【动态资讯】

1．河南洛阳市全国首台挤奶机器人下线

【农民日报】智能"眼"自动定位奶牛乳头、蓝色机械臂来回运转，依次精准完成套杯、挤奶、脱杯……日前，在河南洛阳高新区拓博尔铁路设备有限公司厂房内，国内首台挤奶机器人成为焦点，别看它外形"憨憨的"，却拥有自主知识产权的双目立体视觉系统。在此之前，国内挤奶机器人的这项技术全靠引进，是一项外国垄断的技术。据介绍，这台挤奶机器人是拓博尔公司参与国家重点研发计划项目课题的研发成果。该项目属国家重点研发计划项目自动挤奶、防疫消毒机器人与环境控制技术设备研发与应用示范课题，着力破解我国目前养殖业广泛采用的半自动挤奶设备效率低、微生物污染隐患大的问题。"在不久的将来，你喝的牛奶或许是机器人挤的。"说起无人奶牛养殖场的愿景，拓博尔公司生产厂长王民方不无骄傲地说，他们所研发的挤奶机器人，将在提升奶源质量、无菌化生产、大数据监测奶牛并为之建立"健康档案"、智能个性化改善奶牛身体状况等方面提供"最强大脑"，解决传统挤奶工作的诸多痛点问题，推进国内无人自动化养殖的发展。此外，挤奶机器人在无人化的操作环境下，进行自动清洗、自动套杯、自动脱杯的标准化挤奶流程，保障挤奶过程的全程密封，杜绝了出现人体携带的细菌与奶牛交叉感染的情况。

链接:

http://szb.farmer.com.cn/2019/20190817/20190817_006/20190817_006_2.htm

2．手机拍一拍番茄"医生"来

【农业科技报】也许，你只需要拿出手机，打开摄像头，对着田地里的番茄拍张照，就能避免一场导致"颗粒无收"的疫病。近日，在线发表于《自然—植物》的一篇论文描述了一款可以检测微生物侵染番茄植株的智能手机传感器。该系统有望以及时发现病菌的

方式，帮助对抗破坏性作物病害。目前，植物病原菌的检测主要集中在多种分子分析方法上，包括基于核酸的PCR和DNA微阵列等技术，以及免疫学方法，如基于抗体的侧流试验（LFA）和酶联免疫吸附测定（ELISA）。该研究负责人、美国北卡罗来纳州立大学的魏青山表示，基于核酸的方法是敏感和特异的，但检测方案繁琐，免疫分析技术令现场检测变得简单，但在某些应用中受到检测灵敏度和特异性的限制。于是，魏青山和同事开发了一款传感器，可以在番茄感病后的两天内检测出晚疫病。他们使用的化学修饰金纳米粒子会与病株叶片释放的挥发性有机物发生反应，而手机摄像头能够捕捉这种反应引起的颜色变化。"我们开发的这种基于智能手机的挥发性有机化合物指纹识别平台，能通过监测田间特有的叶片挥发性排放，对晚疫病进行无创诊断。"魏青山说，"该手持装置集成了一个一次性比色传感器阵列，由等离子体纳米色素和化学反应性有机染料组成，可在反应1分钟内检测关键植物挥发物水平。""这一技术可以在肉眼看到症状前就检测出晚疫病，使人们尽早采取行动防止病害传播。如果与不同的比色法指示剂结合使用，该技术或能用于检测其他植物病害。"魏青山说。

链接:

