

《智慧农业发展战略研究》专题快报

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【动态资讯】

1. 水稻生产机械化如何实现均衡发展？

【农民日报】数据显示2020年我国水稻耕、种、收的机械化率分别为98.35%、56.30%和97.73%，综合机械化率已达到84.35%。不难发现，水稻耕作和收获环节已基本实现了机械化，但种植环节的机械化水平不高，发展也不平衡，仍然是水稻生产机械化的薄弱环节，也是水稻生产机械化发展潜力最大的环节。

链接:

<http://agri.ckcest.cn/file1/M00/10/09/Csgk0GLOnhuAWQwuAAG7JSgZIYg616.pdf>

2. 从会种地到“慧”种地 更轻松更高效

【成都日报】成片的高标准农田里，数十台大型拖拉机、无人机、智能无人插秧机整齐有序排列，在这里大显身手；前日上午，在崇州市十万亩粮食高产稳产高效综合示范基地里，崇州天府粮仓国家现代农业园区2022年大春开耕仪式正式举行。

链接:

<http://agri.ckcest.cn/file1/M00/10/09/Csgk0GLOnIKAcOBIAAHQEHHd6a8874.pdf>

3. 广西冷害热害监测预警及防控技术：精细化监测预警助力水稻高产

【中国气象报】本报讯报道 “过去，我们只能依靠经验来种田，现在已经发展成水稻产业化种植了。有了气象部门‘高精尖’的科技指导，不仅大大提高了我们的工作效率，还提高了产量。”日前，广西壮族自治区北流伟民米业有限责任公司负责人陈有裕对农业气象服务赞不绝口。

链接:

<http://agri.ckcest.cn/file1/M00/03/37/Csgk0YcIT4SAe4NYAAGTuhQU12g294.pdf>

【文献速递】

1. 基于机器视觉和北斗定位融合的喷药机行线跟踪方法

文献源: 农机化研究, 2022-06-23

摘要: 目前, 基于机器视觉的水稻行线识别跟踪控制方法存在稳定性问题, 基于北斗定位的水稻直线行线跟踪控制方法存在对弯曲水稻行线的适应性问题。为此, 提出了一种机器视觉和北斗定位融合的水田喷药机行线跟踪方法。首先, 对单目相机进行标定和矫正, 提取图像的ROI, 选定颜色空间和灰度通道; 在实验室环境下求取透视变换矩阵, 对图像进行透视变换, 确定扫描基点后对水稻行线进行滑窗扫描, 确定喷药机行驶航线的图像坐标; 根据图像、相机和车辆的位置关系将图像坐标变换为北斗定位坐标, 使用北斗定位跟踪控制算法控制喷药机跟踪弯曲航线。试验结果表明: 机器视觉与北斗定位融合的水田喷药机行线跟踪算法可以在自动驾驶作业过程中识别和跟踪水稻行弯曲的行线, 解决了基于机器视觉和基于北斗定位的导航算法对水稻苗的损伤问题。

链接:

<http://agri.ckcest.cn/file1/M00/10/0A/Csgk0GLUypuARNtXACDA376EE00964.pdf>

2. 基于无人机多光谱遥感的水稻冠层SPAD值反演

文献源: 中国农村水利水电, 2022-07-12

摘要: 为研究水稻叶片叶绿素相对含量 (SPAD) 在3种水分处理和5种施氮处理下的变化规律, 探讨无人机多光谱遥感技术反演水稻SPAD的可行性, 本研究利用大疆精灵4多光谱无人机, 采集了水稻拔节孕穗期、抽穗开花期和乳熟期的冠层多光谱遥感影像, 并同步测定水稻SPAD值, 基于25个光谱变量 (5个波段反射率和20个植被指数), 采用多元线性逐步回归、岭回归和套索回归3种方法构建了水稻SPAD的反演模型。结果表明: 水稻3个生育期的SPAD最佳反演模型均是采用套索回归方法构建的, 其中乳熟期建立的SPAD最佳反演模型在3个生育期中的反演精度最高, 决定系数为0.782, 均方根误差为1.2177, 相对误差为6.6113%。因此, 该研究可对水稻叶片SPAD进行遥感监测, 并为水稻精准灌溉和施肥提供科学依据和数据支撑。

