农业与资源环境信息工程专题

本期导读

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➤ 前沿资讯

1．Making steps toward improved data storage（进一步改善数据储存技术）

简介：一个科学家小组创造了世界上最强大的太赫兹电磁脉冲，以精确控制数据存储材料转换物理形态。这一发现有助于创建一种缩小内存设备的方法，从而彻底改变计算机处理信息的方式。计算机光盘可能已经过时了，但它们可能是激发下一代的计算机纳米技术的关键因素。CD光盘中的玻璃层由相变材料组成，当光脉冲使玻璃层小区域中的晶体生长或熔化时，相变材料就可以用来进行信息编码。

来源：EurekAlert

发布日期：2018-11-06

全文链接：https://www.eurekalert.org/pub_releases/2018-11/ku-mst110618.php

➤ 学术文献

1．Computational intelligence in optical remote sensing image processing（计算智能光学遥感图像处理中的应用）

简介：With the ongoing development of Earth observation techniques, huge amounts of remote sensing images with a high spectral-spatial-temporal resolution are now available, and have been successfully applied in a variety of fields. In the process, they bring about great challenges, such as high-dimensional datasets (the high spatial resolution and hyperspectral features), complex data structures (nonlinear and overlapping distributions), and the nonlinear optimization problem (high computational complexity). Computational intelligence techniques, which are inspired by biological systems, can provide possible solutions to the above-mentioned problems. In this paper, we provide an overview of the application of computational intelligence technologies in optical remote sensing image processing, including: 1) feature representation and selection; 2) classification and clustering; and 3) change detection. Subsequently, the core potentials of computational intelligence for optical remote sensing image processing are delineated and discussed.

来源：Applied Soft Computing

发布日期：2018

全文链接：http://agri.ckcest.cn/file1/M00/02/9C/CsgkOFviX3iAb-iRAHizBpnKnpo059.pdf

2．Combined use of agro-climatic and very high-resolution remote sensing information for crop monitoring（将农业气候和高分辨率遥感信息结合用于作物监测）

简介：Accurate and real-time yield forecasting is one of the main pillars for decision making in farming and thus for farmers' profitability. Biomass has been traditionally predicted by multi- and hyperspectral vegetation indices from low- and medium-resolution platforms.

This research work aimed to assess the accuracy of the combined use of agro-climatic information and very high-resolution products obtained with RGB cameras mounted on unmanned aerial vehicles (UAVs) for biomass predictions in maize (Zea mays L.). Two agro-climatic predictors, refere nceevapotranspiration (ETo) and growing degree days (GDDs), and twelve vegetation indices (VIs) derived from RGB bands were calculated for the entire growing cycle. The root mean squared error (RMSE) of the model that considers only GDD to estimate total dry biomass (TDB) was 692.7gm−2, which was reduced to 509.3gm−2 when introducing as predictor variables the VARI and GLI vegetation indices. Difficulties in the radiometric calibration of consumer grade RGB cameras together with sources of error such as the bidirectional reflectance distribution function and the blending algorithms in the photogrammetry processing could decrease the applicability of the obtained relationship and should be further evaluated. This study illustrated the advantage of the combined use of agro-climatic predictors (GDD) and green-based VIs derived from RGB consumer grade cameras for biomass predictions.

来源：International Journal of Applied Earth Observation and Geoinformation
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全文链接:http://agri.ckcest.cn/file1/M00/02/9C/CsgkOFviXVyAU1xUABitc6-5GAg268.pdf

3．Using smart ICT to provide weather and water information to small holders in Africa:The case of the Gash River Basin,Suda（使用智能ICT系统向非洲小农户提供天气和水信息：以苏丹Gash河流域为例 ）

简介：Climate change, water scarcity and food security are becoming increasingly important topics for the growing population of Africa. Due to a general lack of water resources in semi-arid and arid zones, water is an increasingly scarce input in agriculture. The impact of climate change exacerbates this situation further. Even in areas with abundant water resources, optimal use is hampered by insufficient infrastructure to capture these resources and knowledge on appropriate use. With the increased demand and competition for limited water resources the challenge is to increase agricultural production while reducing water consumption ("more crop per drop"). Solutions must be found to enable rural people to overcome poverty, and a start can be made by assisting in food production and water management to combat food insecurity. Local solutions must be adopted in which rural people's access to new technologies increases. Therefore, smart and affordable technologies need to be adapted to customize farm management for this group of African farmers. Poor farmers need to access real-time information, be able to exchange and apply it: smart ICT (e.g. cell-phones backed up by the web) can play a fundamental role in the communication process.

来源：Climate Risk Management
发布日期:2018-10-03
全文链接:http://agri.ckcest.cn/file1/M00/02/9C/CsgkOFviXFSAPb4zAMHjZt1ulVU298.pdf

➤ 科技报告

1．Geologic, hydrologic, and water-quality data from multiple-well monitoring sites in the Bunker Hill and Yucaipa Groundwater Subbasins, San Bernardino County, California, 1974–2016（1974-2016年，加利福尼亚州San Bernardino县通过多井监测系统收集的地质、水文和水质数据）

简介：In 1974, the U.S. Geological Survey (USGS), in cooperation with the San Bernardino Valley Municipal Water District, initiated a study to assess the regional groundwater resources in the Bunker Hill Subbasin of the Upper Santa Ana River Valley drainage basin in San Bernardino County, California. The study area expanded east into the Yucaipa Subbasin in 1996. This report compiles the geologic (borehole lithology and geophysical logs) and hydrologic (water-quality and water-level) data collected from 19742016 for 11 multiple-well monitoring sites (48 individual wells) constructed by the USGS in the Bunker Hill (7 sites) and Yucaipa Groundwater Subbasins (4 sites). Approximately 240 water-quality samples from the 11 sites were analyzed for constituents including major and minor ions, nutrients, selected trace elements, organic wastewater compounds, volatile organic compounds (VOCs), pesticides and degradates, the stable isotopes of hydrogen, oxygen, and nitrogen, and the radiogenic isotopes of tritium and carbon-14. All environmental data associated with these sites are available on the project web page for the San Bernardino Optimal Basin Management study (https://ca.water.usgs.gov/sanbern/) and the Yucaipa Valley Hydrogeology study (https://ca.water.usgs.gov/yucaipa/). Quality-assurance blank samples were processed periodically throughout the study and show that approximately 2.4 percent of the analytical results for major and minor ions, trace metals, and nutrients, and 1.5 percent of the results for VOCs fall below the acceptable study reporting limits and therefore are censored.

来源：美国地质调查局官方网站（USGS）

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全文链接：http://agri.ckcest.cn/file1/M00/02/9C/CsgkOFviWuCAG23bAX4fqiniFi0757.pdf