http://eb.nkb.com.cn/nykjb/20190815/html/index_content_001.htm

3．World's largest urban farm set to open…on a Paris roof

【Agriland】The world's largest urban farm is set to be opened in Paris in the year 2020 on the rooftop of a new building currently under construction. Two French firms Agripolis and Cultures en Ville are teaming up for the ambitious project, which will see 14,000m² of roof devoted to the growth of fruit, vegetables and herbs. The farm will be situated atop a new building located at the Paris Expo Porte de Versailles exhibition centre, located to the south-west of the city centre, in the 15th arrondissement (district). It's envisaged that the produce produced here will be available for purchase to visitors to the facility. Produce will also be supplied to restaurants. The farm will be operated by Agripolis while Cultures en Ville will handle the services and events held at the site. Among the other services offered are: farm tours; workshops; spaces for rent; and events. It's hoped that the facility will see around one tonne of seasonal fruit and vegetables produced per day, with 140 spaces available for members of the public to rent out and use to grow their own produce. The project is expected to receive around 10,000 visitors per year when it opens, both to the farm and various events held there, for which 500m² will be devoted. The plants will be arranged vertically, above ground, in columns of crops and fed by rain water and biological nutrients. Though the produce will be grown using organic principles, it cannot be

labelled as such because it's not grown in the ground a necessity for an organic label under French regulations. In a statement translated from French, Agripolis said that the project will "offer diversified, high-quality local produce, respecting nature's cycles and limiting the carbon impact as much as possible". "The [project] partners carry an ambitious project that has all the features to become a model of innovative urban agriculture, serving a sustainable city," the statement concluded.

链接:

4．Pioneer Launches Corn Yield Estimator

【Successful Farming】 You now have a new way to estimate corn yields. The new Pioneer Corn Yield Estimator is available as part of the Pioneer mobile app. This tool uses a machine-learning model, which allows you to quickly and accurately count the kernels on an ear while in the field, say Corteva Agriscience officials. The yield estimate is based on kernel count, stand count, and kernels per bushel.   The yield estimator walks you through the process of lining up the ear of corn to be sampled, taking the necessary number of images, and entering the remaining information before providing a yield estimate. The tool requires that husks and silks be removed before taking the picture, but the ear does not need to be pulled from the stalk. "The creation of this tool is part of Pioneer's larger efforts to advance customers' ability to improve management," said Jeremy Groeteke, U.S. digital agriculture lead, Corteva Agriscience, in a company news release. "The goal of this app is to standardize the process for estimating yield from a single ear of corn and is part of our predictive agriculture effort." The introduction of the Yield Estimator kicks off a more connected Pioneer digital ecosystem, including the Pioneer Seeds mobile app and the revamped Pioneer.com, say Corteva Agriscience officials.   The new login interface, along with a user-friendly online payment experience and mobile responsiveness, is designed to make a more cohesive online environment for all users, say company officials.   The new Pioneer.com website is designed to be a one-stop shop, providing premium resources, such as a personalized seed guide, local yield data, updated and improved agronomy filtering, and seasonal tools and calculators, says Corteva Agriscience officials.

链接:

5．No Need to Watch Grass Grow Anymore!

【USDA】 Each spring, ranchers face the same challenge of trying to guess how much grass will be available for their livestock to graze during the summer. Ranchers make this determination relying on boots-on-the-ground observations of rangeland conditions. But now in the Northern Great Plains, ranchers have a new forecasting tool to help them with this important decision: "Grass-Cast." With Grass-Cast, ranchers can now base their decisions on where to graze their cattle and how many cattle to release on 38 years of historical data on weather, grass growth and seasonal precipitation outlooks. Grass-Cast processes these data to predict if rangeland grasses in a rancher's county will produce in above-normal, near-normal, or below-normal amounts. Grass-cast is first released in early May each year as three color-coded maps. The maps are then updated every two weeks. The tool improves in accuracy the deeper we go in the growing season. Ranchers also fine-tune the data with their knowledge of local plant communities, soil types, typography and other factors before making their final management decisions. The tool uses well-known relationships between historical weather and grassland production. It combines current weather data and seasonal climate outlooks with a well-trusted grassland model to predict total biomass for individual counties, compared to their 38-year average. Grass-Cast debuted in May 2018 and is a collaboration between ARS scientists in Fort Collins, Colorado, and colleagues at Colorado State University, the USDA Natural Resources Conservation Service, the National Drought Mitigation Center, and the University of Arizona.

