基于神经网络的作物营养诊断专家系统

Crop nutrition diagnosis expert system based on artificial neural networks

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中文摘要：

针对传统专家系统自学习能力差的缺点，设计了基于神经网络的作物营养诊断专家系统。收集了小麦缺素时的田间宏观表现、叶部、茎部、果实症状及引起缺素的原因，由专家进行诊断，将其在诊断过程中输入的可信度值和结论作为神经网络的输入神经元和输出神经元。在PC机上经过神经网络学习产生的学习结果存入永久性存储器中作为系统知识库的一部分，然后采用MCS-51C进行设计，在单片机上实现了整个系统的诊断功能。通过田间试验表明该系统充分模仿了专家现场诊断的功能，大大提高了诊断效率。

英文摘要：

Aimed at the low self-learning ability drawbacks of traditional expert system, artificial neural networks(ANN) were applied in crop nutrition diagnosis system. Wheat nutrition disorder symptoms were collected from the following five aspects: macroscopical phenomenon, stalk (root) symptoms, leaf symptoms, fruit symptoms and crop nosogenesis. After field diagnosis from these five aspects by experts, the confidences and the corresponding conclusions which they inputted were as the input neurons and output neurons of the ANN. Running on a personal computer, the ANN study results were obtained, and then were saved in flash memory and regarded as the system knowledge base. Using MCS-51C language, the diagnosis function was realized on the single chip computer. The analysis of the field validation test results indicates that this system adequately simulates the expert diagnosis process, and greatly improves the diagnosis efficiency.

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