Welcome to Advanced Topics in HCI!

Koji Yatani

Welcome!

I am Koji Yatani (矢谷浩司), your instructor.

This course is:

- 3747-108: Advanced Topics in HCI (ヒューマンコンピュータインタラクション特論)
- 4915100: Human Interfaces (ヒューマンインタフェース)

If you need a credit, please register yourself to either of these courses (cannot register to both).

Just a bit of background…

Computers are used to be huge.

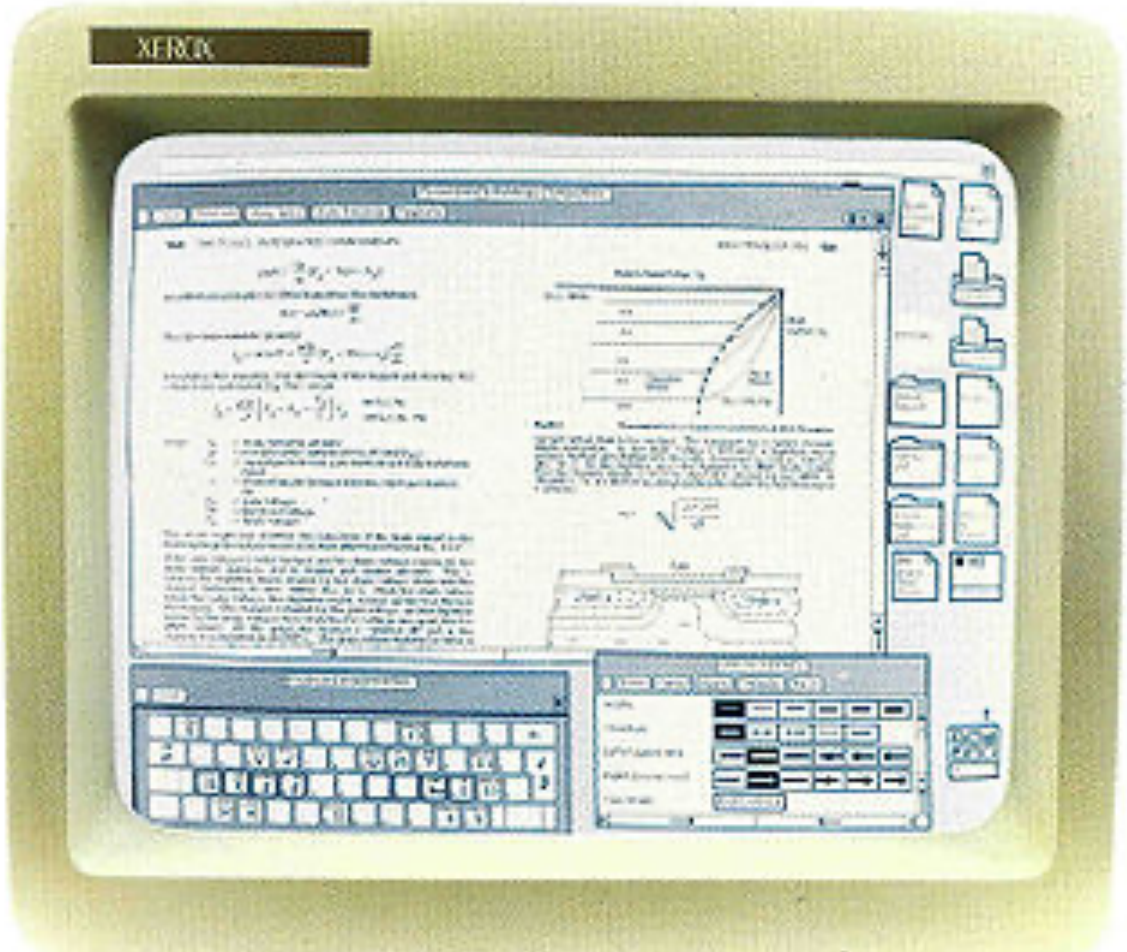
ENIAC (1946)
http://en.wikipedia.org/wiki/File:Eniac.jpg

And then like this.