链接:

<http://agri.ckcest.cn/file1/M00/03/37/Csgk0YcIUU6Aa8yAABMTRLRToQlo380.pdf>

3. 基于SCResNeSt的低分辨率水稻害虫图像识别

文献源：农业机械学报，2022-07-11

摘要：针对稻田自然环境下害虫移动，难以近距离拍摄高质量图像，导致在现有识别模型检测时无法达到满意识别精度的问题，提出了一种基于SCResNeSt的低分辨率水稻害虫图像识别方法。首先，使用增强型超分辨率生成对抗网络（ESRGAN）对低分辨率图像进行数据增强，解决低分辨率水稻害虫有效信息少的问题；其次构建了SCResNeSt网络，使用3个连续的 3×3 卷积层替换ResNet50中第1个 7×7 卷积，以减少计算量；使用自校准卷积替代第2层卷积层中的 3×3 卷积，通过内部通信显式地扩展每个卷积层的视场，获取害虫图像的部分背景信息，从而丰富输出特征；在主干网络中使用ResNeSt block（Split-attention network block）进一步提升图像中害虫信息获取的准确性。最终，将优选模型移植到手机端，开发了轻量化的移动端水稻害虫识别系统。实验结果表明，与现有方法对比，ESRGAN数据增强方法可以恢复真实的作物害虫信息，SCResNeSt模型有效提高了水稻害虫的识别性能，识别精度达到了91.20%，比原始ResNet50网络提高了3.2个百分点，满足野外实际场景下的应用需求。

链接：

<http://agri.ckcest.cn/file1/M00/03/37/Csgk0YcIXAqAR8G1ABA6KhVdsqY639.pdf>

4. 自适应穗高拨受式水稻智能育种系统的研制？

文献源：农机化研究，2022-06-22

摘要：针对杂交水稻拨穗授粉工作中存在的效率低、工作强度大等问题，研制了一种自适应穗高拨受式杂交水稻智能育种系统。系统由驱动与升降模块、拨穗与收放模块、环境监测模块、支持模块组成，包括驱动电机、履带、小车、电动伸缩杆、尼龙绳等零部件。在此基础上，通过多体动力学仿真对研制系统的动态干涉性进行了检验，从而验证了其运行可靠性，并进一步对其试验操作流程进行了阐述。试验结果表明：自适应穗高拨受式水稻智能育种系统可在最佳的时空域条件下完成拨粉育种工作，提高了工作效率，降低了劳动强度，对提高水稻的质量和产量均有较大的益处。

链接：

<http://agri.ckcest.cn/file1/M00/03/38/Csgk0YcreqKAcqE9ACNjL8nDZWY312.pdf>

5. Direct comparisons of four irrigation systems on a commercial rice farm: Irrigation water use efficiencies and water dynamics

文献源：ScienceDirect,2022-03-22

摘要：This two-year field study compared the industry-standard rice (*Oryza sativa* L.)

