Participation in the Carolo Cup 2008

General

| The student team "GalaXIs" sponsored by the Chair of Computer Science 11 has won this year's Carolo-Cup for autonomous model cars of the TU Braunschweig. The Carolo-Cup award comes with 10.000 Euros prize money and took place for the very first time this year.

The aim of the contest is to offer students the possibility to deal with interdisciplinary problems from the field of electrical engineering, mechanical engineering and computer science at an early stage. Experience in the practical transfer of knowledge along with teamwork, project and time management optimize qualifications for career entries.

Every concept is compared to concepts of other participating teams and is finally evaluated whereas the teams are challenged in various static and dynamic disciplines.

The Static Disciplines

| The three static disciplines are evaluated as parts of a conceptual presentation whereas each team must present and defend its concept to/against experienced jurors from the industry and research area. The presentation is divided into the following categories:

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Production costs and energy balance (50 points)
-
Parking concept (150 points)
-
Concept of automatic guidance incl. change maneuvers (150 points)

The 30-minute presentation is followed by a 20-minute talk with the jurors.

The Dynamic Disciplines

| The dynamic disciplines challenge actual abilities of the autonomous model cars. The disciplines are in particular:

- Parallel parking (200 points)
- Circular track without obstacles (200 points)
- Circular track with obstacles (250 points)

In the case of parallel parking, the car must drive along a straight route, search for a suitable parking lot and park without striking the obstacles (white boxes). After the parking procedure is completed the car must stand in a straight position with a deviance of max. 5°.

The circular track represents a winding country road. The cars must drive three rounds within a possibly short time. In the third discipline "Circular track with obstacles", parking cars are distributed on the own lane as well as on the left lane such that evasion requires the use of indicators. Of course, the car may not strike the obstacles.

The dynamic disciplines can be viewed in the media section of this page.

The Galaxis Team

The team of 2008 consisted of five students:

- Yves Duhr - 21 years - computer science (aspired degree: Diplom) (5th semester)
- Philipp Fischer - 20 years - computer science (aspired degree: B.Sc.) (3rd semester)
- Stefan Kockelkoren - 27 years - (aspired degree: Diplom) (9th semester)
- Julian Krenge - 21 years - (aspired degree: Diplom) (5th semester)
- Hugues Tchouankem - 30 years - electrical engineering (aspired degree: Diplom) (9th semester)

The Model Car

The model car was designed based on a Tamiya TT-01 Chassis, on which we mounted a camera stand for optimized field of vision.

The applied camera and the image processing microcontroller represent a complete module, the CMUcam3, that can be programmed in C. A second microcontroller (Atmega 128) is responsible for reading and evaluating sensor data that is transferred to the ARM7TDMI processor of the CMUcam in a fixed protocol via an RS232 interface.

The sensors that we applied were 3 ultrasonic sensors (SRF08), 2 optocouplers with home-made wheelencoder disks and 1 infrared sensor.

The architecture overview:
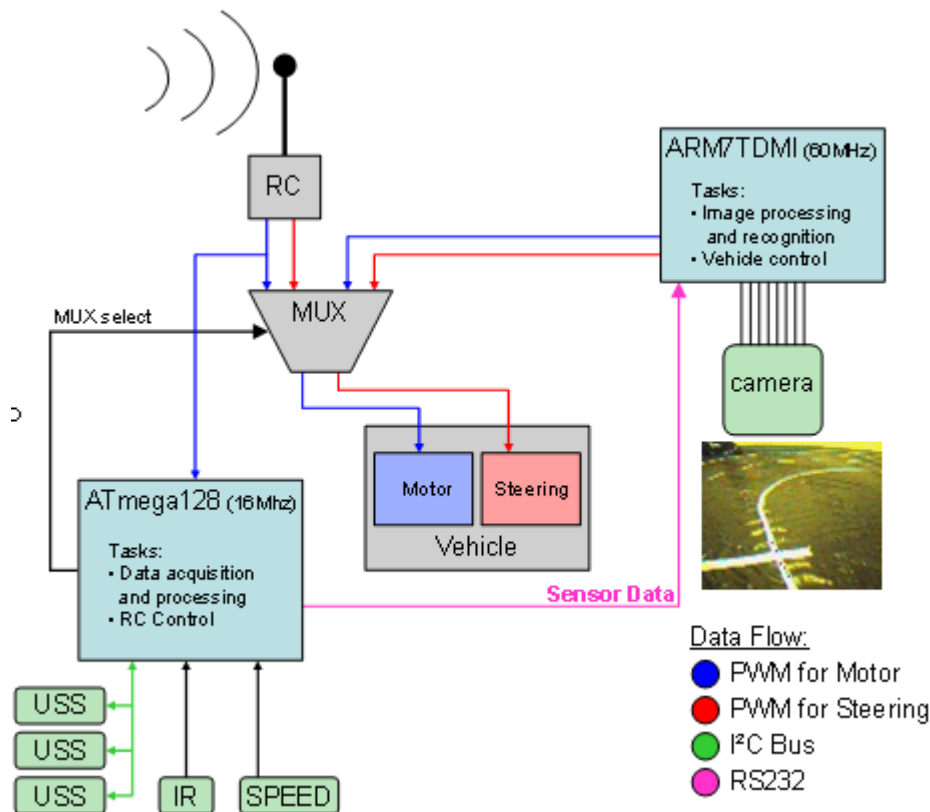
Media

- Videos
  - The car on a test route at i11 (12 MB) (vorbeifahrt.mpg)
  - Parking process (27 MB) (einparken.mpg)
  - Change maneuver (27 MB) (ausweichen.mpg)
- Links
  - Team GalaXIs Homepage
  - Pictures of the Carolo-Cup 2008 on the official web site

Contact

In case of further questions, please contact Dr. rer. nat. Andreas Polzer.

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