Apple II (1977)
http://en.wikipedia.org/wiki/File:Science_museum_025_adjusted.jpg

Now, smaller, smaller, smaller!

Are these the right thing to do?: Conventional interfaces would not work.



What new applications can we invent if computers are in completely different forms?

New ways to interact with new devices

Re-think about why we want to use computing devices.

Re-think about how we want to use computing devices.

Re-think about how we design new computing devices.

Imagine that
everything around you is a computer
that collaborates, senses, and helps.

How would you design the world? ☺

Two goals of this course

Let's learn cool work: Learning recent prominent work on HCI with emphasis on sensing technologies and healthcare applications

Let's learn skills: Having hands-on experience on building interactive systems and applications using sensing mechanisms

Course design

Research discussions

Discussing classic latest HCI work published at top-tier conferences

Capstone projects

Developing an interactive system with machine intelligence behind

Evaluation

Research discussions [30%]

For your performance in leading discussions about the paper assigned to you from the reading list

Capstone project [50%]

For the quality of your project outcome (demos and videos)

Engagement and attendance [20%]

For your attendance to the course and your involvement in discussions during the class

Prerequisite (all recommended)

Basic HCI research experience and knowledge

Programming skills

English communication skills

And your passion ☺

Course website

https://iis-lab.org/hci

Please check regularly. Announcements about this class will be made through this website.

Course policy

Work proactively, work collaboratively.

Don’t expect the instructor to teach everything for you.

This is an English-friendly class. Strongly encouraged to use English (even if you are Japanese).

Class structure

[5 mins] Introduction by Koji

[35 mins] Presentation and discussion on Paper #1

[5 mins] Quick break

[35 mins] Presentation and discussion on Paper #2

[25 mins] Individual discussions on capstone projects with Koji

Academic misconduct

No tolerance to any academic misconduct (e.g., plagiarism, stealing others' ideas)

We have strong penalties when misconducts are found.

Just don't do it. Not worthwhile at all!

Any question?

Capstone Project

Capstone Project

Developing an interactive system using some kinds of sensing technology and/or artificial intelligence

Demonstrating at least one cool application (games excluded).

Collaboration

You may team up with fellow students. 2 or 3 people in one team recommended.

Make sure your team has enough expertise to drive successful projects (e.g., hardware, smartphone hacking, programming, etc).

Deliverables

A presentation of your system (10 – 15 mins total).

Live demo of your system showing some kinds of applications (except games).

A short demo video (2 – 4 mins).

Examples of projects

New sensing and applications using smartphones

Wearable sensing for healthcare applications

Novel biometrics authentication

Any project is welcome as long as it is interactive and cool.

Negative examples of projects

- X Pure GUI
- X Pure ML, AI, computer vision and NLP
- X Pure games
- X Study-type HCI work

Phones on Wheels: Exploring Interaction for Smartphones with Kinetic Capabilities

