

LFE Medieninformatik • Miriam Kranz

Abschlussvortrag Projektarbeit

# Extending Sourcebinder for prototyping physical interfaces

Betreuerin:

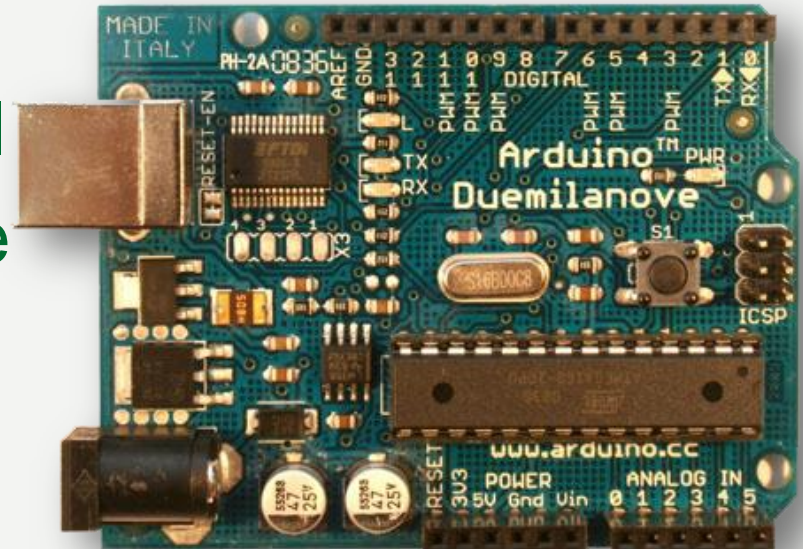
Verantw. Hochschullehrer:

Bettina Conradi

Prof. Dr. Heinrich Hußmann



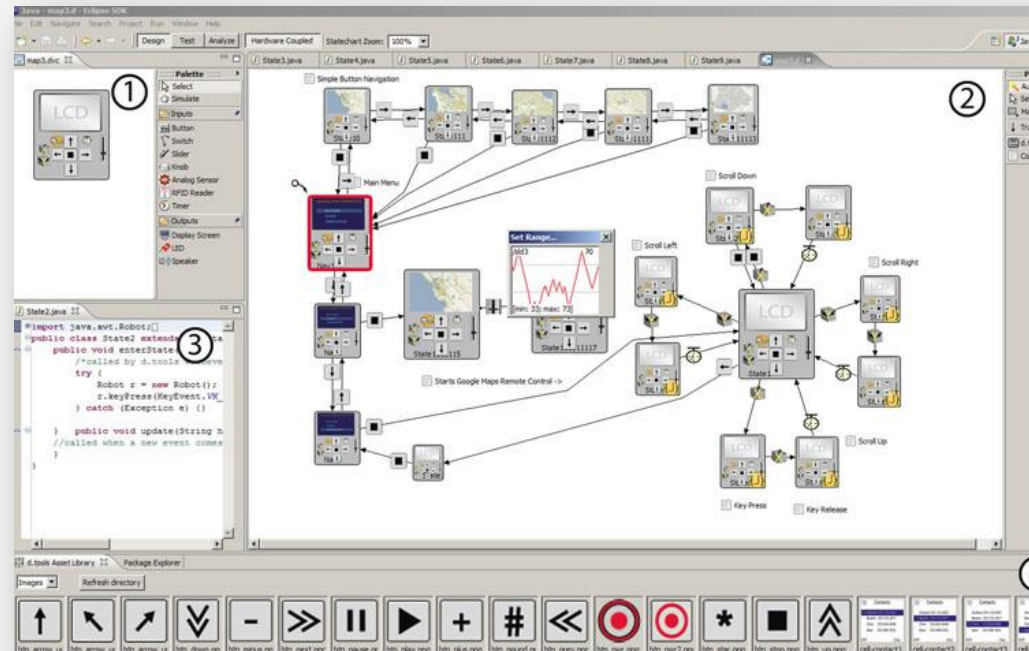
- **Prototyping** is key element in innovation
- Until recently developing physical interface (PI)-prototypes required engineering skills
- **Hardware** and **software toolkits** developed allowing people that not engineers to prototype PI
- **SourceBinder** [1] can be used to prototype Pis



[2]



- D.tools [3]:
  - Iterative design-centered approach to prototype PUIs and information appliances
  - Visual programming through statecharts



- More related works:
  - ESPranto [4], Exemplar [5], Papier-Mâché [6], i-Stuff Mobile [7],...