irrigation practice, a continuous-flood delivered using cascade distribution (CASC), to two related levee-based systems (multiple-inlet rice flood distribution (MIRI) and MIRI plus alternate wetting-drying flood management (AWD)) and one furrow-irrigated with end-blocking (ROW) system. Seasonal applied irrigation, soil volumetric water holding content, water depth, grain yield and irrigation water use efficiency (IWUE) were determined for sixteen 16-ha commercial rice fields sown using the same hybrid each year. Also, runoff from one field for each system was measured each year. Average seasonal irrigation applications were 824 ± 197 mm for CASC, 641 ± 165 mm for MIRI, 696 ± 181 mm for AWD and 631 ± 125 mm for ROW. Although a minimum of two AWD dry-down cycles were performed each year and runoff was the least from MIRI (5% runoff) and AWD (3% runoff), ROW (13% runoff) was the only system to receive less irrigation ($p = 0.0314$) than CASC (14% runoff). In terms of grain yield, only the ROW fields, with an average yield of 8890 ± 417 kg ha⁻¹, differed ($p = 0.0107$) from CASC (9991 ± 751 kg ha⁻¹). This reduction in ROW yield was due primarily to herbicide injury in 2018 and resulted in average irrigation water use efficiency (IWUE) values that were not different between irrigation treatments ($p > 0.05$). Taken together, ROW with end-blocking (a) proved to be a more consistent method of water conservation than MIRI and AWD under field conditions complicated by variable soil textures, and (b) lends itself to automation as the ROW fields were irrigated regularly, on a three-to-four-day schedule, rather than depending on human judgement to decide when to irrigate as was required for CASC, MIRI and AWD.

链接:

<http://agri.ckcest.cn/file1/M00/03/37/Csgk0YcIXSCAIPVgAH3O3mDS-LI678.pdf>

6. Green and energy-efficient extraction of cellulose nano-fibrils from rice straw and its coating to improve functional properties of rice straw paperboard made via refiner mechanical pulping

文献源: ScienceDirect,2022-02-09

摘要: Rice straw is openly burnt in the farms in parts of India as it is not efficiently used as compost or cattle feed. In the present work, a unique approach was used in an attempt to utilize the rice straw grown in the Indian state of Haryana. It was converted into a paperboard of 200 g/m² and was coated with up to 10 g/m² cellulose nano-fibrils (CNF) extracted from the rice straw. The CNF of 50 nm size could be

extracted via the process which involved a chemical process followed by a two-step mechanical process 1) high speed homogenization and 2) probe sonication. Subsequent steps of homogenization and probe sonication saved electrical energy by 11.45% than using probe sonication alone. The adapted process did not alter the crystalline arrangement of the cellulose as shown by infrared spectroscopy and x-ray diffractometry, making the process acceptable. Various properties of the coated paperboard were tested and it was found that the coating played a great role toward reducing Bendtsen roughness, water absorption (Cobb60), and porosity; while improving water vapor barrier and grease-resistance.

链接:

<http://agri.ckcest.cn/file1/M00/10/09/Csgk0GLOq3SAOpAZACbGsyhR6pI938.pdf>

[f](#)

7. Typology of rice-based cropping systems for improved soil carbon management: Capturing smallholder farming opportunities and constraints in Dinajpur, Bangladesh

文献源: ScienceDirect,2021-12-02

摘要: Characterization of smallholder land resource endowment and cropping practice can assist in the implementation of a more tailored approach to Soil Carbon Management (SCM). Land resource and cropping practice data, stratified by soil physiography, was collected through a survey involving 83 farmers in four upazila of Dinajpur district, Bangladesh. The aim was to determine a farming system typology based on smallholder land resource endowment and cropping practices, and to consider the likelihood of soil carbon improvement under the typology. A Cluster Analysis was performed using data on seven variables that combined land resource (physiography, land type, landholding, farm size) and cropping practice (cropping system, cropping intensity, crop rotation) characteristics to determine a farming system typology. The resulting typology, referred to as Soil Carbon Improvement Likelihood (SCIL), identified three different farming system types. These were then assessed with regard to their potential for improving soil carbon in these systems. The most prevalent SCIL, Medium SCIL (Type 1, 42%) consists of the maize-rice, wheat-rice and veg.-rice cropping systems in the HL areas of the Piedmont plain, Floodplain and Terrace. It is managed with high fertilization, low crop rotation and low

