

Development of a safety-critical CAN Protocol for a medical application

Motivation

In nowadays intensive medical care ARDS (acute respiratory distress syndrome) became one of the most problematic disease patterns. Mortality rate for ARDS is still between 40 and 60 percent.

A newer treatment option for this illness is the extracorporeal oxygenation. Here the patient is connected to an oxygenator. This device realizes a high percentage of the needed gas exchange with the blood outside the human body. The lung is disencumbered during this procedure in order to have a chance to regenerate faster.

The overall aim of the project SmartECLA is to optimize the used devices for the extracorporeal oxygenation according to the medical requirements and to develop a safety driven closed-loop control for this system. SmartECLA is part of a research network of 6 chairs out of 4 different faculties founded by the DFG.

Task

The concept of system planes several autonomous devices that shall communicate with each other via CAN-Bus. It is the task of the described thesis to work out a fault tolerant CAN Protocol definition with respect to the special needs of the project. Therefore also existing CAN-Protocols should be looked at and based on these protocols a specification shall be developed.

Outline

- Familiarize with the topic
- Point out the requirements towards the communication-protocol
- Comparison with existing CAN-Protocols
- Detailed specification of the developed CAN-Protocol
- Exemplary implementation
- Documentation of the results

Goal

The aim of the thesis is to create a detailed definition for the CAN-Protocol that shall be used in the project SmartECLA.

Fields of Study

- Computer science, electrical engineering or comparable

Student

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