

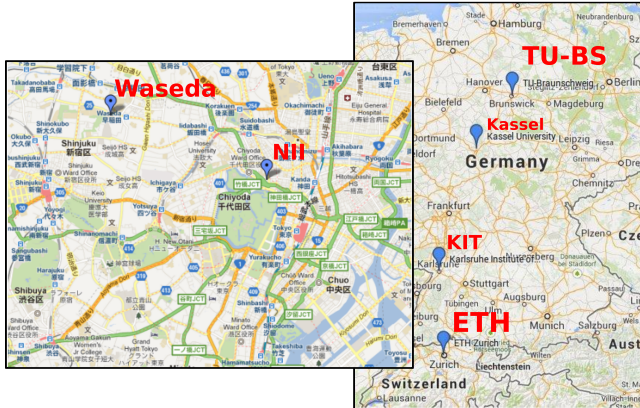
Intelligent Information Processing – Chances of Crowdsourcing

Stephan Sigg

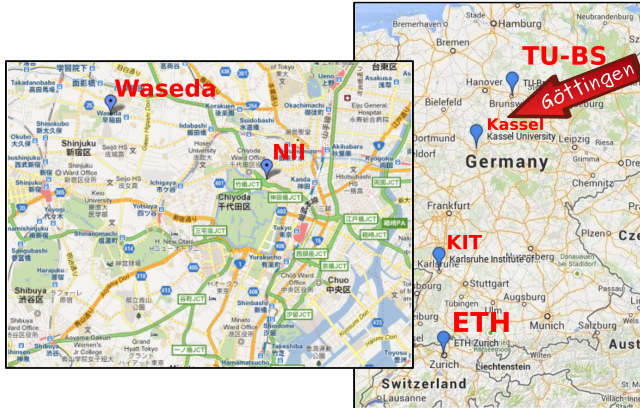
Computer Networks Group

NII Shonan Meeting Seminar 34, Shonan Village, 18.11.2013

My background

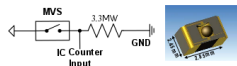
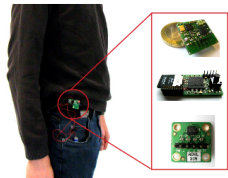


My background



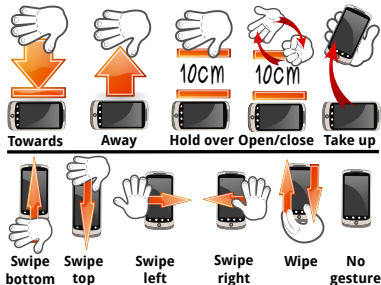
Research interests:

- Activity recognition
- Security (context-based)
- Math. comp. on the wireless channel



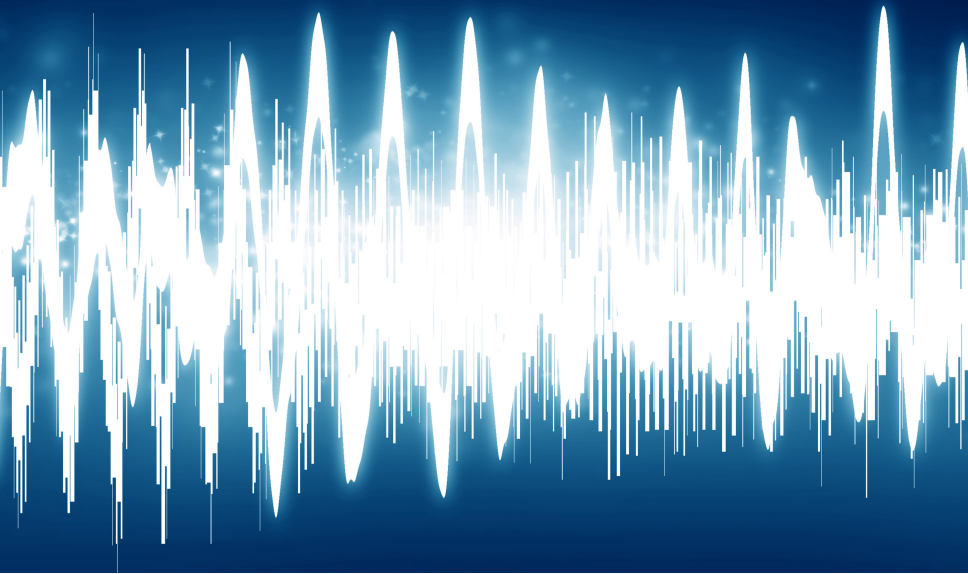


RF-based device-free activity recognition



| | Classification | | | | | | | |
|------|----------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|
| | Aw | Ho | To | No | Op | Sr | St | recall |
| Aw | .7 | .02 | | | .06 | .09 | .13 | .70 |
| Ho | .03 | .28 | .22 | .05 | .2 | .16 | .06 | .28 |
| To | | .09 | .76 | .07 | .06 | | .02 | .76 |
| No | | .05 | .06 | .73 | .14 | .01 | .01 | .73 |
| Op | .01 | .15 | .1 | .14 | .49 | .04 | .07 | .49 |
| Sr | .02 | .01 | | .01 | .06 | .83 | .07 | .83 |
| St | .12 | .03 | .01 | | .05 | .14 | .65 | .65 |
| prec | .795 | .444 | .661 | .730 | .462 | .654 | .644 | |

