapidly when hydrothermal carbonization was conducted at temperatures higher than 200℃., and the initial moisture content was reduced by 75% after hydrothermal carbonization at 300℃.

链接:

http://agri.ckcest.cn/file1/M00/03/34/Csgk0YcFopCAMCz5ABPmWzmGlIk934.pdf

2．Model-based evaluation of rainfed lowland rice responses to N fertiliser in variable hydro-edaphic wetlands of East Africa

文献源：ScienceDirect,2022-06-18

摘要：In East Africa, rainfed lowland rice is primarily produced by smallholders in alluvial floodplain and inland valley wetlands. These wetlands differ in their dominant soil types and water regimes that vary seasonally, inter-annually and between field positions. Yield responses to mineral nitrogen (N) fertiliser thus likely vary between and within wetlands and years, modulating the profitability of N fertiliser use. Therefore, the locally-validated APSIM model was used to study yield responses to N fertiliser rates (0, 30, 60, 90, 120, and 150 kg ha) and supplemental irrigation at different field positions in a floodplain in Tanzania (fringe and middle positions) and an inland valley in Uganda (valley-fringe, mid-valley and valley-bottom positions) over 30-years. Average rainfed yield gains with mineral N and N use efficiencies were high, ranging between 1.7 and 4.5 Mg ha-1 in the middle positions of the floodplain, and 60150 kg ha-1 in the mid-valley and 90150 kg ha-1 in the valley-bottom positions of the inland valley. In the valley-fringe position, N fertiliser use was comparatively riskier and profitable only in 7790% of years at N rates of 60150 kg ha-1. Supplemental irrigation may help boost N fertiliser use efficiencies and use profitability with average yield gains of > 1.5 and > 0.4 Mg ha-1 in the floodplain and inland valley, respectively, while simulated spatial-temporal water stress pattern may help guide efficient irrigation scheduling.

链接:

3．Agricultural Innovization: An Optimization-Driven solution for sustainable agricultural intensification in Michigan

文献源：ScienceDirect,2022-06-18

摘要：Humanity, now increasingly populous and affluent, poses a new challenge for the twentieth-first century farmer: increase food supply while maintaining the earth's underlying ecosystems. This paper proposes a novel systems approach, agricultural innovization, to sustainably increase food production. Innovization applies the knowledge obtained through multi-objective optimization to discover new agricultural management practices which reduce the risk of climate variabilities on crop yields. In agricultural innovization, an optimization platform generated the near-optimal management actions for 30 years using a calibrated crop model for maize. From those near-optimal solutions, recommendations for improving management practices were data mined. Then these improved recommended practices were evaluated over 420 validation seasons. The validation results were promising as the recommended practices obtained from the innovization increased yields and generated no negative change in nitrogen leaching. Furthermore, these recommendations can be applied to future seasons of management, which makes them a fully predictive application of multi-objective optimization.

链接:

4．Multi-factor decomposition and multi-scenario prediction decoupling analysis of China's carbon emission under dual carbon goal

文献源：ScienceDirect,2022-06-18

摘要：Comprehensively clarifying China's carbon emission factors and formulating effective strategies are essential and significant for achieving the "3060" dual carbon target. This manuscript proposed a novel hierarchical framework of multi-factor decomposition, comprehensive evaluation, prediction, and decoupling analysis of the carbon emission. The multi-factor decomposition model from the perspectives of energy, economy, and society based on the expanding the Kaya Identity and LMDI decomposition method can provide the quantification results. On this basis, this manuscript applies the entropy weight method to construct the evaluation system and generate the index from the environment, energy, and

economy dimensions for China's six power generation modes. Furthermore, the carbon emission dynamics model is built based on the carbon emission data in the past 40 years and used to predict China's carbon emission in the next 40 years under multi scenarios combined with Tapio's decoupling theory. The results show that income per capita and thermal power generation result in carbon emission, while energy price and intensity are decreasing. Moreover, reducing energy consumption and increasing the proportion of renewable energy are effective ways to make China's carbon emission peak in 2030, with a peak value of 12.276 billion tons. Eventually, with policies implemented, carbon emission, economic growth, and social development are predicted to reach a strong decoupling state, indicating long-lasting negative correlations. In summary, this study will provide a comprehensive analytical solution for factor decomposition, integrated assessment, and predictive decoupling of carbon emission from a national level, aiming to provide scientifically reasonable suggestions for policies and regulations for the "dual carbon" goal.

