Perspective

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Row Spacing Differences on Variation Coefficient of Stubble Height Consistency

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Description

To improve the utilization of peanut vines as animal feed and address the inability of current agronomic and agricultural machinery in China to adapt and the low levels of mechanized peanut production, a “three-stage” harvesting mode, “vine cutting harvesting – digging and drying – pickup and picking”, that produces peanut vines suitable for feed was proposed. The general agronomic process of mechanized peanut production under this mode was studied, and the requirements for integrating agricultural machinery and agronomy into each key production process were proposed. Plant characteristics, stubble height consistency and pickup effects were measured and tested in the field. The influence of ridge height differences, ridge width differences and row spacing differences on the variation coefficient of stubble height consistency and their significance were analysed. The results showed that the influence of ridge height differences and ridge width differences was significant and that of row spacing differences was not significant. The influence of pickup spring finger spacing, soil penetration depth, forward speed, variety, stubble height and the variation coefficient of stubble height consistency on the pickup rate and the pickup dropping rate, and their significance were studied. The results showed that the stubble height and its consistency variability coefficient had an extremely significant impact on the pickup rate and the spring finger spacing had a significant impact; the soil penetration depth and forward speed had significant effects on the pickup dropping rate, and the stalk connection force and the stubble height had an extremely significant impact.

Summarizes The Research Status Of Agricultural Iot

Agricultural Internet of Things refers to a network in which physical components, such as animals and plants, environmental elements, production tools, and various virtual “objects” in the agricultural system, are connected with the internet through agricultural information perception equipment under certain protocols to perform information exchange and communication. It intends to realize the intelligent identification, positioning, tracking, monitoring, and management of agricultural objects and processes. The “human-machine-things” interconnection of agricultural IoT can help humans recognize, manage, and control various agricultural elements, processes, and systems in a more refined and dynamic way. It can also greatly enhance human's understanding of the essential parts of the lives of agricultural animals and plants help with the ability to control complex agricultural systems, and assist in handling agricultural emergencies. At present, worldwide research on agricultural IoT technology is both extensive and intensive, but applications are generally in the experimental demonstration stage. This paper systematically summarizes the research status of agricultural IoT. First, the current situation of agricultural IoT is illustrated and its system architecture is summarized. Then, the five key technologies of agricultural IoT are discussed in detail. Next, applications of agricultural IoT in five representative fields are introduced. Finally, the problems existing in agricultural IoT are analyzed and a forecast is given of future development of agricultural IoT. With the wide application of IoT technology in agriculture, driven by the development of the Internet, digital technology, and sensing technology, sensors made using new technologies are constantly emerging and developing towards the direction of being embedded, intelligent, integrated, and miniaturized. At present, the United States, Japan, and Germany are ahead of other countries in sensor technology and manufacturing processes, and they occupy a dominant position. The functions of agricultural sensors are becoming increasingly diversified, including soil sensors, meteorological sensors, water sensors, and plant sensors. These sensors detecting various objects provide powerful support for agricultural production data collection.

Strengthen the Sustainable Development Ability of Agriculture

The globe's population is increasing day by day, which causes the severe problem of organic food for everyone. Farmers are becoming progressively conscious of the need to control numerous essential factors such as crop health, water or fertilizer use, and harmful diseases in the field. However, it is challenging to monitor agricultural activities. Therefore, precision agriculture is an important decision support system for food production and decision-making. Several methods and approaches have been used to support precision agricultural practices. The present study performs a systematic literature review on hyperspectral imaging technology and the most advanced deep learning and machine learning algorithm used in agriculture applications to extract and synthesize the significant datasets and algorithms. We reviewed legal studies carefully, highlighted hyper spectral datasets, focused on the most methods used for hyper spectral applications in agricultural sectors, and gained insight into the critical problems and challenges in the hyper spectral data processing. According to our study, it has been found that the Hyperion hyper spectral, Landsat-8, and Sentinel 2 multispectral datasets were mainly used for agricultural applications. The most applied machine learning method was support vector machine and random forest. In addition, the deep learning-based Convolutional Neural Networks (CNN) model is mainly used for crop classification due to its high performance with hyper spectral datasets. The present review will be helpful to the new researchers working in the field of hyper spectral remote sensing for agricultural applications with a machine and deep learning methods. This paper quantitatively analyzes the input–output of energy values, environmental carrying capacity and the effect of ecosystem operation for the agricultural ecosystem in Shangri-La County, which is one of the tourism regions in Yunnan province. The aim of this paper is to better understand the utilization of solar energy resources and the sustainable development of agriculture. The results showed that the energy yield rate in the area of study was 342.66, the energy investment rate was 0.01, and the energy density was 3.49 × 1011 sej/m2. The emergy input per capita was 2.32 × 1016 sej/pp, and the emergy yield per capita was 8.42 × 1016 sej/pp. This work revealed that the environment contribution rate was 98.97%, the renewable resource input rate was 97.34%, the non-renewable natural resource input rate was 1.63%, and the non-renewable industrial resource input rate was 1.03%. Besides, the study also showed that the environmental capacity was 0.027, and the environmental sustainability index was 12,691.11. The results affirmed that the agricultural economic development was relatively backward, and the sustainable development ability was weak. To advance the agricultural economy and strengthen the sustainable development ability of agriculture, it is necessary for the Shangri-La County authority to pay more attention to increasing the high-grade ability energy, adjustment of the emergy investment structure and agricultural development mode transformation.