

# Tools for Intelligence Amplification

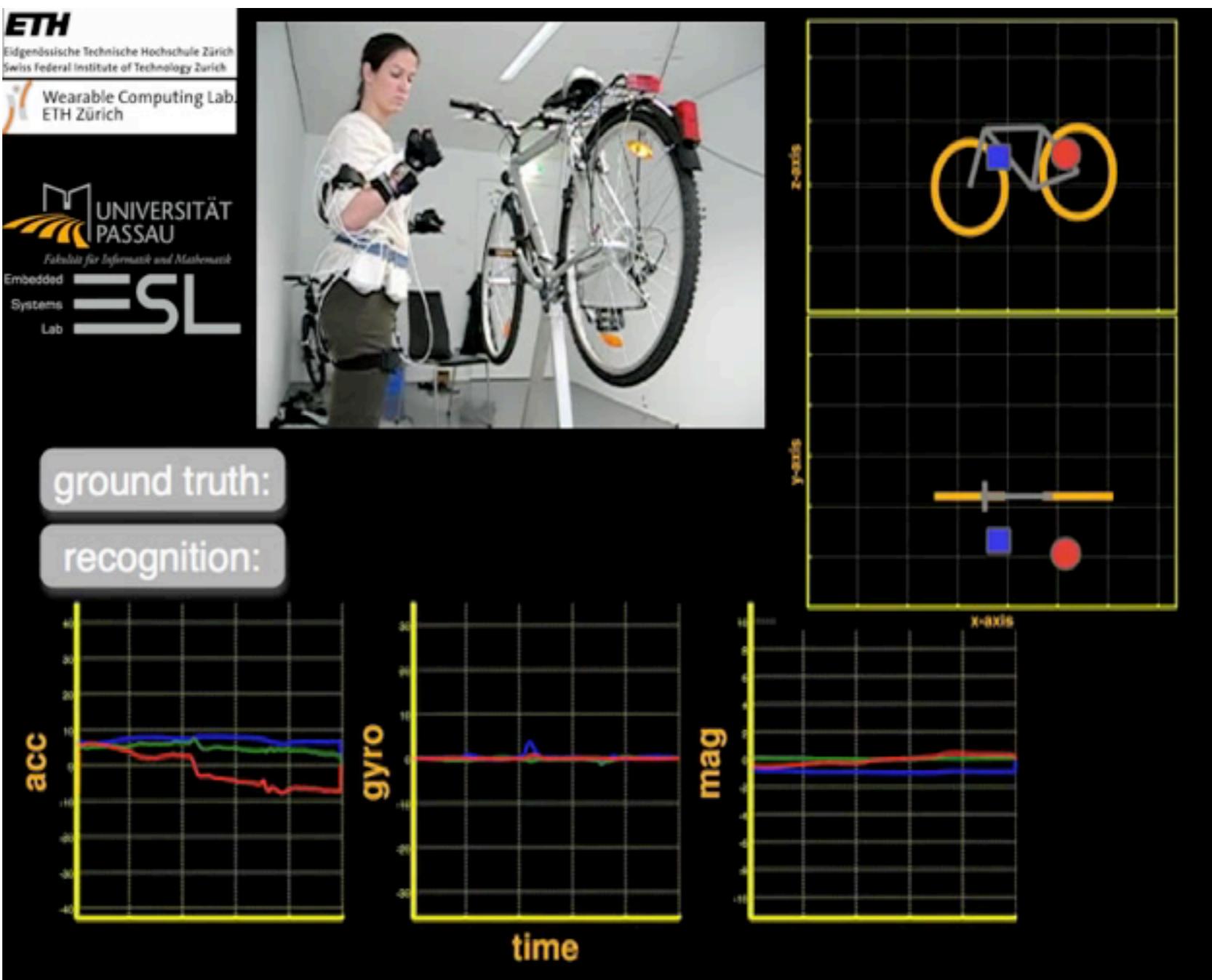
## Augmenting the Human Mind



Kai Kunze  
Osaka Prefecture University  
Keio Media Design

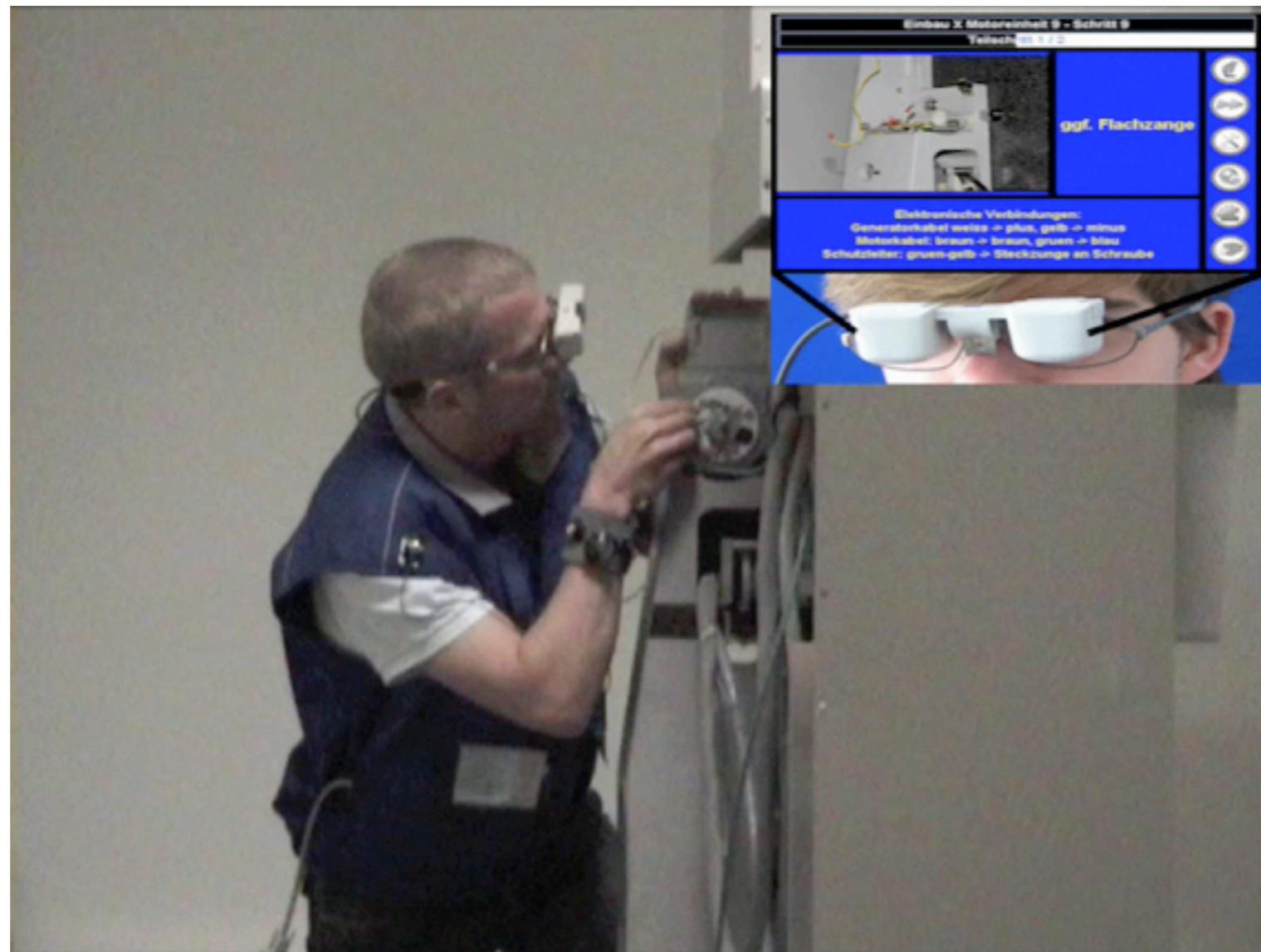


# Wearable Computing



Research by: Georg Ogris, Thomas Stiefmaier

# Wearable Computing



Kunze, K., Wagner, F., Kartal, E., Morales Kluge, E., and Lukowicz, P. Does Context