to medium crop residue retention. The next most prevalent SCIL, Low SCIL (Type 3, 30%) consists of a rice-rice cropping system in the HL and MHL areas of the Piedmont plain, Floodplain and Terrace, and is managed with medium fertilization, no crop rotation and limited residue retention. The least prevalent farming system type, the High SCIL (Type 2, 28%) consists of crop-diversified and mustard-rice cropping systems in the MHL areas of the Floodplain and Terrace, which is managed with high fertilization, crop rotation and high crop residue retention. This study showed that cropping systems with higher crop intensification and high retention of crop residue, on the Floodplain soil physiography and MHL land inundation type, provide the greatest opportunity for improved SCM, but were represented by less than one-third of the farmers (n = 20) in this survey. These farmers were also mainly private landholders. The typology presented here can potentially serve as a practical framework for delineating cropping systems and management under particular land resource settings to undertake more targeted innovations and SCM priorities in Rice-based Cropping Systems.

链接:

<http://agri.ckcest.cn/file1/M00/03/37/Csgk0YcIXE6AUgucACe6FcWI2mo418.pdf>

8. The Earth Observation-based Anomaly Detection (EOAD) system: A simple, scalable approach to mapping in-field and farm-scale anomalies using widely available satellite imagery

文献源: ScienceDirect,2021-10-08

摘要: To feed the world increasing population, expansion in the area under arable cultivation is expected, with the majority projected to occur in Sub-Saharan Africa and Latin American countries. However, many existing Precision Agriculture (PA) techniques are difficult to transfer to agricultural systems in these regions as they rely on prohibitively expensive crop monitoring systems. Satellite Earth Observation (EO) has the ability to provide affordable solutions, particularly to identify yield-limiting conditions within site-specific management zones (MZs). This paper presents the Earth Observation-based Anomaly Detection (EOAD) approach, a novel system for the detection of in-field anomalies through automatic thresholding of optical Vegetation Index data, based on their deviation from a normal distribution. The EOAD sets dynamic thresholds for the pixel values within a parcel by removing the atypical

values in increments from the tails towards the median until the distribution is normal. The distribution normality is assessed based upon measures of skewness and kurtosis for each iteration. The anomaly detection approach demonstrated a strong agreement, 80% overall accuracy, with identified in-field anomalies when applied to rice plots in the Ibagué Plateau, Colombia, using both Sentinel-2 and PlanetScope imagery. Areas identified as anomalous during the booting stage were shown to be significantly ($p \leq 0.005$) associated with a decrease in final yield. Additionally, the percentage of anomalies detected with the EOAD improved the detection of underperforming plots in early growth stages. Using freely available data and software, this automated approach demonstrates an exciting potential for use in improving agricultural practices in low-resource regions.

链接:

<http://agri.ckcest.cn/file1/M00/10/09/Csgk0GLOq6GAMjCgAGjJWjeZbwc838.pdf>

9. Forecasting of applied irrigation depths at farm level for energy tariff periods using Coactive neuro-genetic fuzzy system

文献源: ScienceDirect,2021-07-15

摘要: Nowadays, water scarcity and the increase in energy demand and their associated costs in pressurized irrigation systems are causing serious challenges. In addition, most of these pressurized irrigation systems has been designed to be operated on-demand where irrigation water is continuously available to farmers complexing the daily decision-making process of the water user association ' managers. Know in advance how much water will be applied by each farmer and its distribution during the day would facilitate the management of the system and would help to optimize the water use and energy costs. In this work, a new hybrid methodology (CANGENFIS) combining Multiple input -Multiple output, fuzzy logic, artificial neural networks and multiobjective genetic algorithms was developed to model farmer behaviour and short-term forecasting the distribution by tariff period of the irrigation depth applied at farm level. CANGENFIS which was developed in Matlab was applied to a real water user association located in Southwest Spain. Three optimal models for the main crops in the water user association were obtained. The average for all tariff periods of the representability (R^2) and accuracy of the forecasts (standard error prediction, SEP) were 0.70, 0.76% and 0.85% and 19.9%,

22.9% and 19.5%, for rice, maize and tomato crops models, respectively.