链接:

https://www.usda.gov/media/blog/2019/08/14/no-need-watch-grass-grow-anymore

6．Artificial intelligence helps banana growers protect the world's most favorite fruit

【International Center for Tropical Agriculture (CIAT)】Using artificial intelligence, scientists created an easy-to-use tool to detect banana diseases and pests. With an average 90 percent success rate in detecting a pest or a disease, the tool can help farmers avoid millions of dollars in losses. Artificial intelligence-powered tools are rapidly becoming more accessible, including for people in the more remote corners of the globe. This is good news for smallholder farmers, who can use handheld technologies to run their farms more efficiently, linking them to markets, extension workers, satellite images, and climate information. The technology is also becoming a first line of defense against crop diseases

and pests that can potentially destroy their harvests. A new smartphone tool developed for banana farmers scans plants for signs of five major diseases and one common pest. In testing in Colombia, the Democratic Republic of the Congo, India, Benin, China, and Uganda, the tool provided a 90 percent successful detection rate. This work is a step towards creating a satellite-powered, globally connected network to control disease and pest outbreaks, say the researchers who developed the technology. The findings were published this week in the journal Plant Methods. "Farmers around the world struggle to defend their crops from pests and diseases," said Michael Selvaraj, the lead author, who developed the tool with colleagues from Bioversity International in Africa. "There is very little data on banana pests and diseases for low-income countries, but an AI tool such as this one offers an opportunity to improve crop surveillance, fast-track control and mitigation efforts, and help farmers to prevent production losses." Co-authors included researchers from India's Imayam Institute of Agriculture and Technology (IIAT), and Texas A&M University. Bananas are the world's most popular fruit and with the global population set to reach 10 billion in 2050, pressure is mounting to produce sufficient food. Many countries will continue depending on international trade to ensure their food security. It is estimated that by 2050 developing countries' net imports of cereals will more than double from 135 million metric tonnes in 2008/09 to 300 million in 2050. An essential staple food for many families, bananas are a crucial source of nutrition and income. However, pests and diseases -- Xanthomanas wilt of banana, Fusarium wilt, black leaf streak (or Black sigatoka), to name a few -- threaten to damage the fruit. And when a disease outbreak hits, the effects to smallholder livelihoods can be detrimental. In the few instances in which losses to the Fusarium Tropical race 4 fungus have been estimated, they amounted to US$121 million in Indonesia, US$253.3 million in Taiwan, and US$14.1 million in Malaysia (Aquino, Bandoles and Lim, 2013). In Africa, where the fungus was first reported in 2013 in a plantation in northern Mozambique, the number of symptomatic plants rose to more than 570,000 in September 2015. The tool is built into an app called Tumaini -- which means "hope" in Swahili -- and is designed to help smallholder banana growers quickly detect a disease or pest and prevent a wide outbreak from happening. The app aims to link them to extension workers to quickly stem the outbreak. It can also upload data to a global system for large-scale monitoring and control. The app's goal is to facilitate a robust and easily deployable response to support banana farmers in need of crop disease control. "The overall high accuracy rates obtained while testing the beta version of the app show that Tumaini has what it takes to become a very useful early disease and pest detection tool,"

said Guy Blomme, from Bioversity International. "It has great potential for eventual integration into a fully automated mobile app that integrates drone and satellite imagery to help millions of banana farmers in low-income countries have just-in-time access to information on crop diseases."

链接:

https://www.sciencedaily.com/releases/2019/08/190812130827.htm

7．Science Simulations Support Salmon, Other Species

【USDA】How do river ecosystems support fish? How do environmental changes influence the system's capacity to support fish? And how might different restoration strategies influence fish? These are questions J. Ryan Bellmore, a research fish biologist who works in Juneau, Alaska, for the USDA Forest Service's Pacific Northwest Research Station, and his partners set out to answer. River restoration is typically aimed at recovering or conserving one or two target species like salmon or trout. It also influences all the other river species and the larger food web—the natural interconnection of many food chains made up of animals and plants that connect in many ways. "To successfully conserve and restore one species, we need to know how the larger food web responds to our efforts," said Bellmore. Bellmore and his partners recently published a report describing a model that can help address specific river research and management questions. This model—the Aquatic Trophic Productivity (ATP) computer simulation—is an interactive tool that links the success of fish populations to the food webs and the conditions that influence them. The model separates aquatic organisms into "trophic groups" that share similar predators and prey. These relationships are then linked to the physical and chemical conditions of the river, including the movement of the water and the structure and composition of vegetation along the river's edge. Recently, the ATP model was used to explore food web and fish responses to dam removal and floodplain restoration on rivers in Washington state. The model is currently being used to explore how climate change will impact the capacity for Alaskan rivers to continue to support abundant salmon populations in the future.

