

#### **Brief Course Outline**

- Breaking Interface Conventions?
- Exercise creating a cooperative multi user game
- Nature and Value of Physical Prototyping
- Break
- Smart-its basics
- Smart-its enhanced light
- Lunch break
- Students project (afternoon) Smart-its enhanced light

sical Prototyping, Albrecht Schmidt

- Smart-its enhanced light results
- Building Smart-its hardware
- Break
- Developing Smart-its Software
- Smart-its Examples
- Wrap-Up

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# Smart-its Device Setup Device consists of a core and optionally a AddOn component Core processing Wireless and wired communication debugging I/O AddOn Sensors Actuators Other forms of communication Other forms of communication 29 with







#### Do It Your Self Approach

- Building prototypes requires it!
- Building Smart-Its yourself let you understand more
- Change in the physical layout are then a natural step (e.g. connecting a sensor with wires instead of soldering it in)
- May be obsolete if there is a component that is small enough and has a connector for everything you want to connect

### Basics - Soldering a good mechanical connection before soldering makes things much easier heat up the track and the component not the solder







Software compatible to modules





#### AddOn Connector

- Mechanical function
  - Hold the AddOn board
- Electronics
  - Provide
    - Power and GND
    - 5 Analog IN
    - 7 Digital I/O
    - I2C bus



#### Hardware Sensor Board Basics



#### New Sensor boards Add-Ons to the core smart-It Hardware Much simpler Software - Build upon frameworks Communication - Basic functions available Examples General sensors ٠ Vision / Camera ٠ • Load sensing ٠ Weather board Motion sensing • Actuator boards ping, Albrecht Schmidt

#### Creating new AddOn Boards

- Connection
  - Analog
  - I2C
  - Serial
  - Binary
- Writing a driver

, Albrecht Schmid





Technologies for context acquisition	
Sensing Technologies	
Light and Vision	
Audio	
Movement and Acceleration	
Location and Position	
Magnetic Field and Orientation	
Proximity, Touch and User Interaction	
Temperature, Humidity and Air Pressure	
Weight	
Motion Detection	
Gas-Sensors and Electronic Noses	
Bio-Sensors	
Zero-Power Sensors	
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## Sensor don't come for free Constraints on Sensing Requirements on Sensing in a Ubiquitous Computing Design and Usability Energy Consumption Calibration Start-up Time Robustness and Reliability Portability, Size and Weight Unobtrusiveness, Social Acceptance and User Concern Price and Introduced Cost Precision and Openness