Matter ? - A Quantitative Evaluation in a Real World Maintenance Scenario. In *Proceedings of the 7th international Conference on Pervasive Computing Nara, Japan, May 11 - 14, 2009.*

# Physical Activity Recognition becoming mainstream

Sensors in everyday objects, clothes, accessories ...

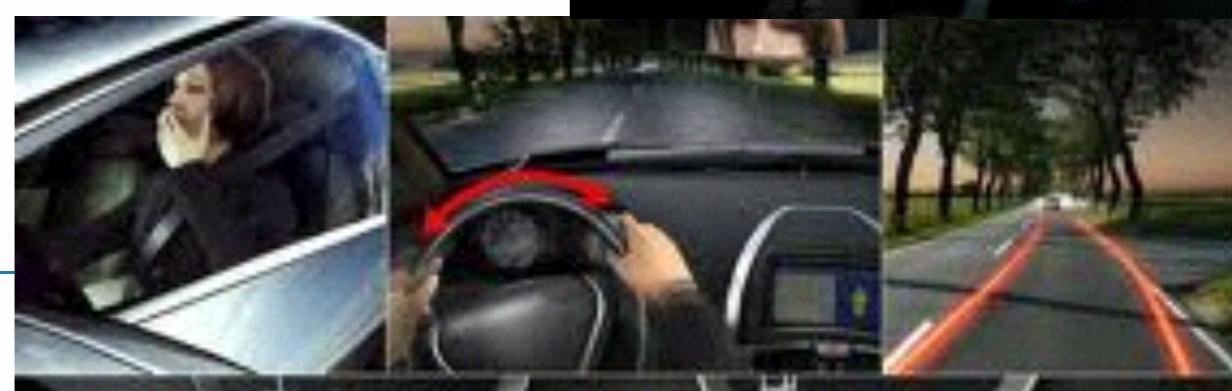
We see the first commodity devices tracking physical activity