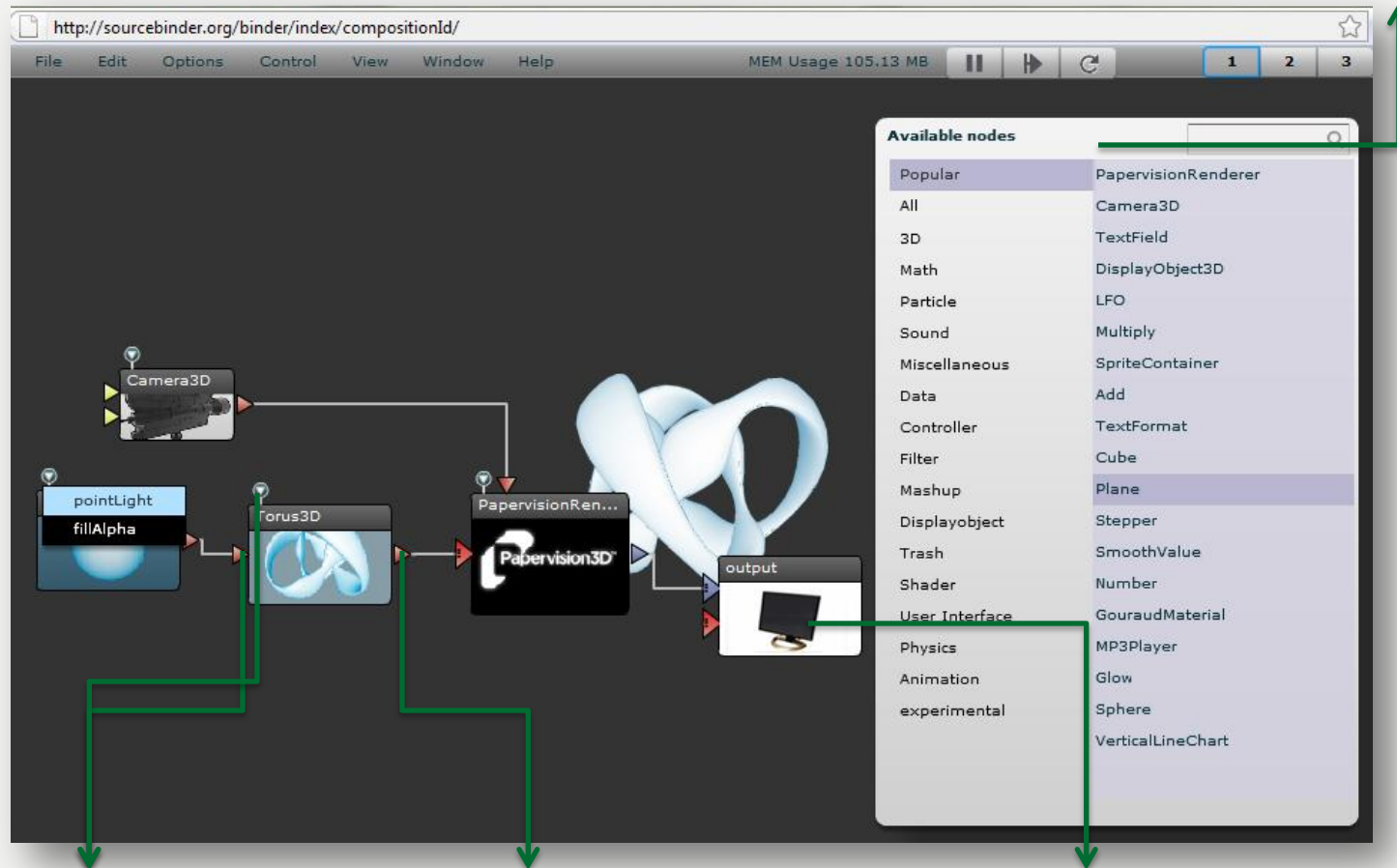
- Rapidly expanding, **community-based** development environment
- AS classes and code snippets can be inserted by anyone and become **nodes**
- Arduino-nodes allow connection to Arduino
- Nodes are visually connected together and build custom Flash applications that can be saved as **compositions**





- Sourcebinder Interface:

List of available nodes



Input connector

Output connector

Output node



## AngryBall

- Ball to let out once anger and inform friends
- FSR-sensor inside
- Connected to Arduino which is linked to Sourcebinder

a.



