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## 农牧业信息化专题

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1. 用于电化学测量的参比电极和装置

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## ▶ 前沿资讯

### 1. 潘云鹤：需深入认识人工智能技术新方向

**简介：**“通过对人工智能2.0的深入研究，我们认识到人工智能和机器人的发展呈现出一些新的方向。”10月26日，中国工程院院士潘云鹤在德清召开的IKCEST2018国际高端研讨会上如是说。1956年，美国达特蒙斯学院首次确立了人工智能的概念，即让机器能像人那样认知、思考和学习，也即用计算机模拟人的智能。潘云鹤表示，机器人是人工智能的重要研究领域，也是人工智能发展60年来典型应用领域之一。60年来，模拟人与生物动作的机械取得研究上的重大进展，而应用各种模拟人形机械遇到严峻挑战。“在这60年的发展中，我们看到比机器人发展更快的一个系统，就是无人系统。”潘云鹤认为，无人机、无人车等无人系统的快速成长表明机器人发展的新趋势。他指出，机器人扩展的第一方向是自主智能系统。从聚焦模拟人或生物行为的机械，扩展为对已有机械进行自主化、智能化的改革和升级。“智能自主系统，不是无人系统，往往更具竞争力。”潘云鹤说，“对现有的机械进行自主化和智能化改革，刚好可以应付量大面广的智能化机械的发展，更符合中国制造业转型升级的新需求。”此外，潘云鹤认为，人机融合增强智能系统是机器人发展的另一个新方向。目前，人机交互技术已成为重要研究领域，美国卡内基梅隆大学等著名大学都专门成立了人机交互系。与此同时，各种穿戴设备、人-车共驾、脑控或肌控外骨骼机器人、人机协同手术等实现生物智能系统与机器智能系统的紧密耦合，在外科和脑手术中已经开始使用。“人工智能2.0的关键理论与技术的发展方向，包括大数据智能、群体智能、跨媒体智能、人机混合增强智能、自主智能系统等；其应用则包括智能城市、智慧医疗、智能制造等。”在潘云鹤看来，对人工智能2.0的技术新方向，要进行深入认识。当前，在国家规划的指导下，中国的很多地区和企业都纷纷制定人工智能发展方向，摩拳擦掌，准备大干一番。潘云鹤相信，中国人工智能技术与产业一定能够促进中国的经济与社会走向一个高质量、高水平的快速发展期。本次会议由联合国教科文组织和中国工程院共同主办，联合国教科文组织国际工程科技知识中心（IKCEST）等承办。中国工程院院长李晓红、浙江省副省长王文序出席会议并致辞。

**来源：**科学网

**发布日期：**2018-10-26

**全文链接：**<http://agri.ckcest.cn/file1/M00/02/9D/Csgk0Fv2dHiAG435AAgzrbfc0jQ266.pdf>

### 2. 邬贺铨：AI是把双刃剑 “眼见不一定为实” 值得警惕

**简介：**11月7日至9日，第五届世界互联网大会在浙江乌镇举行，在8日下午的《人工智能：融合发展新机遇》论坛，中国工程院院士、中国互联网协会理事长邬贺铨发表了以《人工智能的双刃剑》为题的演讲。邬贺铨院士认为，人工智能的发展是一把双刃剑，当前，大数据和强算力促进了概率计算取得巨大的进步，AI在分析相关性上也取得了显著进展，并且在很多领域产生了深远影响。“人工智能的典型应用是代替人类做大量重复的劳动，利用AI技术一分钟就能完成一个信息安全分析师一年的分析数据和代码工作，极大地提升了生产力”，邬贺铨院士说。在这边双刃剑的背面，他指出，AI的能力也只是处于起步阶段，深度学习目前实质是通过把曲线拟合到数据上实现分类，AI在因果关系计算上仍然无能为力，不确认性的概率计算模型需求巨量的空间和时间。他还提到AI有可能让未来出现“眼见不一定为实”，被谣言制造者利用等问题，国外某社交软

件，有着大量的僵尸程序，这就造成了假新闻泛滥或者放大谣言，这都值得警惕。邬贺铨院士预测，在未来AI的双刃剑特征会愈演愈烈，我们需要从法律、管理和技术等多方面来扬长避短。