链接:

http://agri.ckcest.cn/file1/M00/03/37/Csgk0YcIXOGAVVYgADOQ3DPV_kM896.pdf

10. Environmental sustainability assessment of rice management practices using decision support tools

文献源: ScienceDirect,2021-06-18

摘要: Rice has a large water demand and its cultivation is responsible for 8% of global anthropogenic methane (CH₄) emissions. In this context, on-farm practices to increase water use efficiency and decrease greenhouse gas (GHG) emissions are increasingly being considered by rice producers. In this study, four water saving practices implemented in ten Arkansas rice farms during two consecutive years were evaluated: Multiple-Inlet Rice Irrigation (MIRI), zero grade (land leveling), Furrow-Irrigated Rice (FIR), and Alternate Wetting and Drying (AWD). The sustainability of these practices at the field level was evaluated with two decision support tools, Fieldprint Platform (FPP) and Cool Farm Tool (CFT). From a GHG perspective, both tools agreed that FIR and AWD were the best practices to decrease CH₄ emissions. A sensitivity analysis with FPP was performed to detect which variables and management practices most affect metric scores. FIR was the best practice regarding GHG emissions due to the decrease in CH₄ emissions; however, when considering energy use, FIR and zero grade increased energy use due to greater chemical applications. Initiatives such as AWD irrigation, burning the straw or other straw removal practices when practicing a rice-rice rotation, or making decisions about crop planting based on differences in soil type inside the farm should be encouraged to decrease CH₄ emissions. The energy cost of agrochemical production had a large impact whereby even 1020% reductions in application rates can significantly reduce the energy use. These decision support tools offer farmers an opportunity to evaluate their practices and increase farm sustainability; however, policy makers need to incentivize conservation practices and encourage creation of farmer networks to support adoption of sustainability practices.

链接:

<http://agri.ckcest.cn/file1/M00/03/37/Csgk0YcIS3mAUhQpAE6yHAIU3jl730.pdf>

11. Development of a mobile computing framework to aid decision-making on ? organic fertilizer management using a crop growth model

文献源: ScienceDirect,2021-01-07

摘要: Interest in organic farming has increased to minimize the environmental issues associated with intensive crop production. However, the support for decision-making on organic fertilizer management has been limited, which would become a barrier for wide adoption of organic farming. Here we propose a software development framework to facilitate the development of a decision support system based on a mobile computing platform. In the present study, the Organic-fertilizer Application Support Information System (OASIS), which is compatible with the Android operating system, was implemented to perform the hindcast simulation of crop growth under organic management practices. The performance of OASIS was tested using 16 different smartphones. It was found that OASIS took a relatively short time, e.g., < five seconds, to simulate crop growth even using an outdated smartphone, although it took within about one minute to download the weather data. In a case study, the observation data from field experiments were applied to OASIS. Our results indicated that the hindcasts had relatively small differences in heading dates and yield, which were a maximum of one day and 10%, respectively. These results suggest that OASIS would support reasonable decision-making on organic fertilizer management practices. Our framework would guide the implementation of mobile applications to support decision-making on specific crop management practices.

链接:

<http://agri.ckcest.cn/file1/M00/10/09/Csgk0GLOrD6ATdzjABqnSjs2D-M925.pdf>

12. Centralized and distributed optimization models for the multi-farmer crop planning problem under uncertainty: Application to a fresh tomato Argentinean supply chain case study

文献源: ScienceDirect,2020-12-16

摘要: Imbalance between supply and demand of crops frequently occurs in markets originating an excess or shortage of supply in relation to demand. This causes high volatility and uncertainty in market prices, unmet demand, and waste, especially for fresh crops due to their limited shelf-life. This imbalance is mainly due to the inherent

