

网络与通信

一种适用于煤矿安全监控系统的CAN总线应用层通讯协议

李恩¹;蔡丽²;梁自泽²;张文亚^{2,2}

中国科学院自动化研究所¹

收稿日期 2006-3-24 修回日期 2006-5-29 网络版发布日期 2006-8-31 接受日期

摘要 针对煤矿安全监控系统中的CAN总线通讯,提出了一种适用于该系统的应用层通讯协议。通过对CAN2.0B帧结构的分析,根据监控系统的通讯要求对扩展帧的报文标识符的各位进行了定义,用来存放通讯中的控制信息,而8字节长度的数据场可以全部用来存放通讯数据,进而提高了通讯效率。基于管道技术设计了支持多线程通讯的应用层通讯协议,实现了监控系统中的命令和数据并行传输。基于帧号和位图进行数据包的拆分与重组,解决了由于CAN总线本身的短帧结构所造成的大数据量传输困难的问题。最后对通讯过程中的控制协议及其帧格式的构成进行了简要的阐述。

Abstract In this paper, we proposed an application layer communication protocol which was suitable for CAN(Controller Area Networks) bus based colliery safety monitoring systems. After analyzing the frame structure of CAN 2.0B and the communication requirements of the monitoring system, we gave a definition for each bit of message identifier in the extended data frame to carry communication control information. Consequently, all of the eight bytes in the data field can be used to transmit actual data and then the CAN bus based communication efficiency was improved. The application layer protocol with multi-pipe technique can support the multi-thread communication between the transmitter and the receiver, and the command and captured data can be transmitted simultaneously in the monitoring system. The CAN bus short frame structure may result in the transmission failure of the large size data, while the frame number and bitmap technique can effectively solve the problem. Finally, the control protocol of the application layer and its frame format were briefly introduced.

关键词 [现场总线](#) [通讯协议](#) [监控系统](#) [多线程](#)

Key words field bus; communication protocol; monitor system; multi-thread

分类号

DOI:

通讯作者:

李恩 en.li@ia.ac.cn

作者个人主页: 李恩 蔡丽 梁自泽 张文亚

扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF](#) (897KB)

▶ [\[HTML全文\]](#) (0KB)

▶ [参考文献\[PDF\]](#)

▶ [参考文献](#)

服务与反馈

▶ [把本文推荐给朋友](#)

▶ [加入我的书架](#)

▶ [加入引用管理器](#)

▶ [引用本文](#)

▶ [Email Alert](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

相关信息

▶ [本刊中 包含“现场总线”的 相关文章](#)

▶ 本文作者相关文章

· [李恩](#)

· [蔡丽](#)

· [梁自泽](#)

· [张文亚](#)

·