链接:

https://www.usda.gov/media/blog/2019/08/09/science-simulations-support-salmon-other-species

8．陕西长武：智慧农业让农民在手机上"种苹果"

【农业科技报】"以前判断果园灌溉全凭经验，不知道果树到底缺不缺水、缺多少水。有了这套现代化设备，就可以根据检测数据科学浇水，光浇水这一项，一年就能节省5千多元。"7月24日，农业科技报陕西千亿级苹果产业全媒体采访团来到陕西省咸阳市长武县亭口镇三丰农业有限公司，记者在公司的苹果种植基地见到了负责人文娟，提到果园科学管理，她深有感触。"在这里看果园不一定要去果园，只需鼠标轻轻一点，通过一台大型立体电子显示屏，就能直观地展示园区不同方位、不同检测项目的画面，还能进入系统管理后台，看到自动生成的各种气象、土壤、水肥数据。园区全貌清晰可见，像临近村庄处、道路拐角处等边角部位也都在可看范围之内。画面放大后，每一片树叶上的纹路真实可辨。无论身在何处，足不出户，只要一个手机，园区情况一目了然。"文娟这样说道。 文娟告诉记者，经过几年的努力，在政府的帮扶下，截至目前，园区除了安装40多个高清摄像头，还建有包括气象站在内的各类监测传感设备，实时监测基地的土壤湿度、温度、风速、雨量等信息，同时传输到手机客户端和电脑软件上。只要下载安装"智慧农业"电脑软件或手机APP，坐在家里就能随时了解果园情况，随时查阅生成的各类果园数据，更精准、更科学管理果园。 记者在采访中了解到，三丰农业启动实施"智慧农业"项目以来，在种植苹果时通过网络信号传输，运用互联网平台，利用软件系统后台收集农作物生长各项数据，视频监控实时查看生长现状，真正为苹果整个生长周期提供环境监测、生产技术、质量追溯、市场信息、品牌推广等全方位服务，实现苹果优质高产，更好地提升农产品质量。 此外，三丰农业通过"智慧农业"智能化管理，还实现了农产品质量追溯，让客商了解苹果生产和管理的全过程，实现农产品质量安全的有效监管，为进军高端水果市场打牢基础，真正享受到科技带来的实惠。"未来我想把智慧农业做的更细更精，把好的经验做法和管理模式推广出去，有效利用苹果产业中的高端、前沿管理技术，将设施设备水平提升一个层次，带领更多的公司实现果品更优质，效益最大化。"文娟向记者谈起了将来的打算滔滔不绝。目前，这套"高大上"的设备已运行近2年了，尝到甜头的文娟对"智慧农业"的前景非常看好，她还主动申请将园区作为智慧农业试验田。

链接：

http://eb.nkb.com.cn/nykjb/20190808/html/page_02_content_001.htm

9．江西启动农产品追溯平台互联互通工作

【农民日报】为加快实现全国追溯平台业务协同和信息共享，全面提升智慧监管能力和大数据分析决策水平，为追溯企业和消费者提供更加便捷化的服务，江西省委、省政府高度重视，迅速启动了省级追溯平台与国家追溯平台对接工作。省农业农村厅成立了以分管厅领导为组长的对接工作领导小组，健全市、县两级追溯体系联络员队伍，出台技

术对接方案，稳步推进对接工作顺利实施。截至目前，江西省农产品质量安全监管机构、检测机构、执法机构的省、市、县三级账号已开通并发放完毕。116个监管机构（含1个省级、11个市级和104个县级）已完成了注册工作，15个检测机构（含1个省级、2个市级和12个县级）及13个执法机构（含1个省级、12个县级）完成注册工作。