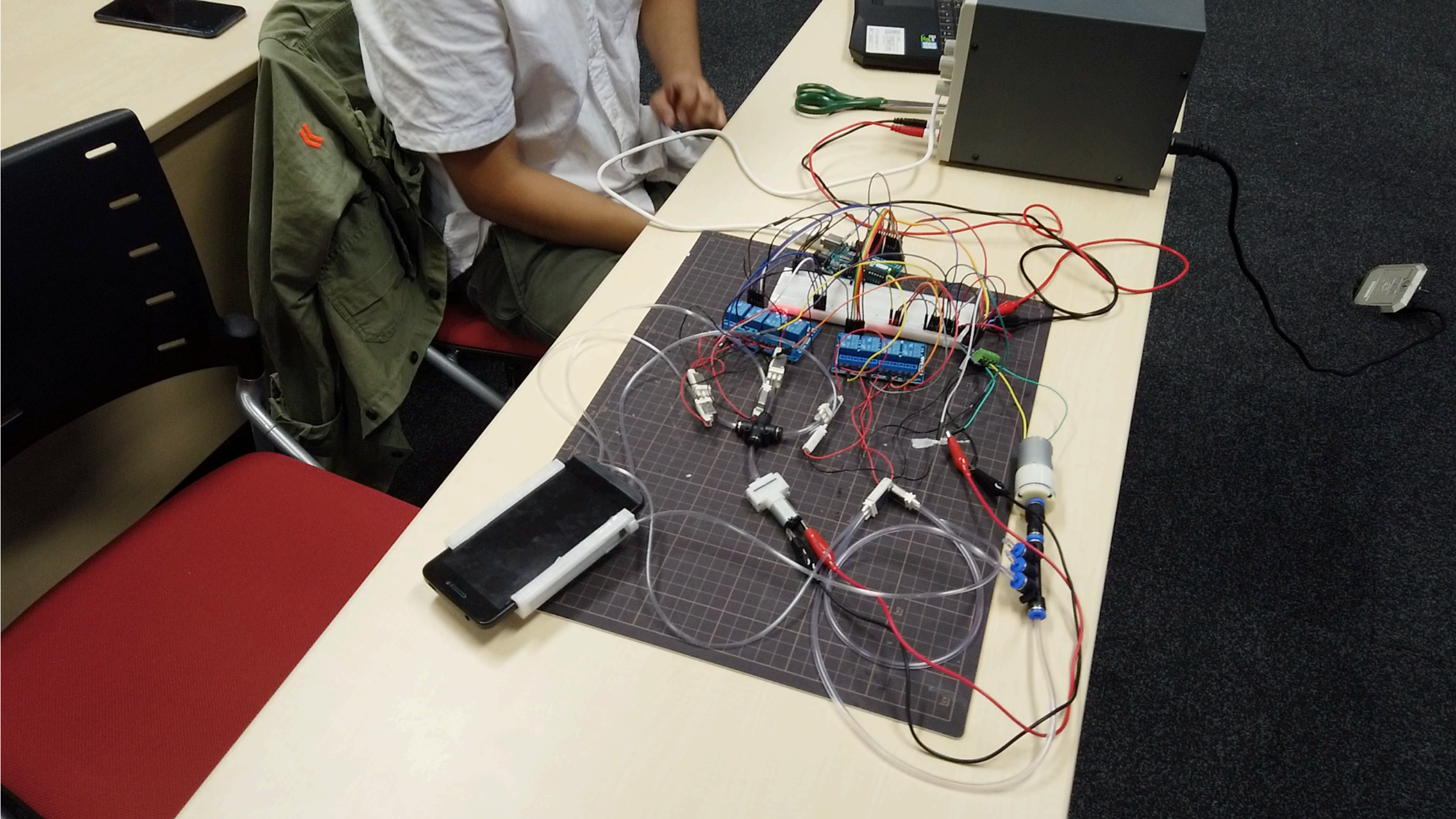
Takefumi Hiraki, Koya Narumi, Koji Yatani, and Yoshihiro Kawahara

The University of Tokyo

08.03.16

Wheels Turn This Smartphone Into A Robot Helper

You'll wonder how you ever got around without one.




Vibration Test
利用後は必ず
現状復帰して下さい

Potential exposure

Publishing your demo videos on YouTube (with your permission).

Publishing work at conferences (as a paper or a demo).

If you want to do part of your thesis work, please consult with your supervisors first, get a written approval, and send it to me.

Project driving

I will have a quick chat with each team toward the end of each class.

You may use time with me in any way (e.g., brainstorming, implementation plan, application ideas, etc).

Be proactive! ☺ You are the person to think about how to use a professor.

Project peer review

We have peer review sessions on 31st May and 5th July.

Providing feedback on projects mutually

Identifying areas for improvements before the final presentation

Research Discussions (paper reading)

Research discussions

We have two roles in research discussions.

Chair: Leading a discussion about the paper assigned at the class

Member: Engaging the discussion with the chair and fellow members

Research discussion chair

You must do a chair at least once for your credit (maybe twice depending on how many we will have).

In case we don't have many people, I may have to ask some of you to volunteer one more extra paper (you will of course get extra marks ☺).

Research discussion chair

Read the assigned paper carefully before the class.