uncertainty present in the agricultural sector, the perishability of fresh crops, and the lack of coordination among farmers when making planting and harvesting decisions. Despite farmers usually plan the planting and harvesting in an individual way, there is a scarcity of research addressing the crop planning problem in a distributed manner and, even less, assessing their impact on the supply chain (SC) as a whole. In this paper, we developed a set of novel mathematical programming models to plan the planting and harvest of fresh tomatoes under a sustainable point of view for multi-farmer supply chains under uncertainty in different decision-making scenarios: i) distributed, ii) distributed with maximum and minimum land area constraints to be planted for each crop, iii) distributed with information sharing, and iv) centralized. Then, for each distributed scenario, the individual solution per farmer as regards the planting and harvesting decisions per crop are integrated to obtain the overall supply to satisfy the markets demand. This allows the assessment of the farmers' real performance and the impact of their individual decisions to the entire SC performance. We also compare the results obtained for each scenario with the centralized model in terms of economic, environmental, and social impact. The experimental design shows that, when integrating the solutions for the whole SC, significant differences between planned and real results are obtained in each scenario as regards the gross margin per hectare, unmet demand, waste, and unfairness between farmers, being the distributed model with information sharing the most similar to the centralized one. The results show that uncertainty consideration in models improves the gross margin and the unfairness among farmers in all scenarios for both, planned and real evaluation.

链接:

http://agri.ckcest.cn/file1/M00/03/37/Csgk0YclRFWAHuTdAEhojyRs_GI441.pdf

【会议论文】

1. Pest detection and classification to reduce pesticide use in fruit crops based on deep neural networks and image processing

发布源: IEEE

发布时间: 2021-11-03

摘要: The aim for organic farming is obtaining food of the highest quality, avoiding synthetic chemicals, protecting the environment and preserving the fertility of the land. In this context, effective pest control allows to reduce yield loss and pesticides

application producing pollution-free vegetables. In fruit crops, Carpocapsa is the main pest present in pear, apple, walnut and quince trees. This insect produces irreversible damage to the fruit, since the larvae feed the seeds inside the fruit. In this paper, we present automatic pest detection and classification in the context of fruit crops based on image processing and Deep Neural Networks, employing an image collection obtained from in-field traps. Due to the limited size of the data set, we perform data augmentation to increase the number of images for training, to prevent over-fitting and to improve the deep neural network learning rate. Results showed an overall accuracy of 94.8%, while precision and recall scores for the class related with the moth were around 97.2% and 93.6% respectively, demonstrating the efficacy of this type of classifier proposed for pest detection. An inference time of 40 ms per image for the deep neural network classifier has been reached.

链接:

<http://agri.ckcest.cn/file1/M00/03/37/Csgk0YclW2yAXBtsAD-HaqSXPIA554.pdf>

2. Apple Fruit Disease Detection for Hydroponic plants using Leading edge Technology Machine Learning and Image Processing

发布源: IEEE

发布时间: 2021-10-07

摘要: An Apple is also kind of fruit that can be cultivated through Hydroponic farming. The apple fruit that are been cultivated through soil has a less sweet taste when compared to hydroponic farming. The production of apples in hydroponic farming is high when compared through soil. In hydroponic farming detection of disease in apple fruit is very important at early phase else leads to a great loss in terms of productivity, quality and quantity. Detection of disease in fruits can be achieved through Image processing and Machine learning techniques.

链接:

http://agri.ckcest.cn/file1/M00/10/09/Csgk0GLOqruAa_J0AC1yZDyddm4782.pdf

3. Automating the Process of Distinguishing Marketable Apples

发布源: IEEE

发布时间: 2021-09-20

摘要: The effective transfer of information accumulated from years of experience to

following generations is a frequent challenge for farmers across the world. This report describes a work in progress which aims to preserve and apply such knowledge using machine learning techniques to help local apple farmers who face the same problem in fruit sorting processes, known as "senka" in Japanese. The process of identifying scratches, bruising, or other signs of illness in apples is typically carried out manually by only a few experienced farmers who reached their levels of expertise after many years of training. By allowing a deep learning software model to study a sufficient sample of images of the fruit sorted by veteran farmers, we aim to develop an automatic process for distinguishing marketable and non-marketable apples automatically and report the results of preliminary experiments which reached approximately 80% classification accuracy.