链接:

http://agri.ckcest.cn/file1/M00/10/06/Csgk0GKu88GAHjehABwvkyoGVpE926.pdf

5．A novel model for water quality prediction caused by non-point sources pollution based on deep learning and feature extraction methods

文献源：ScienceDirect,2022-06-18

摘要：Non-point source (NPS) pollution is an important factor affecting the quality of water environment. In recent years, a large number of online water quality monitoring stations have been used to obtain continuous time series water quality monitoring data. These data provide the necessary basis for the application of deep learning methods in water quality prediction. However, the prediction accuracy of traditional deep learning methods is low, especially in predicting the water quality with NPS pollution. Aiming to address this limitation, a novel deep learning model named SOD-VGG-LSTM with the simulation-observation difference (SOD) modular based on physical process, the visual geometry (VGG) modular reflecting spatial characteristics, and the long short-term memory (LSTM) modular based on deep learning method was developed to improve the accuracy of the water quality prediction with NPS pollution. The established model can overcome the problem that mechanism models can not predict the changes of water quality on the hourly or minute time scale. The model was applied in Lijiang River watershed. Experimental results indicated that the proposed model had the highest accuracy in the extreme value

prediction compared with the mechanism model and LSTM model. The maximum relative errors between the predicted and observed results for DO, CODMn, NH3-N, and TP were 8.47%, 19.76%, 24.1%, and 35.4%, respectively. The model evaluation demonstrated that the established SOD-VGG-LSTM model achieved superior computational performance compared to Auto Regression Integreate Moving Average model (ARIMA), Support Vector Regression model (SVR), and Recurrent Neural Network model (RNN). The evaluation results showed that SOD-VGG-LSTM achieved 3.2 - 39.3% higher R2 than ARIMA, SVR and RNN. The proposed model can provide a new method for water quality prediction with NPS pollution.

链接:

http://agri.ckcest.cn/file1/M00/10/06/Csgk0GKu8S6AQS0iAC0sQ44Dyrs383.pdf

6．不同炭硅处理对水稻抗倒伏特性和产量的影响

文献源：中国稻米,2022-06-17

摘要：以越光品种为试验材料,研究了生物炭与硅肥配施对水稻抗倒伏特性、茎秆强度、化学物质含量、酶活性的影响及相互关系。结果表明,花生壳生物炭与硅肥配施显著降低了水稻节长,增加了茎粗,进而降低了水稻的倒伏指数和倒伏面积率,并提高了茎秆中的淀粉、木质素和纤维素含量及木质素关键酶活性。其中,7.5 t/hm~2生物炭与45kg/hm~2硅肥基施、叶面喷施0.02%硅肥的处理表现最优,该处理显著增强了越光的抗倒伏性,第1、第2和第3节的倒伏指数分别比对照下降36.42%、30.19%和26.83%,并实现了增产。相关分析表明,水稻的倒伏指数、倒伏面积率与茎秆强度呈极显著负相关;茎秆中淀粉、纤维素和木质素含量与茎秆强度呈显著或极显著正相关,与倒伏指数和倒伏面积率呈显著或极显著负相关;木质素含量与PAL、TAL、4CL和CAD等酶的活性呈显著正相关。研究结果可为优质水稻越光的抗倒伏栽培提供科学依据和技术支持。

链接:

http://agri.ckcest.cn/file1/M00/03/34/Csgk0YcEQH6AJon9AAzkdRI-Pe8090.pdf

7．基于信息熵特征选择的小麦冠层叶绿素估测方法

文献源：农业机械学报,2022-06-16

摘要：为运用图像颜色特征估测作物的叶绿素含量,以自然环境下的小麦冠层图像为研究对象,提出一种基于熵权法的颜色特征选择方法,并应用机器学习方法建立小麦冠层叶绿素含量估测模型。熵权法通过信息熵来衡量颜色特征指标权重,实现冠层图像特征排序,机器学习方法选用多元线性回归（Multiple linear regression， MLR）、岭回归（Ridge regression， RR）和支持向量回归模型（Support vector regression， SVR）对小麦冠层