Deliver a 20-min presentation that covers:

- Backgrounds of the research,
- Summary of the developed system,
- Some cool parts of the technology,
- Novelty and originality of the work, and
- Pros and cons of the system/method

And then, lead a discussion about the work.

Research discussion chair

Bring some questions for discussions.

- What makes the work strong?
- What would this work lead us to?
- What are creative applications using the demonstrated technology?
- How differently would you drive this project?
- How would you comment if you were a reviewer?
- What evil things could we do? How can we prevent that?

Research discussion chair

Presentation slides must be in English though delivery can be either in English or Japanese.

Most of the papers have accompanying videos, so please include them in your presentations.

Discussions can be either in English or Japanese.

I am happy to do translations if needed.

Research discussion members

Read the two papers assigned for the next class in advance.

Prepare discussion points.

- What did you like in this work? Why?
- How do you think this work can inspire your research?
- What are possible applications out of this technology?
- What are shortcomings? What improvements do you think this technology needs?
- If you were a reviewer on this paper, how would you rate and provide feedback?

Paper assignment

Our reading list is already on the course website.

Choose five papers you would like to serve on as a chair, and send your preference from a google form (the url is on the course website.).

I will do my best to accommodate your preferences.

Paper assignment

Depending on the number of us, you will be asked to be a discussion chair once or twice

Based on the number of papers assigned to you, I will adjust the evaluation scheme and workload for capstone projects accordingly.

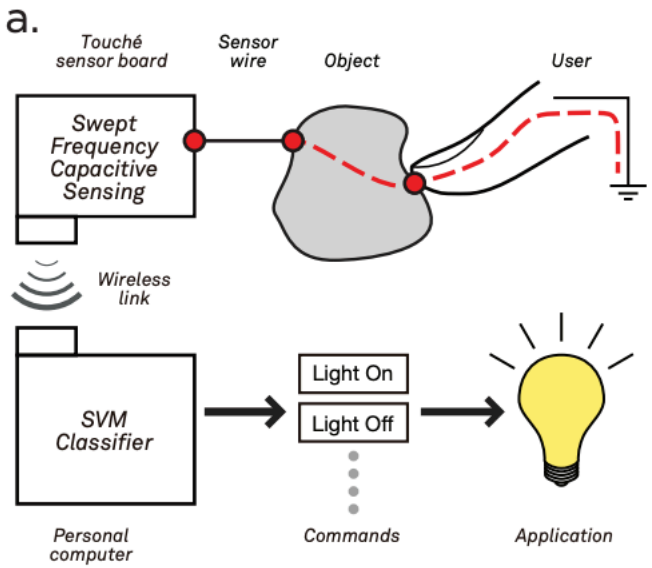
Systems using sensing technology for emerging applications and interaction

- Sensing touch and gestures
- On-body interaction
- On-body actuation
- Sensing your body with smartphones
- Mixed reality
- Wearable sensing
- Sensing with smartwatches
- Infrastructure-based sensing
- Interacting with your mood