链接:

10．If one drone isn't enough, try a drone swarm

【BBC】When Bill Herz wants to know how his crops are doing, he launches a drone. He has nearly a thousand acres of corn and soybeans in LaSalle, eastern Illinois. "My drone has saved me time and energy," he says. "I don't need to walk a whole field to find a problem area. I can fly the field, look at the results and go right to it." Drones used for farming belong to the arsenal of tools used for precision agriculture - hi-tech farming using data to make better decisions. So far, flying robots have enabled farmers to live stream crop growth, patrol for pathogens and boost farm efficiency. The next step is to recruit squadrons of them that can co-operate and carry out their tasks without the need for a human pilot. Scientists from the Norwegian Defence Research Establishment (FFI) and the US's Rajant Corporation are working on simultaneously flying about 20 drones that can work in co-ordination with little human supervision. A simple command is all that is needed for the robots to self-organise and communicate in a decentralised way, much in the way flocks of birds or schools of fish move around and interact with each other when they want to "solve" a task requiring collective intelligence. A Rajant-patented radio technology called "kinetic mesh" and "foreign function interface" distributed computing software are the technological ingredients behind this breakthrough. "A typical drone of any size flies maybe 30 minutes or less," says Don Gilbreath, systems vice president at Rajant. "If a farmer needs to map hundreds of acres of their field, it might take 50 battery charges. A swarm is essentially doing in parallel the same job up to 20 times faster than a single drone." This "parallelisation of the workload" will single out healthy plants from sick ones and help farmers decide where to deliver more pesticides and nutrients, says Sondre Engebraten, a researcher at FFI.

链接:

1 .UAVs technology for the development of GUI based application for precision agriculture and environmental research

文献源：Remote Sensing Applications: Society and Environment,2019

摘要：Farmers, agencies, agricultural research community and firms require access to tools to analyze and estimate stressed and productive regions to obtain higher yield. At present, this is performed manually using visual interpretation. Recently there has been some development in the detection and mapping of the stressed crop by use of hyperspectral analysis; but, there is an information gap between farmers and information about the location of the crop under stress in the given area. There is an urgent need to provide a robust solution to identify the stressed region in the agricultural area. To address this, a unique application called as VegNet (Vegetative-Network) has been developed, which aims to provide the necessary tools to detect stressed crop locations using the spectral images obtained from UAVs, and provide stressed crops condition, location and area covered by those stressed crops. In this paper, a combination of spectral vegetation indices techniques has been highlighted to produce a comprehensive solution for precision agriculture using a UAV and VegNet. This incorporates several algorithms; segmentation, Canny-edge detector, dilation, gap-filling, image extraction and locating the stressed region using spectral modelling based Graphical User Interface (GUI) application for precision agriculture, societal benefit and Environmental research.

链接:

http://agri.ckcest.cn/file1/M00/0E/7E/Csgk0F1affeAHC-aAHWdUK-Pxf0944.pdf

2．基于植入式RFID感温芯片的猪体温与饮水监测系统

文献源：农业机械学报,2019

摘要：为了实现猪体温和饮水行为的协同感知和联合数据采集,针对传统体温测量效率低、饮水量监测不准、数据可用性差的问题,将植入式RFID温度芯片应用于集中式圈舍养殖中猪体温的测量,将水流量传感器用于猪饮水行为的监测,两者配合可以实现猪身份识别码(ID)、体温和饮水行为的协同感知和联合数据采集。根据猪用自动饮水碗的结构和饮水时的场景,设计了集水流量传感器、RFID阅读器和Zig Bee模块于一体的无线监控节点,开发了在猪只饮水的同时自动进行体温测量的监测系统。对芯片植入深度、体温变化和饮水行为的监测分别设计了不同的试验,结果表明:该系统可以实现对猪只不同深度

体表温度、不同饮水时长和饮水量的自动监测,3种数据的自动关联和同时采集,可为猪病早期预警和诊断提供技术支撑。该系统有效避免了人工操作失误,提高了工作效率,可以满足集中式养猪场的精细化管理要求。