来源：网易智能;;网易

发布日期:2018-11-08

全文链接:<http://agri.ckcest.cn/file1/M00/02/9D/Csgk0Fv2c-KASnZEAAgsw28arf4176.pdf>

### **3 . NIRS device to measure nutrient in pasture (测定牧草养分的NIRS装置)**

**简介:**一种快速检测草原养分水平的新方法允许农民快速监测牧场养分的变化，并相应地调整放牧方式。通过将分析时间从16个小时减少到不到一分钟，这个“相对便宜和简单的方法将大大提高草原的可持续管理——世界许多地方的主要农业形式，和反刍家畜的一种廉价和可负担得起的营养来源，反过来又为人们提供肉和奶，”每日科学报道。研究人员在《Frontiers in Sustainable Food Systems》期刊上发表的文章表明，利用这种新方法，牧场过度放牧至7cm以下，会显著降低草原的蛋白质含量和消化率。这项研究的主要作者、英国诺丁汉大学生物科学学院的助理教授Matt Bell说：“实时营养监测可以提供一种比目前农民使用的更及时、更适应的牧场管理方式，并且可以提高生产力，”NIRS技术。为了更有效地管理牧场，研究人员校准了一种手持近红外光谱(NIRS)设备来测量牧场中的营养物质。NIRS技术测量白光照射下样品反射的能量谱，提供不同营养水平的信息。它将分析所需的时间从大约16小时减少到不到一分钟。使用这种新方法，这项研究的合著者Luca Mereu在诺丁汉大学农场收集样本，以评估牧场养分的变化以及可能导致这些变化的因素。结果表明，牧草高度和覆盖度的降低与消化率降低、蛋白质浓度降低有关。避免低于7厘米的高度。Bell解释，“密集放牧的牧场应避免低于7厘米的高度，否则动物的营养摄入量将受到限制。在这个高度以下，草的成分更多的是茎和残留的植物材料，而不是营养植物材料。我们的研究证实了这种新的手持NIRS技术可以用于更好的草地管理决策和牧场可持续生产的利用。”研究人员说，他们希望研究其他可能影响牧场养分变化的因素，比如植物成分、不同的放牧动物和一天内的变化。“这可能有助于农民决定放牧牛羊的最佳时间，以及青贮饲料的管理。”

来源：FUTUREFARMING.com

发布日期:2018-11-21

全文链接:<http://agri.ckcest.cn/file1/M00/02/9D/Csgk0Fv2c0OAFJJ-AAkxA92BkK4485.pdf>

### **4 . Putting food-safety detection in the hands of consumers (把食品安全检测交给消费者)**

**简介:** MIT Media Lab researchers have developed a wireless system that leverages the cheap RFID tags already on hundreds of billions of products to sense potential food contamination -- with no hardware modifications needed. With the simple, scalable system, the researchers hope to bring food-safety detection to the general public. The researchers' system, called RFIQ, includes a reader that senses minute changes in wireless signals emitted from RFID tags when the signals interact with food. For this study they focused on baby formula and alcohol, but in the future, consumers might have their own reader and software to conduct

food-safety sensing before buying virtually any product. Systems could also be implemented in supermarket back rooms or in smart fridges to continuously ping an RFID tag to automatically detect food spoilage, the researchers say. The technology hinges on the fact that certain changes in the signals emitted from an RFID tag correspond to levels of certain contaminants within that product. A machine-learning model "learns" those correlations and, given a new material, can predict if the material is pure or tainted, and at what concentration. In experiments, the system detected baby formula laced with melamine with 96 percent accuracy, and alcohol diluted with methanol with 97 percent accuracy. "In recent years, there have been so many hazards related to food and drinks we could have avoided if we all had tools to sense food quality and safety ourselves," says Fadel Adib, an assistant professor at the Media Lab who is co-author on a paper describing the system, which is being presented at the ACM Workshop on Hot Topics in Networks. "We want to democratize food quality and safety, and bring it to the hands of everyone." The paper's co-authors include: postdoc and first author Unsoo Ha, postdoc Yunfei Ma, visiting researcher Zexuan Zhong, and electrical engineering and computer science graduate student Tzu-Ming Hsu.