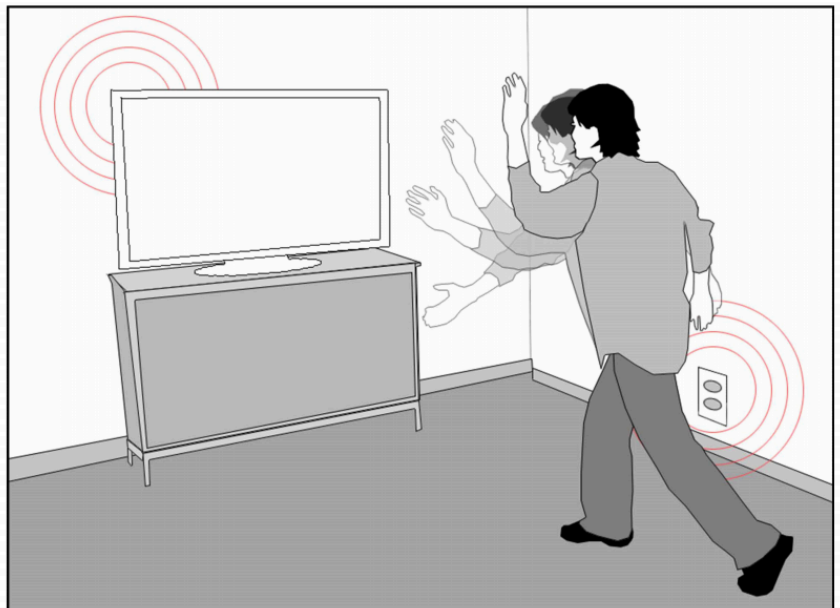
Papers to be discussed

Please take a note on the projects that interest you. ☺

Sensing touch and gestures



Touché: enhancing touch interaction on humans, screens, liquids, and everyday objects



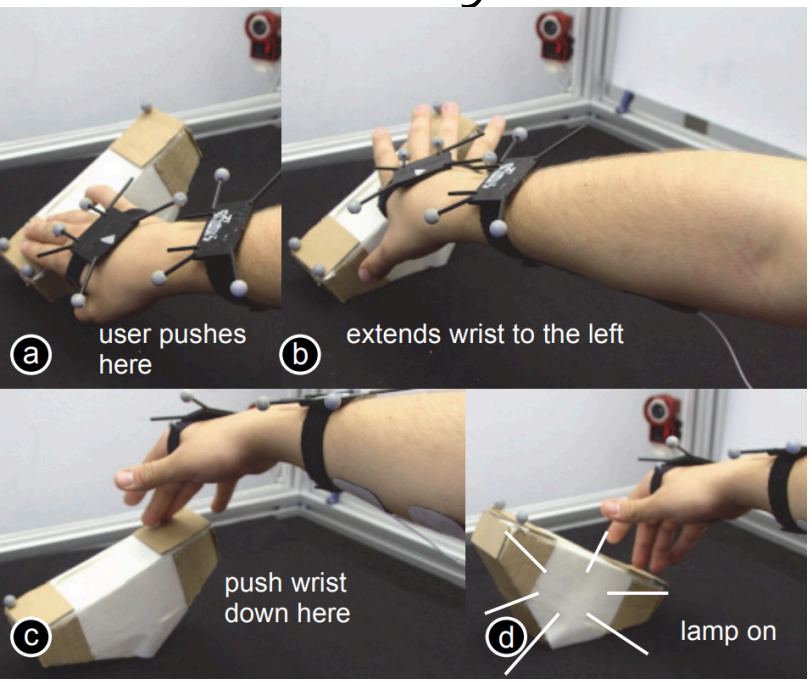
Humantenna: using the body as an antenna for real-time whole-body interaction