链接:

http://agri.ckcest.cn/file1/M00/0E/7E/Csgk0F1aeqeAFTgdAAsyYCrv4qk262.pdf

3．Sensor nodes fault detection for agricultural wireless sensor networks based on NMF

文献源：Computers and Electronics in Agriculture,2019

摘要：Nowadays, Wireless Sensor Networks (WSN) are widely been employed to solve agricultural problems related to the optimization of scarce farming resources, decision making support, and land monitoring. However, the small sensing devices that are part of WSNs known as sensor nodes suffer from degradation and so producing erroneous measurements. In this paper, a machine learning method based on Non-Negative Matrix Factorization (NMF) is applied to the spectral representation of data acquired by a WSN to extract features that model the normal behavior of sensor node readings leading to a good representation of data using a low number of features. This procedure is accompanied by a classifier that decides if there is a set of features that deviates from the normal ones. Experiments on soil moisture data show that NMF achieves good results detecting flaws in readings from sensors. Results are compared with other method based on Principal Component Analysis (PCA), the Multi-scale PCA (MSPCA) algorithm.

链接:

http://agri.ckcest.cn/file1/M00/0E/7E/Csgk0F1afHuATDBbAB28HBAkBWs603.pdf

4．一种复杂环境下多传感器数据融合方法

文献源：山东大学学报（工学版）,2019

摘要：针对现有方法没有利用证据数据采集源头的可靠性信息这一问题,结合温度数据采集,提出一种复杂环境下多传感器数据融合算法。从多传感器采集的原始数据出发,通过原始数据分析当前传感器节点的信任度,对当前传感器证据进行相应的修正,从证据源层面修正冲突证据。在证据融合阶段引入支持度修正证据迭代融合思想,比较融合证据与原证据的差异冲突等属性来评估原证据的支持度并修正原证据,将修正后的证据再次融合,多次迭代至最终融合结果收敛。试验仿真与现存的多种融合方法进行比较,仿真结果验证了本研究方法在解决证据冲突问题上的有效性。

链接:

5．Land parcel-based digital soil mapping of soil nutrient properties in an alluvial-diluvia plain agricultural area in China

文献源：Geoderma,2019

摘要：The ability to accurately and precisely perform soil nutrient mapping over large areas is essential in the decision-making processes for precision agriculture. However, existing grid-based or non-grid-based digital soil mapping (DSM) can lead to the problem of mixed units of input information, which causes the mapping results to be unsuitable for direct use in guiding the implementation of precision agriculture. Instead, the goal of this study was to achieve DSM based on land parcels, which are the basic units of agricultural management and have practical geographical significance for precision mapping in agricultural areas. This study established a convolutional neural network-based automatic extraction model to extract land parcels from high resolution remote sensing images. Thirty environmental covariates were chosen and calibrated at land parcels to establish the relationships between soils and landscapes. Four prediction algorithms, namely, ordinary kriging, cokriging, random forest and artificial neural network, were combined with the land-parcel-based DSM framework to develop and evaluate their effectiveness in predicting four topsoil nutrient properties in an alluvial-diluvia plain agricultural region located in Ningxia province, China. The results of comparisons show that, overall, the land-parcel-based RF model achieved the best prediction accuracy; its relative improvement (RMSE%) values over the competing models were 1.27, 4.23, 3.19 and 9.01 for soil organic matter, soil total nitrogen, available phosphorus and available potassium, respectively. In addition, land-parcel-based mapping can improve algorithmic efficiency by approximately 4 times by effectively reducing the mapping units for complex agricultural areas compared with the grid-based mapping results when using the same algorithm, and it also achieves a better performance at the detail level. Overall, the land-parcel-based DSM approach achieved good results in plain agricultural areas, but the model still needs improvement for land-parcel-based DSM in mountainous and hilly agricultural areas, and a challenge remains in selecting the most appropriate environmental covariates.