叶绿素含量估测。实验结果表明，与皮尔逊相关系数法和主成分分析法选取的特征集进行对比，熵权法得到a*、R-B-G、R-G、（a*+b*）/L、a*/b*、（R-G）/（R+G+B）、（R-B）/（R+B）、H/S、（R-G）/（R+G）等9个特征组成的特征集，可以利用较少的特征指标达到最优的预测效果。在选取相同特征指标参数的情况下，SVR的预测能力优于其它模型，其R2和RMSE的平均值分别为0.80、1.89，相比于MLR和RR模型R²分别提升2.8%、1.1%，RMSE分别下降0.13和0.05。将基于熵权法建立的SVR模型应用到2021年采集的小麦冠层图像数据，结果表明模型具有很好的稳定性。

链接:

http://agri.ckcest.cn/file1/M00/10/06/Csgk0GKtkwSAc4aQABO8WCTnQ4M442.pdf

8．基于Sentinel卫星的时间序列田块尺度LAI重建与冬小麦估产

文献源：农业机械学报,2022-06-16

摘要：为了进行田块尺度的冬小麦单产估测，以陕西省关中平原为研究区域，基于Sentinel-1、Sentinel-2和Sentinel-3卫星数据反演叶面积指数（LAI），并利用增强的深度卷积神经网络融合模型（EDCSTFN）和增强的时空自适应反射率融合模型（ESTARFM）对Sentinel-1、Sentinel-2和Sentinel-3 LAI进行时空融合，进而重建12 d尺度的20 m空间分辨率LAI并用于冬小麦单产估测。结果表明，基于Sentinel-1后向散射系数和相干性能够准确地反演关中平原冬小麦种植区的20 m空间分辨率LAI，决定系数(R2)在冬小麦主要生育期可达0.70以上；相比于基于Sentinel-2和Sentinel-3的ESTARFM模型和EDCSTFN模型（EDCSTFN__S3），基于Sentinel-1和Sentinel-2的EDCSTFN模型（EDCSTFN__S1）可以明显提高距离参考影像获取日期较远的日期的LAI时空融合精度，ESTARFM、EDCSTFN__S3和EDCSTFN__S1 3个模型在5月下旬的融合结果对应的R²分别为0.53、0.71和0.76；基于时空融合LAI的冬小麦估产结果与冬小麦单产数据具有良好的相关性(R² = 0.52，P ＆lt; 0.01)，估产结果的均方根误差为358.25 kg/hm²，归一化均方根误差为19%，平均相对误差为7.34%，并显示了丰富的田块尺度冬小麦单产分布细节特征，展现了进行田块尺度冬小麦精确估产的潜力。

链接:

http://agri.ckcest.cn/file1/M00/10/06/Csgk0GKtkISAA-tVABwP2CeSji0465.pdf

9．基于改进YOLOX-Nano算法的柑橘梢期长势智能识别

文献源：华南农业大学学报,2022-06-10

摘要：采用机器视觉技术开展柑橘梢期的智能感知技术的研究，以解决背景与目标颜色相似造成识别精度低的问题，实现柑橘梢期自动监测，探索算法的改进方法。根据不同

卷积层提取特征的特点与不同注意力机制的作用，提出了一种基于多注意力机制改进的YOLOX-Nano智能识别模型，建立多元化果园数据集进行预训练。改进的YOLOX-Nano算法使用果园数据集作为预训练数据集后，各类别AP的平均值（mean Average Precision，mAP）达到88.07%。与YOLOV4-Lite系列模型相比，本文提出的改进模型在使用较少的参数和计算量的情况下，识别精度有显著的提升，相比于YOLOV4-MobileNetV3与YOLOV4-GhostNet mAP分别提升6.58%和6.03%。改进后的模型在果园监测终端的轻量化部署方面更具有优势，为农情实时感知和智能监测提供了可行的数据和技术解决方案。