On-body interaction

Skinput: appropriating the body as an input surface

Digits: freehand 3D interactions anywhere using a wrist-worn gloveless sensor

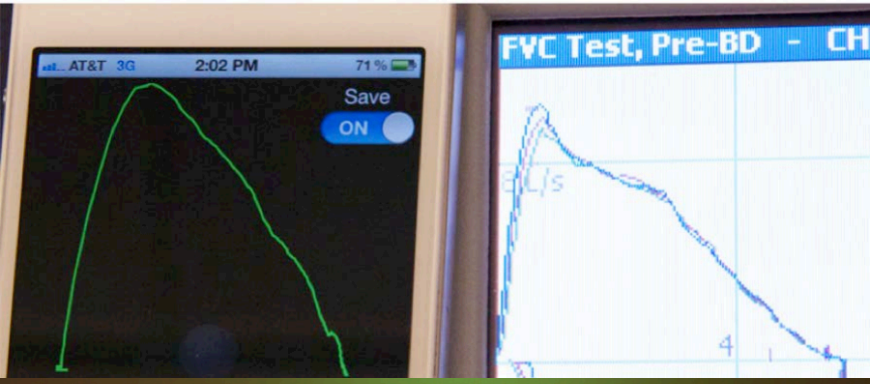
On-body actuation



Affordance++: Allowing Objects to Communicate Dynamic Use

FootStriker: An EMS-based Foot Strike Assistant for Running

Sensing your body with smartphones

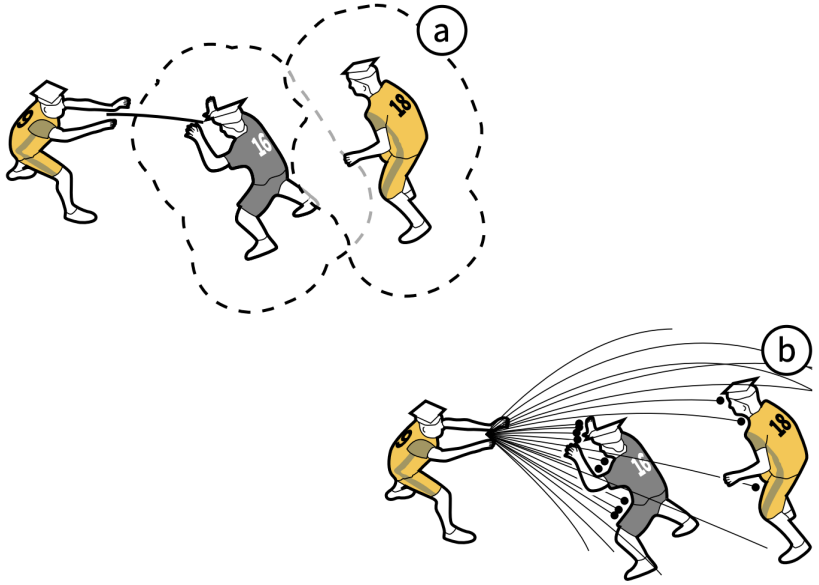


SpiroSmart: using a microphone to measure lung function on a mobile phone

Noninvasive Blood Screening of Hemoglobin using Smartphone Cameras

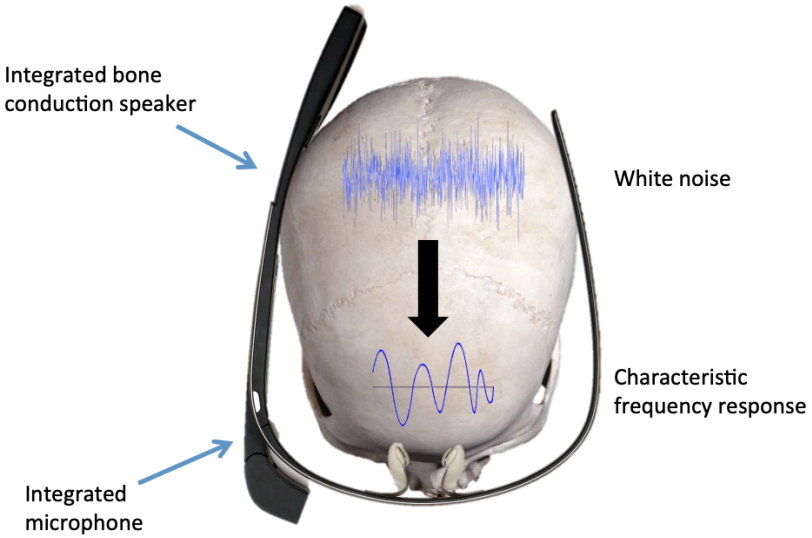
Mixed reality