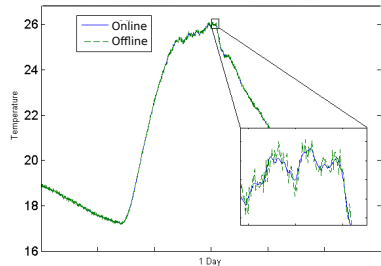
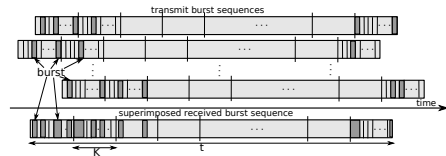
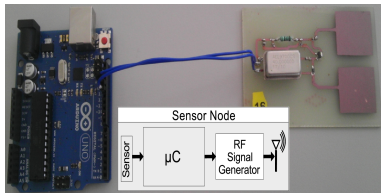
| | | Classification | | | | |
|-------------|------------|----------------|-------------|-------------|-------------|------------|
| | | Away | Towards | No gesture | S. top | recall |
| round truth | Away | .83 | | | .17 | .83 |
| | Towards | | .88 | .09 | .03 | .88 |
| | No gesture | .01 | .05 | .92 | .02 | .92 |
| | S. top | .14 | .02 | .02 | .82 | .82 |
| | precision | .847 | .926 | .893 | .788 | |



Research interests

Calculation of Functions on the RF-channel¹

- ▶ Mathematical calculation on the wireless channel
- ▶ Theoretical framework, simulation, case studies



¹Sigg, Jakimovski, Beigl, Calculation of Function on the RF-channel for IoT, IoT 2012

Research interests

Calculation of Functions on the RF-channel¹

- ▶ Ma
- wir
- ▶ The
- sim

Division

$$1 - \frac{1}{2^n}$$

Addition

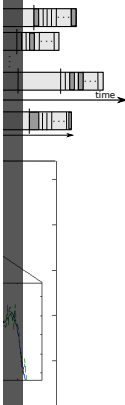
$$\sqrt{a^2 + b^2}$$

Subtraction

$$1 - ((q)^{k!})^n$$

$$\frac{\mu_1 \mu_2}{\mu_1 + \mu_2}$$

Multiplication



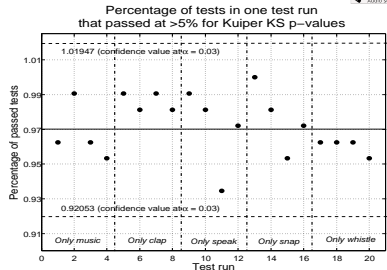
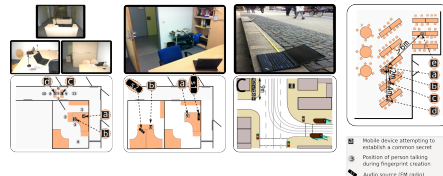
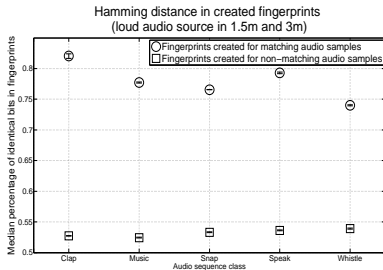
¹Sigg, Jakimovski, Beigl, Calculation of Function on the RF-channel for IoT, IoT 2012



Research interests

Audio-based ad-hoc secure pairing²

- ▶ Use audio to generate secret key
- ▶ high Entropy, fuzzy cryptography, case studies, attack scenarios



²S. Sigg et al., Secure Communication based on Ambient Audio, Accepted for IEEE Transactions on Mobile Computing

Chances/Challenges for Crowdsourcing

Where is the Crowd?

Chances/Challenges for Crowdsourcing

Where is the Crowd?



Chances/Challenges for Crowdsourcing

They are all around us:



Chances/Challenges for Crowdsourcing

They are all around us:



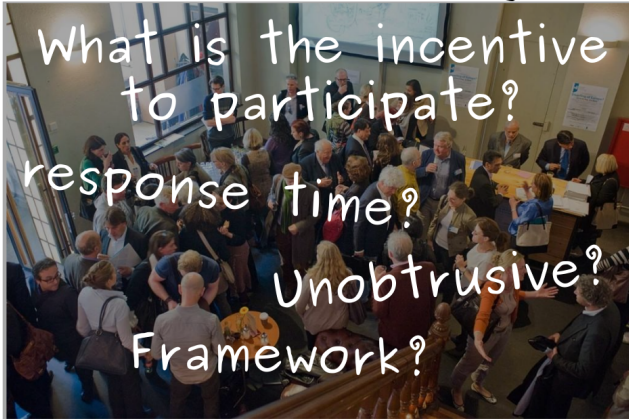
Chances/Challenges for Crowdsourcing

They are all around us:



Chances/Challenges for Crowdsourcing

There are challenges:



Do you have any questions?

Stephan Sigg

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