链接:

http://agri.ckcest.cn/file1/M00/03/37/Csgk0YcIW5yAY3LgAC_LPoAOFrw348.pdf

4. Identification of Fruit Disease Using Instance Segmentation

发布源: IEEE

发布时间: 2021-09-02

摘要: Agricultural farms that have undergone commercialization are continually looking for methods to minimize manpower without sacrificing output. This work proposes and experimentally validates a method for detecting and classifying apple fruit disease. This system takes a picture of an apple fruit as input and determines if it is infected or not. Farmers would be able to spot illnesses in fruits using this approach. Instance segmentation an advancement of image segmentation is used to identify every pixel belonging to an instance of an object and it detects distinct object. Normal apple fruit diseases are considered and then marked in the existing system. There is no algorithm used to find the type of diseases affected. RNN was used for the detection and segmentation of disease in apple fruit. In this work CNN algorithm is proposed which is used for identification of disease in the apple fruit. Few types of fruit diseases, namely bitter rot, sooty blotch and powdery mildew images are used for this approach. Instance segmentation is performed using CNN algorithm to identify affected parts in the apple fruit. Compared to the RNN algorithm, CNN algorithm shows better accuracy for the identification of disease in the apple fruit by applying instance segmentation.

链接:

<http://agri.ckcest.cn/file1/M00/10/09/Csgk0GLOquiAdkOJAAyirX6FQvE225.pdf>

5. A Video-Based Human Activity and Motion Direction Classification Framework for Agricultural Fields

发布源: IEEE

发布时间: 2021-07-16

摘要: In farming systems, harvesting operations are tedious, time- and resource-consuming tasks. Deploying a fleet of autonomous robots to work alongside farmworkers may provide vast productivity and logistics benefits. In this context, an intelligent robotic system should monitor human behavior, identify the ongoing activities and anticipate the worker's needs. Unlike other application areas, such as warehouses and factories, research on human behavior recognition in agriculture is still in its infancy and has few case studies. Thus, there is a need for developing a fully integrated human activity recognition (HAR) methodology applied for agricultural operations in production fields. In this work, the main contribution consists of creating a benchmark framework of video-based human pickers detection, classifying their activities and corresponding motion direction, to serve in harvesting operations in different agricultural scenarios. Our solution uses the combination of a Mask Region-based Convolutional Neural Network (Mask R-CNN) for object detection and optical flow for motion estimation with a newly added statistical attribute of flow motion descriptors, named as Correlation Sensitivity (CS). A classification criterion is defined based on the analysis of the Kernel Density Estimation (KDE) technique and the K-Means clustering algorithm. Both methods are evaluated upon in-house collected datasets from different environments like strawberry polytunnels and apple tree orchards. The proposed benchmark framework is quantitatively analyzed using measures of sensitivity, specificity, and accuracy and shows satisfactory results amidst various dataset challenges such as multi-foreground objects, lighting variation, blur, and occlusions.

链接:

<http://agri.ckcest.cn/file1/M00/10/09/Csgk0GLOfKiAdRUYABmLG2yydNA297.pdf>

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6. Determining The Region of Apple Leaf Affected by Disease Using YOLO V3

发布源: IEEE

发布时间: 2021-06-16

摘要: In the agriculture industry one of the major causes for economic loss is plant diseases. For sustaining agriculture, it is necessary to monitor the health of plants and detect the diseases in plants at an early stage. Constant monitoring is necessary in the case of Apple trees. Early disease detection and crop health monitoring can reduce losses in agriculture. In the case of Apple trees, common diseases that affect the trees and the symptoms which are visible in the leaves are Apple scab, Black rot, Cedar apple rust. YOLO (You Only Look Only Once) networks are used to detect the diseases and find the remaining healthy part on the leaf. The hardware part involves a self designed drone to take the video image of all the trees in the farm. The paper compares the limitations and benefits of these potential methods.

链接:

<http://agri.ckcest.cn/file1/M00/03/37/Csgk0YclLi6ARKazABzxaNdOY4o583.pdf>

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