- When the AngryBall is squeezed (a.), a twitter message is automatically send via API(b.)

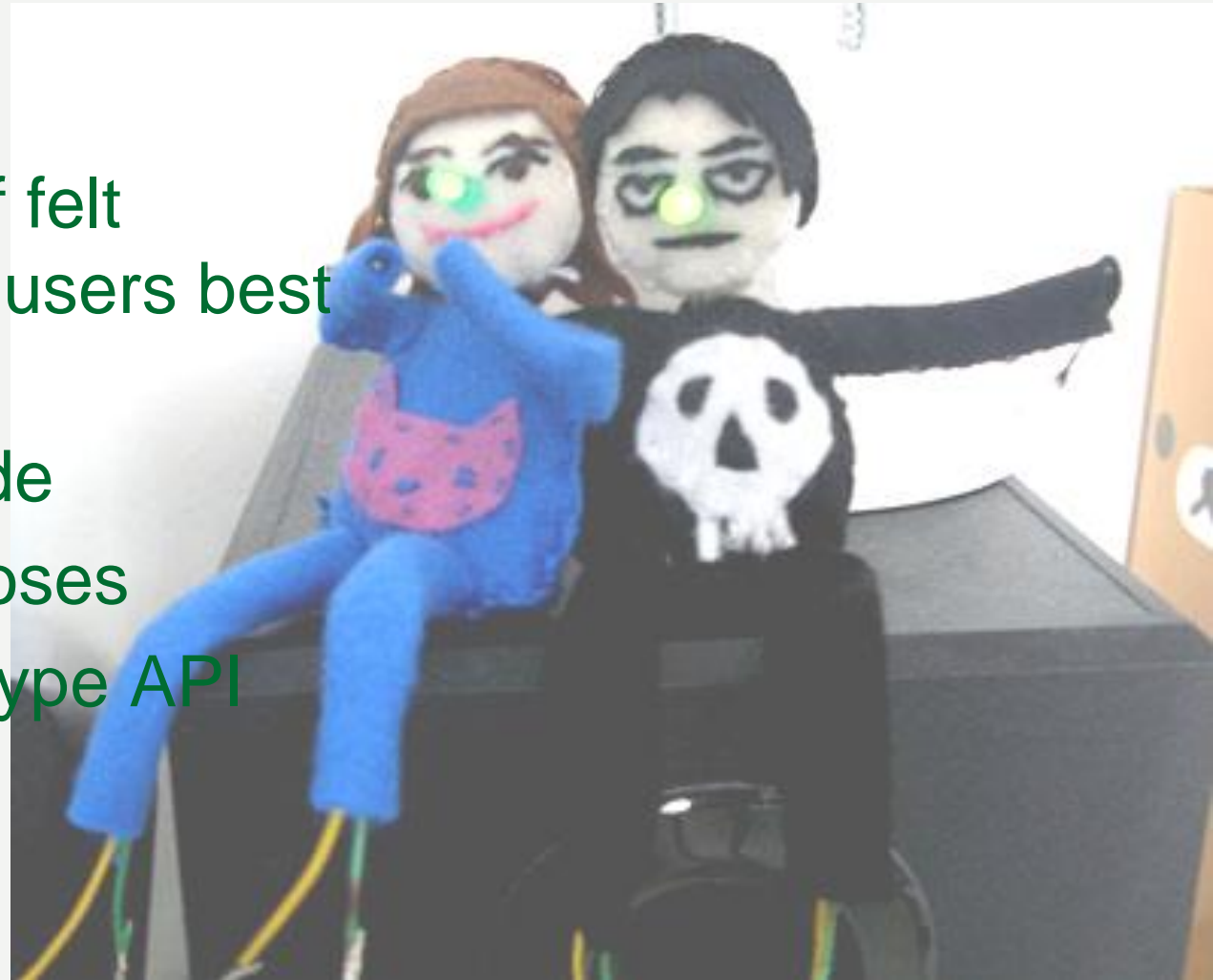
b.



