Semi-automatic R²Pi Navigation

Modul INF-BSc-251: Fachprojekt „Design of Embedded Systems“-WS15
Supervisor: M. Sc. Kuan-Hsun Chen
Kuan-Hsun Chen | Dortmund 16.06.15
LEGO Mindstorms Robot ev3 + Raspberry Pi = Semi-automatic R²Pi Navigation

- Real-Time Traffic Situation
- Remote Control
- Energy Saving
- Information Processing

Source: http://media.ford.com
Included Hardware

- Raspberry Pi
- Pibrella (I/O device)
- Display + Keypad module (Optional)
- Bluetooth Control (Optional)
- Ev3 LEGO + WEDO Sensors
  - Open source Firmware.
[Software] Raspberry Pi

- RTEMS RTOS
- GPIO APIs
- I/O Task Scheduling
- Version control / Coding style

Raspberry Pi Model A and B GPIO pins

- Yellow: GPIO
- Black: Ground
- Orange: 3.3v
- Red: 5v

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[Software] Ev3 LEGO Robot

- Ev3dev/LABVIEW
- Motor Control
- Signal Identification
- Obstacle Avoidance (Optional)

Stop  Turn Around  Speed Up

Follow the Path

A/D Conversion

Sound

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Workload Schedule (~16 weeks 19.10.15 – 12.02.16)

- RTEMS Pi Group (8 people) : GPIO, Scheduling, Lifetime Extension
- Robot Group (8 people) : LABVIEW, Data Gathering, Motor Control
- Each group has to hand in the paper report weekly.
Required Skills

- Knowledge of Java and C
- Knowledge in Linux-Liked Env.
- Some Hardware Knowledge

Acquired Skills afterward

- Low level programming in C
- Real-Time Application Programming
- LEGO Robot Programming
- Github (Open Source)/Coding Conventions
- Team Programming

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