Development of a Metric for the Evaluation of Different Hardware Platforms with Respect to a Safety-Critical 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 ex-change 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 control system to be established will need different kinds of sensors. In order to connect to all these different sensors it is planned to find a common hardware platform to implement the translation and forwarding on the data. It is the task of the described thesis to find a basis of valuation for the different kinds of hardware. In the end there shall be an exemplary implementation on one platform.

Outline:

- Familiarize with the topic
- Point out the requirements towards the hardware
- Develop a metric with respect to the requirements
- Comparison and evaluation of the different hardware platforms
- Exemplary implementation
- Documentation of the results

Goal

The aim of this thesis is to compare different hardware platforms and evaluate them objectively.

Fields of Study

- Computer science, electrical engineering or comparable

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