链接:

6．作物胁迫无人机遥感监测研究评述

文献源：地球信息科学学报,2019

摘要：作物胁迫是全球农业发展的一个重要制约因素,实现快速、大范围、实时的作物胁迫监测对于农业生产具有重要意义。传统的作物胁迫监测方式,如田间调查、理化检测和卫星遥感监测总是受到各种田间条件或大气条件的制约。随着无人机和各种轻量化传感器的快速发展,其凭借高频、迅捷等优势为各种作物胁迫监测提供了一套全新的解决方案。本文在介绍了目前主流的多种无人机和传感器的基础上,首先对目前无人机遥感用于作物监测的主要胁迫类型进行了梳理,然后重点阐述了基于光谱成像和热红外传感器进行作物胁迫无人机遥感监测的应用和技术方法,最后提出了作物胁迫无人机遥感监测尚需解决的关键问题,并展望了未来无人机遥感用于作物胁迫监测的前景。

链接:

http://agri.ckcest.cn/file1/M00/0E/7E/Csgk0F1ae5KAP7DlABPJPamVbBY446.pdf

7．农业大数据基础设施开发的参考模型方法

文献源：华东师范大学学报(自然科学版),2019

摘要：连续的环境观测数据是复杂系统,如天气建模、智慧型科技创新和宏观系统层科学研究的重要驱动力；数据源、应用领域和应用需求的不同,使得管理千差万别的实时数据,并提供有效查找、识别、融合和重用服务变得极富挑战性。数据基础设施通过为数据提供全生命周期的管理服务,为上层数据驱动的科学研究和应用创新提供标准化的数据查询、读取和处理服务。然而数据基础设施的建设常局限于特定领域和历史遗留的前期系统,缺少统一参考,以及基础设施之间数据和服务的互通困难,极大地制约了上层应用,特别是跨学科研究发展的需求。针对大数据基础建设中的上述挑战,借鉴欧洲环境大数据参考模型在环境大数据基础设施建设方面的经验,提出了农业大数据参考模型,为我国农业大数据基础设施建设和所涉及的数据互通挑战提供参考。两个案例展示了所提出的农业大数据参考模型在大数据基础设施的需求分析改进、历史遗留系统的数据互通接入等方面的作用。

链接:

http://agri.ckcest.cn/file1/M00/0E/7E/Csgk0F1aeiyAPdOUADz1VgYBJPQ837.pdf

8．LiDAR-only based navigation algorithm for an autonomous agricultural robot

文献源：Computers and Electronics in Agriculture,2019

摘要：The purpose of the work presented in this paper is to develop a general and robust approach for autonomous robot navigation inside a crop using LiDAR (Light Detection And

Ranging) data. To be as robust as possible, the robot navigation must not need any prior information about the crop (such as the size and width of the rows). The developed approach is based on line extractions from 2D point clouds using a PEARL based method. In this paper, additional filters and refinements of the PEARL algorithm are presented in the context of crop detection. A penalization of outliers, a model elimination step, a new model search and a geometric constraint are proposed to improve the crop detection. The approach has been tested over a simulator and compared with classical PEARL and RANSAC based approaches. It appears that adding those modification improved the crop detection and thus the robot navigation. Those results are presented and discussed in this paper. It can be noticed that even if this paper presents simulated results (to ease the comparison with other algorithms), the approach also has been successfully tested using an actual Oz weeding robot, developed by the French company Naio Technologies.

链接:

