TUIsla: Wireless and Battery-less components for Rapid Prototyping and Sensing

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ABSTRACT
We present TUIsla a library of input components which do not require any wiring to function. TUIslets are RFIDs tags extended with input components, they communicate their state and gather energy using electromagnetic induction. This means that these input components are wireless and do not require any additional energy source (battery or cable). We outline three different application areas, which leverage each a benefit from TUIsla: 1. Rapid prototyping of tangible inputs (e.g. car panel or Stereo) which illustrates the "no hassle" quality of TUIslets wireless components. 2. Batteryless remote controls which emphasizes the benefits of using a remote energy source. 3. Simple sensors for harsh environments such as outdoors or factory/laboratory settings, where Tuislets can be sealed and protected. We finally revisit the concept of Malleable Computing developed around the Pin&Play platform and show how TUIsla extends it further.

Author Keywords
tangible interaction, prototyping, rfid, wireless, battery, phidgets, design, ubicomp.

ACM Classification Keywords
H.5.2 Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms
Design, Human Factors, Languages.

INTRODUCTION
Input devices are generally in direct connection with a main station. This direct connection is either supported

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UbiComp '13, Sep 8-Sep 12, 2013, Zurich, Switzerland.

Benefits compared to pin and play and others : a bit of location awareness and output.

RELATED WORK

Malleable computing
all the projects related to VoodooIO and pushpin computing

http://comp.eprints.lancs.ac.uk/1552/1/2007-Malleable.pdf

http://resenv.media.mit.edu/classes/MAS965/readings/lifton02.pdf

Pin & Play: The Surface as Network Medium

Induction
Paradiso early work: A Compact, Wireless, Self-Powered Pushbutton Controller

Tangible Music Interfaces Using Passive Magnetic Tags

WISP: A Wirelessly-Powered Platform for Sensing and Computation

RFID technology
Marquadt

General explanation of rfid technology citing Roy want.

TUISLA
We provide here an overview of the system

Physical widgets

Tracking

Software element

CASE STUDY EVALUATION
Prototyping with high fidelity physical components.

APPLICATIONS
- Prototyping

Globally controlled widgets
While low frequency RFIDs have only offer short-range readings, extending TUIslets to high frequency RFIDs (Mhz or Ghz) would enable readings from larger distances (10m?) as well as better anti-collision mechanisms.

- Remote controls / room level controls (ex: remotes for classrooms which can be enabled and disabled at will)

- Robust interactions: outdoors (water proof), kitchens (water-proof + counter/intelligence)

DISCUSSION

CONCLUSION

ACKNOWLEDGEMENTS