Introduction of Arduino Fachproject

Bring Your Idea into Reality: Design and Implement Your Own Embedded Systems

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Modul:	Design of Embedded Systems
Size:	Up to 24 students
Languages	Deutsch (with the flexibility of English)
Introduction:	We offer a project for students to design and implement the hardware-in-the-loop CPS, such as robots and smart home systems. The mechanism can be found in the following figure. The students are expected to learn how to design and implement a embedded system including both hardware and software parts, e.g., a) A smart car that can response to obstacles; b) a smart home system that can control the temperature, light and other features at home automatically. Students can learn an example of how A/D converts, information processing, D/A converts, and communications should be designed to make the system behavior predictable. We will provide a completed tool kit of Arduino for each sub-group (with the latest MEGA2560 R3 Development Board + USB Cable + LCD1602 + Resistance + LED + Power supply module + Relay and other accessories). Furthermore, we will

	also supply a certain budget for each sub-group to buy additional material or components that are needed in their final project. The final project has no predefined scope and will allow students to have wild imaginations of their projects. Any good idea is encouraged. Each sub-group should submit a project report and give a short presentation of their final results. Towards this, there will be a presentation afternoon, in which all the sub-groups have to present their results and share the experience with each other.
Objectives:	After attending the project, the students can build their confidence and experience for designing and implementing complex embedded systems from themselves. They should be able to apply programming languages (C-like), formal models, and tools to implement the design. This project can improve their competence to integrate software and hardware components.
Schedule:	14 weeks in total, (3 hours a week)

	4 weeks	Introduction and Training: We will provide several tutorials about how to apply the Arduino board. And several others' projects will be shown and explained.
	4 weeks	Design your own embedded system (1)
	1 week	Mid-term inspection and evaluation
	4 weeks	1. Design your own embedded system (2) 2. Report writing
	1 week	Presentations