http://agri.ckcest.cn/file1/M00/0E/7E/Csgk0F1af0WAWmpkABG-5W7zOgI023.pdf

9．基于嵌入式互联网的远程智能喷雾控制系统设计

文献源：农业工程学报,2019

摘要：为提高设施农业植保作业智能管控能力,该文提出一种基于STM32F101和STM32F103嵌入式技术,结合4G互联网、局域WIFI通信技术及超声波靶标检测算法,能够便捷地对设施作业装备远程视频与控制的方案,达到人机分离与精准施药的目的。该系统在Eclipse和Keil-uvision4开发环境下采用Socket和多线程技术实现双向通信,以TCP通讯协议为媒介,Android端和客户端通过互联网或无线网卡转接移动路由实现远程智能喷雾控制。试验结果表明:1)Android端能够在LAN或Internet中实现智能喷雾装备的近远程控制,软件界面回传状态无卡顿、延时发生,能够准确发射控制指令,实现了对靶标间歇性施药管控;2)系统建立的双向心跳包能够在通信故障情况下迫使喷雾装备处于休眠状态,经测试,心跳包设定时间与喷雾装备休眠响应时间平均相对误差不超过5.50%;3)采用视频帧对冠层中线定位,借助超声检测算法确定风送距离参数且建立冠层体积模型。试验发现,冠层密度对体积测量结果有显著影响,但总体测量准确度可达94.67%。该研究对其他农机装备的智能化管控研究有参考意义。

链接:

http://agri.ckcest.cn/file1/M00/0E/7E/Csgk0F1aeRyARDDtABCH-SpYp9I311.pdf

10．基于CNN的无人机遥感影像质量评价

文献源：林业工程学报,2019

摘要：运用无人机的遥感影像来调查林地状态是一种有效的途径,为了进一步提升遥感图像质量的评价精度,笔者提出了一种基于卷积神经网络(convolutional neural network, CNN)的无人机遥感图像质量评价方法,主要包括图像采集与预处理、数据扩增、模型训练和测试4个阶段。首先对无人机采集到的遥感图像进行主观质量打分,分别获取同一区域不同阶段图像的质量分数;然后运用图像旋转和剪裁等方法对遥感图像进行数据扩增,将扩增后的图片和原始图片融合作为实验数据集;其次在Caffe深度学习框架中构建基于CNN深层特征的回归模型,并训练;最后,根据已建立好的深度回归模型和学习到的参数,预测无人机遥感图像的质量分数。结果表明,提出的方法可以取得较准确的评分效果,在保证客观打分的同时,能基本保持和人眼视觉的感受一致。

链接:

http://agri.ckcest.cn/file1/M00/0E/7E/Csgk0F1aeZaALAUxACwBmziKsyU965.pdf

11．Nanostructured (Bio)sensors for smart agriculture

文献源：TrAC Trends in Analytical Chemistry,2019

摘要：Intense farming represents one of the main sources causing detriments to vital resources as lands and water, due to unsustainable agricultural practices and the resulting environmental pollution. Furthermore, the increasing world population and the impact of climate change contribute to worsen these constraints. To these regards, several attempts have been completed to provide pioneering technologies for facing against these challenges, including nanostructured (bio)sensors. Indeed, nanotechnology-based (bio)sensors, thanks to the exploitation of fascinating properties of functional materials at the nanoscale, can support farmers in delivering fast, accurate, cost-effective, and in field analyses of i) soil humidity, ii) water and soil nutrients/pesticides, and iii) plant pathogens. Herein, we report a glance of the nano nanostructured (bio)sensors developed to support smart agriculture, reporting representative examples form the literature of the last 10 years.

链接:

http://agri.ckcest.cn/file1/M00/0E/7E/Csgk0F1afSGAR-rnABnVJWEf_ME645.pdf

【相关专利】

1．一种农业航空植保自动分级变量施药系统

发布源：国家知识产权局

发布时间：2019-05-10

摘要：本实用新型属于航空植保技术领域，具体涉及一种农业航空植保自动分级变量施药系统。该系统包括药箱、多条施药管路、左分段喷杆和右分段喷杆；关于无人机轴线相互对称设置的左分段喷杆和右分段喷杆位于同一条水平线上，且具有相同的结构；左分段喷杆和右分段喷杆均包括多段长度相等且互不连通的喷杆段，每段喷杆段上设有一喷头；所述药箱的出液口分别与各条施药管路连通，每条施药管路上均设有电动隔膜泵，并分别与左分段喷杆和右分段喷杆中的两个关于无人机轴线相互对称的喷杆段连通。本实用新型能够避免出现由于以固定喷幅喷洒不同最大冠径的果树造成的药液浪费或者漏喷现象，从而达到节能节药的效果。

链接:

http://agri.ckcest.cn/file1/M00/0E/7E/Csgk0F1aa4iAHayfAAWm36H8ouI180.pdf

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