

WSN土壤湿度采集节点电压补偿方法研究 Voltage Compensation Method of WSN Soil Moisture Acquisition Nodes

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摘要: 针对适用于WSN土壤湿度采集节点的EC-5传感器对电源电压敏感的问题,从传感器工作原理入手分析电源电压引起检测误差的来源,且发现当传感器各项参数确定后,这种误差随着被测土壤湿度增大而增大。采用CC2430芯片作为WSN信息传输节点,建立具有多节点的上下位机WSN土壤湿度采集系统,以节点电压 u 和被测土壤实际湿度 θ 为对象,运用神经网络对采集节点中非线性土壤湿度传感器系统进行逆向建模,在上位机上实现由电源电压引起EC-5传感器检测误差的补偿,实验结果表明,该方法能有效地减少节点电池电压变化对WSN土壤湿度采集精度的影响。 Aimed at the voltage-sensitive problem of EC-5 sensor which was suitable for WSN soil moisture acquisition nodes, the sources of detection error was analyzed according to the sensor working principle. It was found that the error would increase with the soil moisture when sensor parameters were determined. Using CC2430 platform as WSN information transmission node, WSN soil moisture acquisition system with multiple nodes based on controller and host computer was established. Taking node voltage u and the real soil moisture θ as parameters, the inverse modeling of nonlinear soil moisture sensor system was performed by neural network, and the compensation of EC-5 sensor detection error caused by supply voltage was implemented in host computer. Experimental results showed that this method could sharply reduce the influence caused by node voltage variation and improve the detection precision.

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