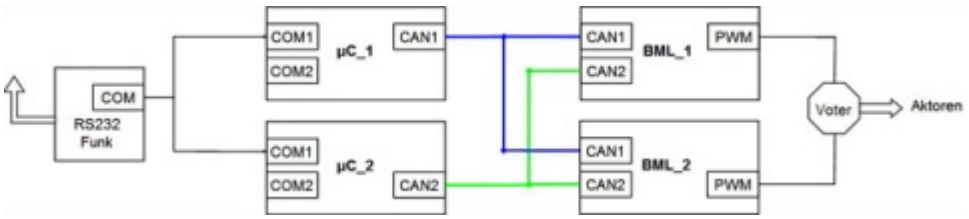
Design and Integration of an Autonomous Parking Assistant in an Experimental Vehicle for Automotive Software

Tasks

We are planning to implement an autonomous parking assistant on our experimental vehicle for demo purposes. The assistant is supposed to detect potential parking spots and maneuver the vehicle into the parking spot independently through actuator control.

Source: BMW Press Release

In order to implement such a system, we need to select adequate sensor technology and integrate it into the vehicle. The implementation of the actual parking algorithm will be done on an embedded PC in PC/104 format which is supposed to be made real-time capable by applying RTLinux. The RTLinux was chosen for our vehicle in the earlier thesis (Design and Implementation of a Drive-by-wire Architecture) due to its high performance as a central control device.



These components - sensor technology and PC - shall be integrated into the existing and redundantly constructed architecture of the model car. The architecture consists of a main module (uC1/ &uC2) and a control module (BML_1/BML_2) which exchange information through a CAN bus (CAN1/CAN2).

Your task in this thesis will be examining the effects on reliability, safety and availability of a system as a whole when integrating new components into a given hardware architecture. For this purpose, you will create various models and evaluate them. In addition to that, you have to consider further aspects such as expandability, modifiability and maintainability for your evaluation.

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