链接:

http://agri.ckcest.cn/file1/M00/03/34/Csgk0YcERN-AQZJdABs5DbpQwj4866.pdf

10．一种结合双注意力机制和层次网络结构的细碎农作物分类方法

文献源：计算机科学,2022-06-09

摘要：细碎农作物由于单一样本的尺寸较小，单一样本之间具有一定的差异性，不能代表整个样本的特征，并且同种样本的不同等级在形状和颜色上非常相似，使得细碎农作物图像识别具有非常大的挑战性。目前，对干茶叶、大米、大豆等细碎农作物的图像分类方法的研究较为匮乏，并且研究数据集大多是在实验室环境下使用专业的设备进行拍摄的，这给实际应用带来了困难。为此，提出了一种使用手机对细碎农作物样本进行图像采集和处理的方案，并以茶叶和大米样本为例，设计了一种结合双注意力机制的层次网络结构，通过粗粒度-细粒度的分类过程，先进行粗粒度分类，即样本的不同类别，然后结合注意力机制，使网络更加关注同种类别下不同等级的样本之间的差异，从而更精确地对样本进行等级分类。最后，所提方法在采集的数据集上达到了93.9%的识别精度。

链接:

http://agri.ckcest.cn/file1/M00/03/34/Csgk0YcEQhmAQpZMAA5z-aDOFtc322.pdf

11．基于THz-TDS技术的培氟沙星和氟罗沙星抗生素定性定量检测研究

文献源：光谱学与光谱分析,2022-06-07

摘要：作为两种常用的喹诺酮类抗生素，培氟沙星和氟罗沙星残留问题引起人们的高度关注，研发快速、高效的检测手段成为一种需求。采用太赫兹时域光谱（THz-TDS）技术对鱼粉基质中的培氟沙星、氟罗沙星进行了研究。制备培氟沙星、氟罗沙星、聚乙烯和鱼粉纯净物质以及培氟沙星-鱼粉和氟罗沙星-鱼粉17种不同浓度二元混合物的压片样品，共106个；对所有压片样品进行太赫兹光谱测量和分析；利用连续投影算法（SPA）结合支持向量机（SVM）和反向传播神经网络（BPNN）建立定性判别模型，对培氟沙

星-鱼粉和氟罗沙星-鱼粉这两种混合物进行分类判别；利用特征频率处吸收系数建立偏最小二乘回归（PLSR）、 BPNN、多元线性回归（MLR）定量预测模型，分别对两种混合物进行定量预测。结果表明：纯净培氟沙星在0.775和0.988 THz存在明显吸收峰，纯净氟罗沙星在0.919和1.088 THz存在明显吸收峰，聚乙烯对太赫兹波基本没有吸收，鱼粉无吸收峰，两种抗生素与鱼粉混合后的峰值出现在纯净抗生素的吸收峰附近；在定性判别中，SVM判别结果最佳，预测集判别准确率、精确率、召回率、F1得分分别为97.06%,97.22%, 97.06%和97.06%;定量回归中，SPA-BPNN模型用于预测培氟沙星-鱼粉结果最佳，预测集相关系数（Rp）、预测集均方根误差（RMSEP）分别为0.984 9和0.009 5, SPA-MLR模型用于预测氟罗沙星-鱼粉结果最佳，Rp和RMSEP分别为0.982 7和0.040 6。研究表明THz-TDS技术对鱼粉基质中培氟沙星、氟罗沙星进行定性定量检测是可行的，为畜禽行业中培氟沙星和氟罗沙星实际检测提供理论和技术参考。

链接:

http://agri.ckcest.cn/file1/M00/03/34/Csgk0YcEQ1mAbrUTAAjRhVzPigs650.pdf

12．耦合气象影响因素和Logistic方程的水稻纹枯病发病等级动态预测模型研究

文献源：植物保护,2022-06-02

摘要：本文基于植保、气象等数据研究水稻纹枯病发病等级-时间动态的预测方法和模型。利用2010年-2016年湖南省12个县的植保调查数据和气象观测值，以水稻纹枯病流行机理为基础将Logistic方程与构建的温度影响模块和湿度影响模块耦合，建立Logistic-RICEBLA病害预测模型。通过对模型参数进行调优、训练和验证，实现对水稻纹枯病发病等级的动态预测。结果表明，Logistic-RICEBLA模型能够较好地响应温度、湿度等气象条件的变化，模型预测结果与实际的水稻纹枯病发病等级-时间变化曲线具有较高的一致性。经验证，模型预测结果在单时相上精度达到R^2=0.68,RMSE=1,容错准确率P__bias=88%,表明预测值与实际发病等级的误差基本控制在±1级范围内。在多时相整体趋势的验证方面，模型预测的病害流行曲线下面积（AUDPC）与病害实际发展的AUDPC保持高度一致性，决定系数（R^2）达到0.86,表明模型能给出纹枯病在水稻不同生育期发病等级变化的整体趋势。本研究构建的Logistic-RICEBLA模型能由简单的气象数据和植保数据驱动，对水稻纹枯病发病等级进行动态预测，有助于在植保管理中及时掌握区域中病害发生发展的趋势，为水稻病害统防统治等防控工作提供参考。

