

基于ARM9的电子鼻系统设计与应用 Development and Application of an Electronic Nose System Based on ARM9

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摘要: 提出了一种基于嵌入式电子鼻的设计方案, 主要包括传感器阵列、模数转换和微处理器3大模块。采用Figaro公司TGS813、TGS825、TGS880 3个气敏传感器组成的传感器阵列采集样品信号; 利用MAXIM公司的MAX1270芯片进行模数转换; CPU采用SAMSUNG公司的S3C2410微处理器, 并在其上移植了WINCE操作系统。软件设计对采集信号进行对数拟合, 采用引进BP神经网络对拟合后的曲线参数进行训练, 建立模型并对样本进行识别利用该系统对4种不同生产日期的意大利巴马臣干酪和3家公司的纯牛奶进行了测试, 识别准确率均达到100%。结果表明该系统具有体积小、重量轻、使用方便灵活且识别准确率高等优点。An embedded electronic nose is developed including three modules, a sensor array, an A/D system, and a microprocessor. The sensor array composed of three gas sensors, TGS813, TGS825 and TGS880 produced by Figaro company, is used to collect sample signal. A MAX1270 chip produced by MAXIM company is used as A/D converter. The S3C2410 microprocessor produced by SAMSUNG company is used as CPU with the embedded operating system WINCE. The signal is simulated by a logarithm curve by designed software, and BP neural network is used to train the curve parameters and build the model to identify the samples. This system is used to identify Italian Ambrosi cheese with four different production dates, and the recognition accuracy reaches 100%. To identify pure milk in three different companies, the recognition accuracy reaches 100% too. The results show that the system has several advantages such as small size, light weight, easy to use, high recognition accuracy etc.

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