来源: EurekAlert

发布日期:2018-11-14

全文链接:

<http://agri.ckcest.cn/file1/M00/02/9D/Csgk0Fv2cqWAB1p-AAN4CybdvJ8854.pdf>

## ➤ 学术文献

### 1 .Optimal control of Chinese solar greenhouse cultivation (中国日光温室栽培的优化控制)

简介: The benefits of introducing heating, CO<sub>2</sub> supply, ventilation and LED lighting in a Chinese solar greenhouse are investigated. To that end, a two time-scale receding horizon optimal control system is assumed to accompany the introduction. The model of the Chinese solar greenhouse dynamics used by the optimal control system incorporates the effect of a north wall, present in any Chinese solar greenhouse. This wall stores heat during the day and releases heat at night to improve temperature. The optimal control system also takes control of a thermal blanket, that can be partly opened and closed to reduce heat loss to the environment. Apart from performing real-time optimal control, the optimal control system enables computation of improvements in terms of profit. Finally the feasibility of real-time implementation of the two time-scale receding horizon optimal control system on a personal computer is verified.

来源: Biosystems Engineering

发布日期:2018-05-21

全文链接:

[http://agri.ckcest.cn/file1/M00/02/9D/Csgk0Fv2cjyAAXAgABbhFxV\\_wV8758.pdf](http://agri.ckcest.cn/file1/M00/02/9D/Csgk0Fv2cjyAAXAgABbhFxV_wV8758.pdf)

## 2 . A general approach to one-step fabrication of single-piece nanocomposite membrane based Pb<sup>2+</sup>-selective electrodes (基于Pb<sup>2+</sup>选择电极的单片纳米复合膜一步制备的一般方法)

简介: A simple and general approach leading to well-dispersed and surfactant-free multi-walled carbon nanotubes (MWCNT) based single-piece Pb<sup>2+</sup>-selective nanocomposite membrane is proposed. The single-piece solid-contact Pb<sup>2+</sup>-selective electrodes were prepared via one-step drop casting the ultrasonicated suspension mixture on the golden electrodes. The obtained electrodes exhibited a Nernstian response slope of  $29.0 \pm 0.2$  mV/decade in the linear range from  $2.0 \times 10^{-3}$  to  $2.0 \times 10^{-9}$  M and a low detection limit of  $4.0 \times 10^{-10}$  M. Due to the inherent high capacitance and hydrophobicity of nanocomposite membrane, excellent long-term potential stability and absence of water films were observed. Moreover, the sensor showed good resistance to interfering agents such as redox couple, light and gases. In addition, the proposed electrodes were demonstrated to be feasible for Pb<sup>2+</sup> determination in tap water. Overall it was demonstrated as an appealing sensor for lead (II) detection for environmental and clinical applications.

来源: Sensors and Actuators B: Chemical

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全文链接:

<http://agri.ckcest.cn/file1/M00/02/9D/Csgk0Fv2cYSATC7QABGxXdOnBTk206.pdf>

### ➤ 相关专利

#### 1 . Reference electrode and an arrangement for an electrochemical measurement (用于电化学测量的参比电极和装置)

简介: The present invention relates to the field of measuring and to electrochemical measurement, and more particularly to a reference electrode and to an arrangement for an electrochemical measurement. A reference electrode (13) for an electrochemical measurement according to the present invention comprises an inner reference element (14), which inner reference element (14) has been embedded into a solid electrochemically active composite material (15). An arrangement (16) for an electrochemical measurement comprises an inner reference element (17) and at least one indicator electrode (19), (20), which inner reference element (17) and the at least one indicator electrode (19), (20) have been embedded into a solid electrochemically active composite material (18). The solution according to the present invention may be utilized in any kind of electrochemical measurement in the fields of e.g. clinical analysis, environmental analysis and industrial analysis.

来源: 美国专利商标局

发布日期:2018-10-09

全文链接:

<http://agri.ckcest.cn/file1/M00/02/9D/Csgk0Fv2cHuAaFm4AAzacpLPFLs447.pdf>