链接:

http://agri.ckcest.cn/file1/M00/10/06/Csgk0GKtkiCAHqi8AAyXyGGQZrk776.pdf

【会议论文】

1．A Study of Efficient Management of Nutrients in Fertilizers using IoT and ML

发布源：IEEE

发布时间：2022-06-16

摘要：Agriculture is a very important and major source of the economy in the country. IOT and machine learning are important technologies to build model for better production of the crop. Yield prediction and observation of fertilizers in the nutrients model is very much required for the farmers to analyze the yield and fertilizer loss in nutrients due to rain, cyclones etc. The model connects sensors with Internet of Things and sensor output will be given to the Model and the decision of yield prediction and nutrients loss decision by efficient machine learning algorithm will be informed to the formers through user friendly application.

链接:

http://agri.ckcest.cn/file1/M00/10/07/Csgk0GKvCP6AEornAAilI01Mb0o208.pdf

2．Intelligent System to Analyse Plant Diseases using Machine Learning Techniques

发布源：IEEE

发布时间：2022-06-16

摘要：Agriculture is the main backbone occupation for Indians. It is critical to diagnose plant illnesses early in order to avoid crop loss and disease spread. The disease is apparent on the leaves of most plants, including apple, tomato, cherry, and grapes. These observable patterns can be recognized in order to accurately forecast the disease and implement preventative measures early on. To overcome this, it's better to use two techniques one is machine learning and another one is deep learning. So, this paper proposes a system for identifying plant disease (tomato, corn, paddy, and cotton) from their leaf photos. The method is carried out using the machine learning technique that is Support Vector Machine and the deep learning technique called Convolutional Neural Network. After the algorithms have been trained on the dataset, the accuracy of the algorithms is compared, the photos are categorised, and preventions for unhealthy plants are proposed.

链接:

http://agri.ckcest.cn/file1/M00/03/35/Csgk0YcFuUKAWcBIAAjca3ZfK1U944.pdf

3．IoT Implementation and Impacts in Agricultural Sector

发布源：IEEE

发布时间：2022-06-16

摘要： In this contemporary era, agriculture industry has grown the tendency of using advanced technological applications in the agricultural activities to enhance sustainability and growth of the industry. IoT is one of the advanced technological applications, which is specifically used by the players of the agriculture industry to attain growth and sustainability. Most importantly, IoT in the agricultural industry is implemented to help farmers in monitoring valuable information like humidity, soil quality, and air temperature with remote sensors. Most importantly, utilisation of IoT in the agricultural industry helps the farmers to improve the level of yields. Apart from these, IoT also helps the farmers to ensure effective planning on efficient irrigation. Overall, implementation of IoT is helpful in making potential harvest forecasts. These aspects are necessary in improving the sustainability and growth of the agricultural industry. Relevant objectives for this research work are developed, which are perfectly aligned with the selected research article. Help of different theories are taken to construct the literature review section of this research article. The researcher of this study has decided to adopt qualitative research methodology in order to achieve the goal of the research. Most importantly, secondary data collection approach has been considered to collect authentic data for this investigative study. In the data analysis and finding's part, different tools of IoT used in agricultural industry have been identified. Different associated challenges also have been found out. At last, some potential strategies are recommended to overcome the identified challenges in the findings section of the research.

链接:

http://agri.ckcest.cn/file1/M00/10/07/Csgk0GKvCBOAS2h9ABN9zvfI2LI054.pdf

4．A review on Smart Agricultural Applications: Crop yield and Plant disease Prediction

发布源：IEEE

发布时间：2022-06-16

摘要：Internet-of-Things (IoT) is considered as a type of large-scale and distributed network, which consists of massive low-cost, and battery-constrained sensor nodes deployed in the environment. In traditional networks, sensor nodes perceive environmental information periodically and trans mit the collected data to the base station or sink node for analysis. IoT finds valuable application in many research areas and particularly, in agricultural applications mainly, disease prediction, and yield prediction. There are so many methods existing in the literature to facilitate an effective prediction in agricultural applications.