IllumiRoom: peripheral projected illusions for interactive experiences



Imaginary reality gaming: ball games without a ball

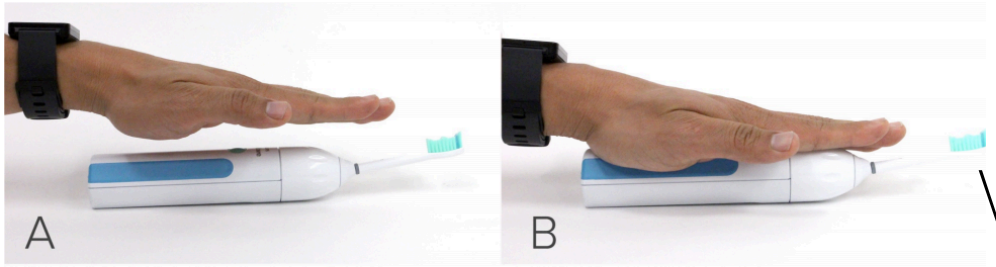
Wearable sensing



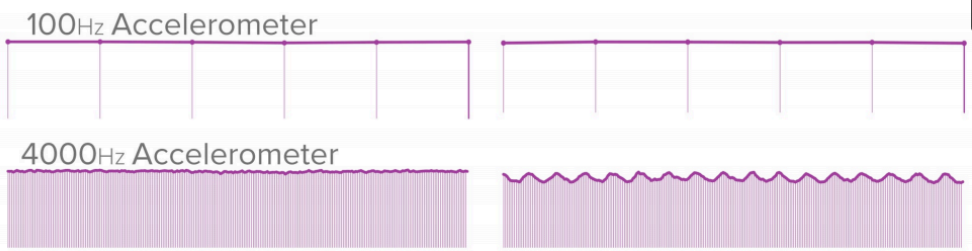
SkullConduct: Biometric User Identification on Eyewear Computers Using Bone Conduction Through the Skull

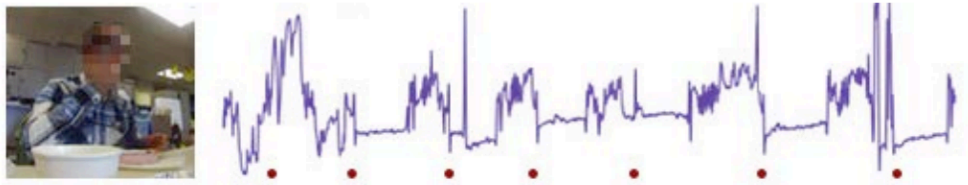
BodyScope: a wearable acoustic sensor for activity recognition

Sensing with smartwatches

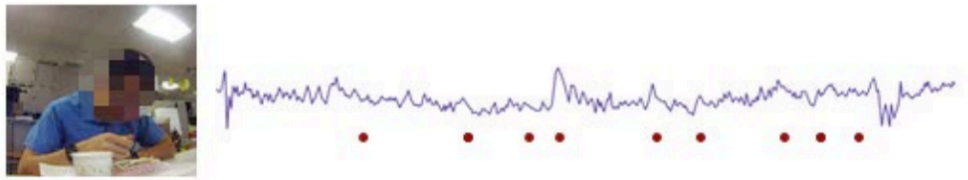


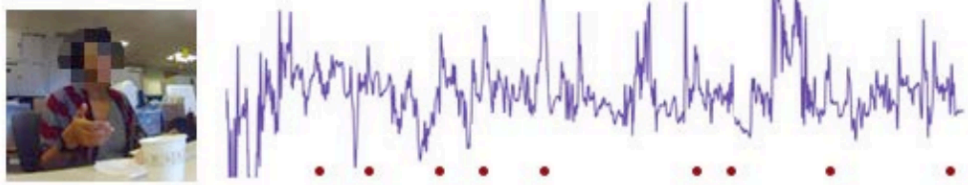
Viband: High-fidelity bio-acoustic sensing using commodity smartwatch accelerometers