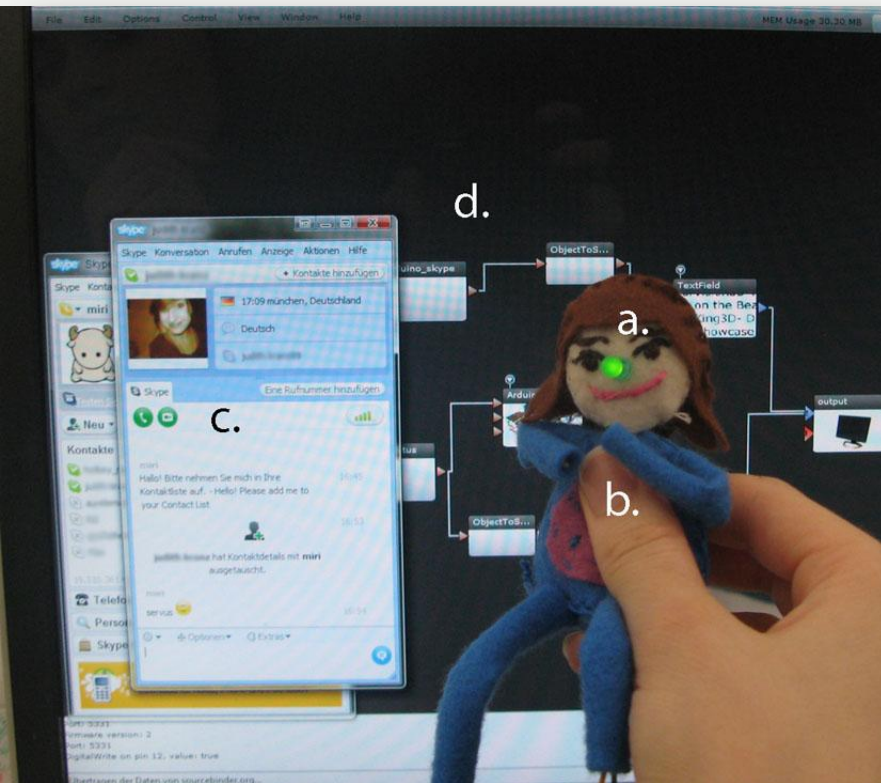
twField | am soooo angry!!  
vor weniger als 20 Sekunden via API

## BestFriends

- Puppets made of felt representing the users best friends
- FSR-sensor inside
- Green LED as noses
- Connected to Skype API



## BestFriends








- The nose of the puppet lights up (a.) when the friend is online in Skype
- If the puppet (b.) is pressed a Skype-chat-window opens (c.)
- The corresponding sourcebinder composition is visible in the background (d.)



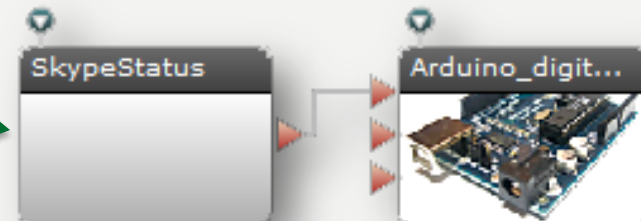
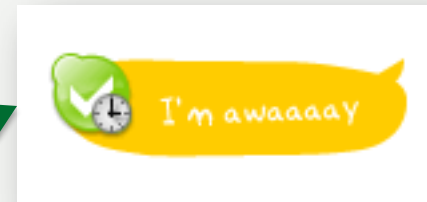


## Code-structure of a node:

```
import org.visualminds.sourcebinder.NodeBase;  
  
public class testNode extends NodeBase  Base-class for every node-definition  
{  
    override public function init() :void{  
    }  Defines startup functionality  
    override public function update() :void{  
        // invalidate();  
    }  Match node output with updated values  
    override public function dispose() :void{  
        super.dispose();  
    }  Cleans up references for the node's instance  
    override public function pause() :void{  
    }  Called when composition is paused/restarted  
    override public function restart() :void{  
    }  
}
```

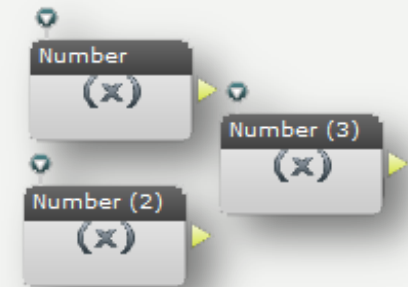
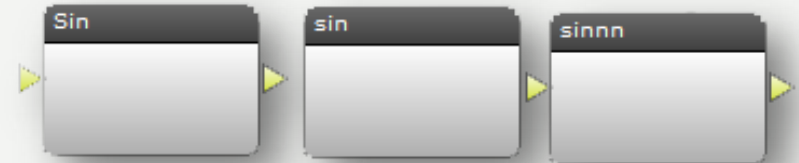
## Developed nodes:

- Twitter [8]
  - TwitterField
  - AngryBall
- lastFM [9]
  - lastFMField
- Skype [10]
  - SkypeField
  - SkypeStatus
  - BestFriends



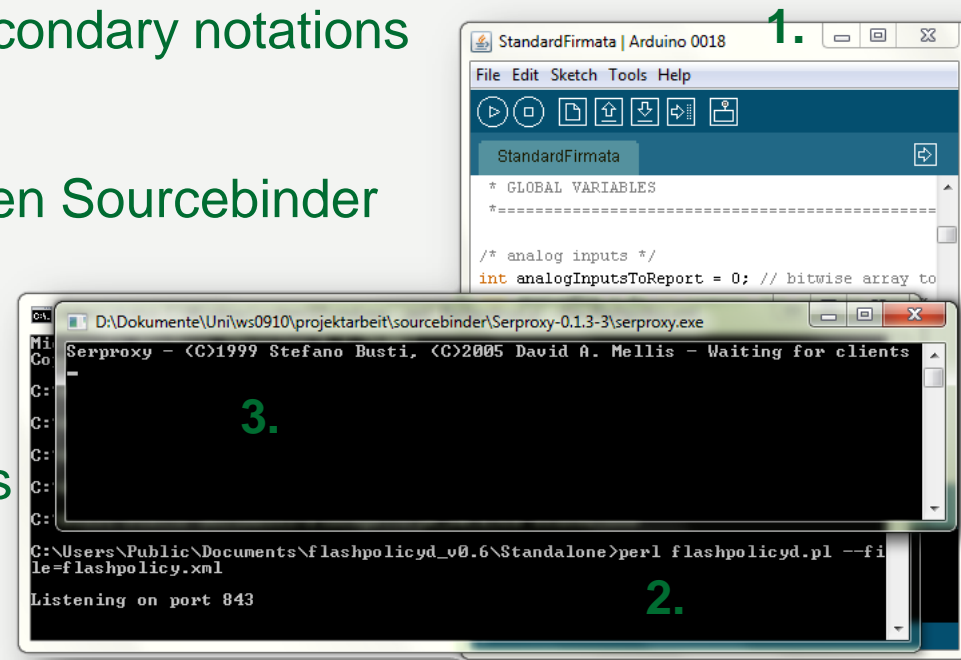


- Based on ‘cognitive dimensions’ framework [11]:
  - Consistency:
    - Many inconsistencies because of community-based nature
  - Error-proneness:
    - Syntax errors quasi nonexistent
    - Sourcebinder avoids errors caused by wrong connections
    - Many and unclear error-messages when developing own nodes
  - Role expressiveness:
    - Names and sometimes images on nodes
    - No possibility to give nodes a ‘local’ names





- Secondary notations:
  - Quasi no possibilities for secondary notations
- Other Problems:
  - Establish connection between Sourcebinder and Arduino is problematic
  - Not enough tutorials
  - Solid programming skills needed to create own nodes
  - Possibilities in domain of prototyping PIs still limited





- Summary:
  - Sourcebinder can be used to create PIs but possibilities in this domain are limited
  - Evaluation showed that Sourcebinder still has room for improvement
- Future work:
  - More tutorials
  - Clearer error messages
  - Add possibility to annotate and comment nodes
  - Ameliorate Arduino-nodes
  - Develop further nodes that allow prototyping of Pis

# Demo





😊 Thank you for your attention!! 😊



- [1] <http://www.sourcebinder.org/>
- [2] <http://www.arduino.cc/>
- [3] Robert van Herk et al.: *ESPranto SDK: an Adaptive Programming Environment for Tangible Applications*. CHI 2009
- [4] Björn Hartmann et al.: *Reflective Physical Prototyping through Integrated Design, Test, and Analysis*. UIST'06
- [5] Björn Hartmann et al.: *Authoring Sensor-based Interactions by Demonstration with Direct Manipulation and Pattern Recognition*. CHI 2007
- [6] Scott R. Klemmer et al.: *Papier-Mâché: Toolkit Support for Tangible Input*. CHI 2004
- [7] Rafael Ballagas et al.: *iStuff Mobile: Rapidly Prototyping New Mobile Phone Interfaces for Ubiquitous Computing*. CHI 2007
- [8] <http://twitter.com/>
- [9] <http://www.lastfm.com/>
- [10] <http://www.skype.com/>
- [11] T. R. G. Green, M. Petre: *Usability Analysis of Visual Programming Environments: a 'cognitive dimensions' framework*. 1996