Hence, this survey analyzes the existing research concentrating on prediction problems associated with IoT agricultural applications, bringing into light various shortcomings of existing methodologies for prediction problems associated with IoT-agricultural applications. Here, analysis of various methods is facilitated based on several factors, such as performance metrics, year of publication and journals, achievements of the techniques in numerical evaluations, and so on. On the other hand, an analysis of the methods concerningthe merits and demerits of the methods are presented. Lastly, the paper discusses potential future research directions and challenges in achieving better prediction accuracy in smart agricultural applications.

链接:

http://agri.ckcest.cn/file1/M00/03/35/Csgk0YcFtFWAYlL_AAarT9tFBJc181.pdf

5．Research on the Application of Virtual Reality Technology in Agriculture under the Background of Rural Revitalization under the Background of Big Data

发布源：IEEE

发布时间：2022-05-26

摘要：Virtual reality technology is called one of the most innovative technologies in the 21st century, It is the theme of this paper to study how to combine virtual reality technology with agriculture under the environment of rural revitalization by using literature visualization analysis tools, so as to make it play a powerful role in virtual crops, agricultural production automation and agricultural production management to the maximum extent.

链接:

http://agri.ckcest.cn/file1/M00/10/07/Csgk0GKvBKiAarBdAAWg2vUbmp8053.pdf

6．A Cost Effective Agriculture System based on IoT using Sustainable Energy

发布源：IEEE

发布时间：2022-05-24

摘要：In this generation, automation has become popular in all the sectors. Even in all hard environments, the latest sensors can read accurate results. Now the deployment of Internet of Things (IoT) has made remote control operations to perform effectively with e ase. The sensors have been reduced in size and can be installed easily at required space. The IoT implementation helps out bridging the control between the devices and end users. The proposed model uses Node MCU with Wi-Fi enabled ESP8266 as a microcontrol ler which

can handle the sensory components with ease. The model features soil dampness, water level and motor control along with some rich features like smart drainage system. The control interface is simple through a web application coupled with ADAFRUIT server which is optimized for better usage. This can be accessed by farmers through their smart phone with any Wi-Fi/2G/3G/4G internet connectivity for remote usage and monitoring. By using renewable energy source named solar energy is used to supply power to entire automated agriculture system, so as to reduce the power consumption and the cost incurred by the power tariff. This model aims for the development of farmers with low cost and energy efficient to readily accommodate the fields.

链接:

http://agri.ckcest.cn/file1/M00/10/07/Csgk0GKvBo-AfULCADv4nFtd1Ew039.pdf

7．Intelligent UAV platform: assist construction of agricultural production automation

发布源：IEEE

发布时间：2022-05-24

摘要： In China, efforts to ensure the construction of agricultural aviation system and increase the research and development and production of agricultural UAV are of farreaching significance for China to synchronously promote the new "four modernizations", improve grain production capacity, ensure food security, promote sustainable agricultural development and realize agricultural modernization. This research is committed to building a comprehensive multi-functional agricultural UAV auxiliary platform for the majority of rural areas. The core technologies include intelligent spraying, monitoring and farmland irrigation. The auxiliary technologies include business model and guidance services, as well as UAV intelligent plant protection system. The core is UAV intelligent monitoring system and UAV self powered navigation protection base station, and the background is intelligent agriculture and science and technology agriculture.

链接:

http://agri.ckcest.cn/file1/M00/03/35/Csgk0YcFtiOAUEn9AB-Fz0aOu8U028.pdf

8．Blockchain Innovation in the Agriculture Aspect

发布源：IEEE

发布时间：2022-05-23

摘要：Since its birth, blockchain technology has demonstrated promising growth prospects,

and its strong functionalities allow it to be used in a wide range of fields, with the potential to bring about revolutionary changes. Within this paper, we'll start with a quick overview of the blockchain, including its role and value in agriculture. After that, concentrate on the four areas of blockchain's applicability in agriculture. The four aspects are Distributed Agriculture system, Smart Transportation, Blockchain application in product retail and agricultural insurance. Then, we will discuss the Opportunities and Defects of blockchain in agriculture. Finally, we summarize our current work of blockchain technology in the agriculture aspect.

链接:

http://agri.ckcest.cn/file1/M00/03/35/Csgk0YcFuDeAecjgAB1XmHjZ0OQ401.pdf