Beyond incremental research

(a.k.a. How to do cool research and get a PhD for it*)*

Stefan Schneegass

Why are we doing this session?

Novel and useful research

Salami-slicing of projects

Increasing quality metric of a system by 1%

Building a system that can support the user yet again in X

What do you need to get a Ph.D.?

- X+ papers?

- H index of X+?

- X+ CHI papers?

- Papers fitting your thesis´ topic?

What do you need for the time after your Ph.D.? (If you are staying in academia)

- A great story for your job talk
- A proof that you are able to do research
- A proof that you are flexible and able to adapt to new challenges/topics/methods
- Understanding of the community/field
- Showing some impact

Story & Impact

Make people WOW

Task

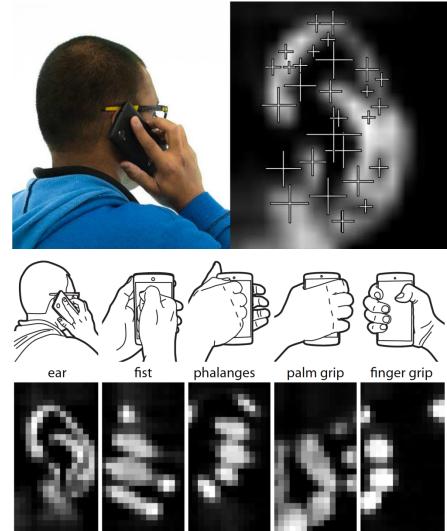Form groups of 3-4 and discuss:

- How to come up with new ideas?

- What methods, tools, approaches, etc. do you know?

Example: Best of CHI 2015

Bodyprint: Biometric User Identification on Mobile Devices Using the Capacitive Touchscreen to Scan Body Parts
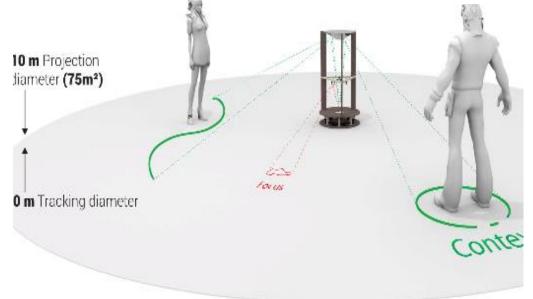
- Accessing the debug API of the Nexus 5's touchscreen

- Getting a 27×15px 8-bit image across a 4.95" surface (6.24 dpi) at 30fps

- Using the screen as a low-resolution capacitive sensors

- Recognizing different body parts

Christian Holz,
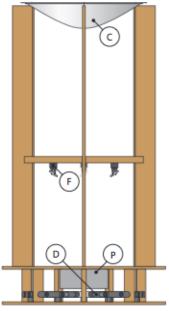Senaka Buthpitiya,
Marius Knaust

ear   fist   phalanges   palm grip   finger grip

BaseLase: An Interactive Focus+Context Laser Floor

- Floor projection
- Laser-based
- 75 m^2
- Special mirror for equal point sizes
- Depth cameras for interaction
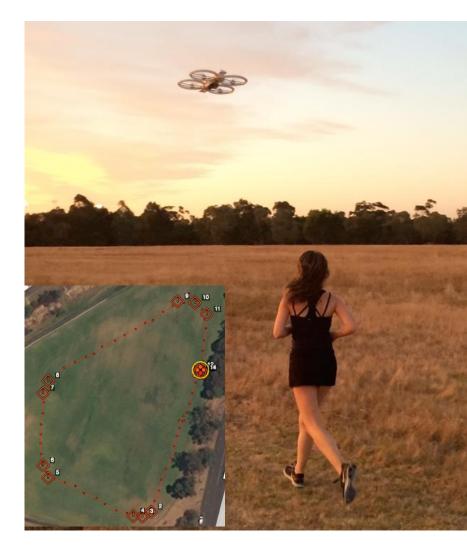- Low resolution + high res. context display
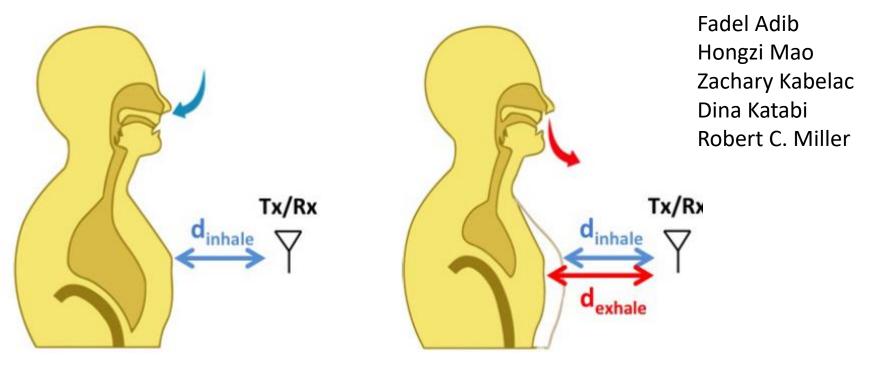
Jogging with a Quadcopter
Florian Mueller and Matthew Muirheaddy

- Explore how robotic systems can support jogging

- Studied experience with 13 joggers

- Derived three design dimensions that describe a design space:
  - Perceived Control
  - Focus
  - Bodily Interaction

Smart Homes that Monitor Breathing and Heart Rate

Vital-Radio transmits a low power wireless signal and measures the time it takes its signal to travel to the human body and reflect back to its antennas. Knowing that wireless signals travel at the speed of light, we can use the reflection time to compute the distance from the device to the human body. This distance varies slightly and periodically as the user inhales and exhales and his heart beats. Vital-Radio captures these minute changes in distance and uses them to extract the user's vital signs.

Fadel Adib
Hongzi Mao
Zachary Kabelac
Dina Katabi
Robert C. Miller

Risks

- The authors might not know…
  - If the idea actually works
  - If users like the system
  - Etc.

- High risk high impact

Task

Form groups of 3-4 and discuss:

- What paper did you enjoyed most at your last conference that was <u>not</u> linked to your Ph.D. topic?

- Why did you enjoy it?

Knowing related work is key to be innovative

- Systematic literature research

- Also saves you time

Example: Electrical Muscle Stimulation

EMS in the ACM DL

- **2010/11**: PossessedHand
- **2013**: muscle propelled, optimal selection
- **2014**: let me grab
- **2015**: Affordance++, CruiseControl, Proprioceptive Interaction, impacto
- **2016**: Embodied Notifications, Muscle Plotter, 2x virtual food texture, follow the force, stimulated percussions, 2x on-skin tech, toolkit, Unlimited Hand
- **2017**: 2x Interactive Systems, Raising the heat, vibrat-o-matic, calibration, stimulated percussions, biosync, haptic marionette, zap++, EmotionActuator, walking
- **2018**: Paralogue, wanding through space, emotional response, multi channel ems,

Impact

Task

Form groups of 3-4 in the bar and discuss:

- How to identify such new technologies/methods/…?

- What will be the next big thing?