

嵌入式系统重构过程中功能构件提取技术研究

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摘要: 针对嵌入式系统重构过程中遇到的功能构件提取不准确、重用率低的情况, 提出了一种适合于嵌入式系统功能构件提取的工作流程. 建立了符合嵌入式系统特点的构件模型, 并给出了模型的形式化描述. 根据构件模型, 采用基于耦合度度量的聚类分析方法对固件代码的功能构件进行逐层实现和提取. 提出了基于模型验证的功能构件验证方法. 对比实验表明该方法极大地提高了嵌入式系统重构过程中功能构件提取的准确率, 并提升了原有系统的可重用性.

关键词: 嵌入式系统; 重构; 逆向工程; 功能构件; 软件体系结构; 耦合度

Research on Functional Component Extraction in Embedded System Reconstruction

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Abstract: Aimed at the inaccuracy and low reuse rate of functional component extraction in embedded systems reconstruction, a procedure suitable for embedded system functional component extraction is presented in this paper. A component model is established conforming to the characteristics of embedded systems, and a formal description of the model is given. According to the component model, firmware code functional component is implemented and extracted layer by layer using cluster analysis method based on coupling measurement. Functional component verification method is proposed based on model verification. By contrast experiment, this method greatly improves the accuracy of functional component extraction in embedded systems reconstruction, and enhances the reusability of original system.

Key words: embedded system; reconstruction; reverse engineering; function component; software architecture; coupling

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