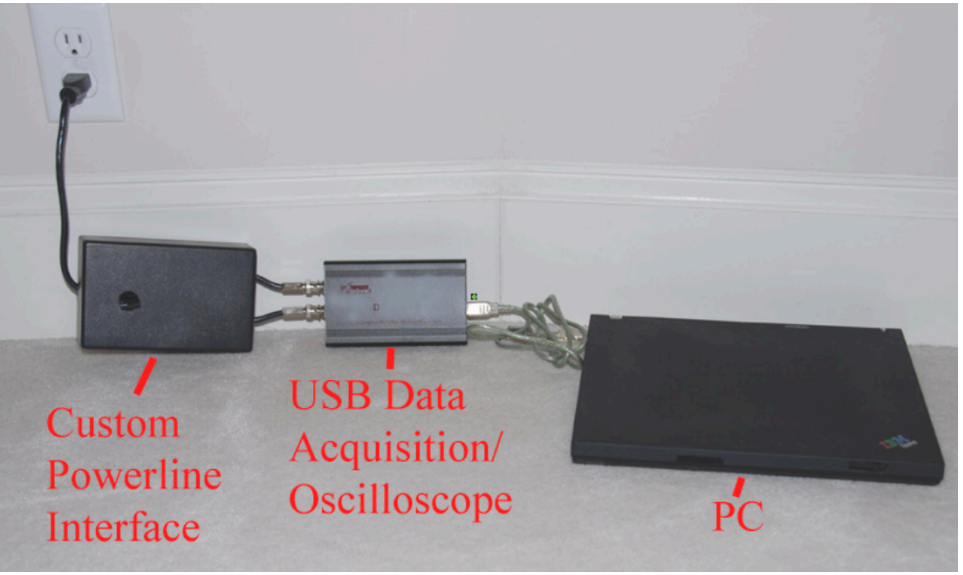


A practical approach for recognizing eating moments with wrist-mounted inertial sensing

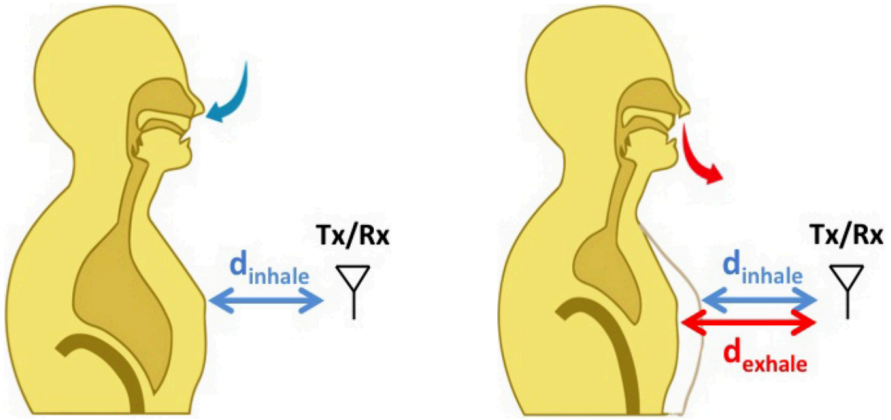




Infrastructure-based sensing



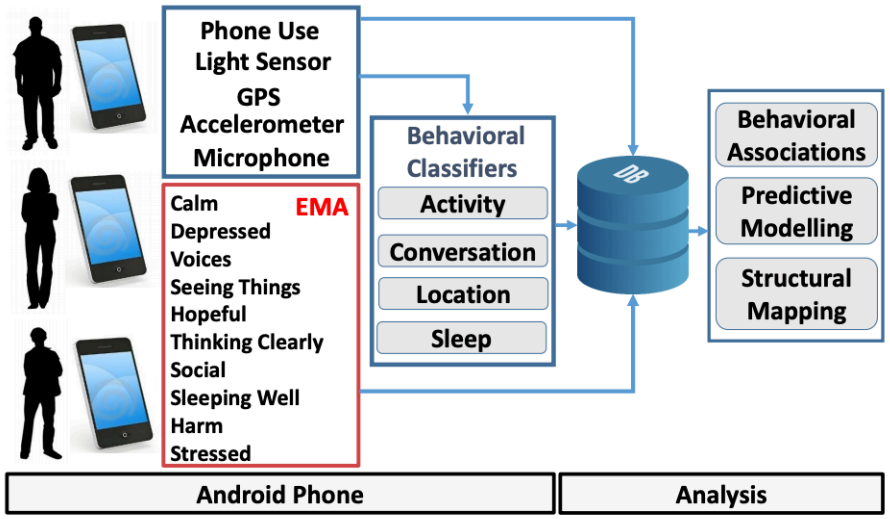
At the Flick of a Switch: Detecting and Classifying Unique Electrical Events on the Residential Power Line



(a) Inhale Motion (b) Exhale Motion

Smart Homes that Monitor Breathing and Heart Rate

Interacting with your mood



CrossCheck: Toward passive sensing and detection of mental health changes in people with schizophrenia

EmotionCheck: leveraging bodily signals and false feedback to regulate our emotions

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