-> towards physiological sensing

May soon extend to cognitive tasks



NeuroOn



# How can we track progress?

Key: Tracking Cognitive Activities in real life

## Tracking Reading Habits (reading life log)

People who read more

*“Can I copy the habits of my thesis advisor to become a better?”*

higher general knowledge [1]

If you give quantified feedback people can improve their habits

similar to apps/devices that track fitness and health

they have been shown to improve physical fitness

Very Few In-Situ Studies [2]

[1] A. Cunningham and K. Stanovich. What reading does for the mind. *Journal of Direct Instruction*, 1(2):137–149, 2001.

[2] A. Bulling, J. A. Ward, and H. Gellersen. Multimodal Recognition of Reading Activity in Transit Using Body-Worn Sensors. *ACM Trans. on Applied Perception*



How much are you reading?

What are you reading?

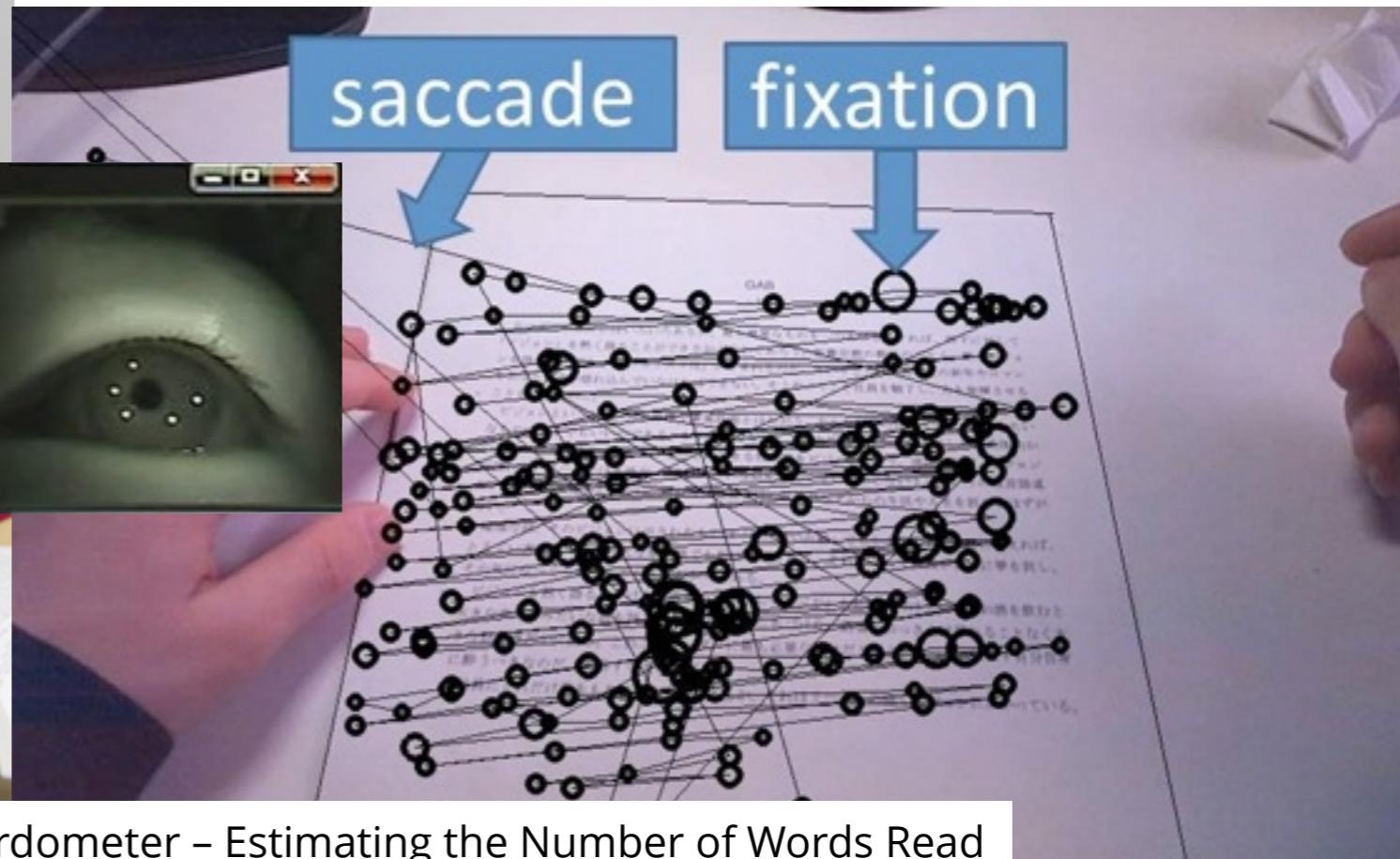
How much do you understand?



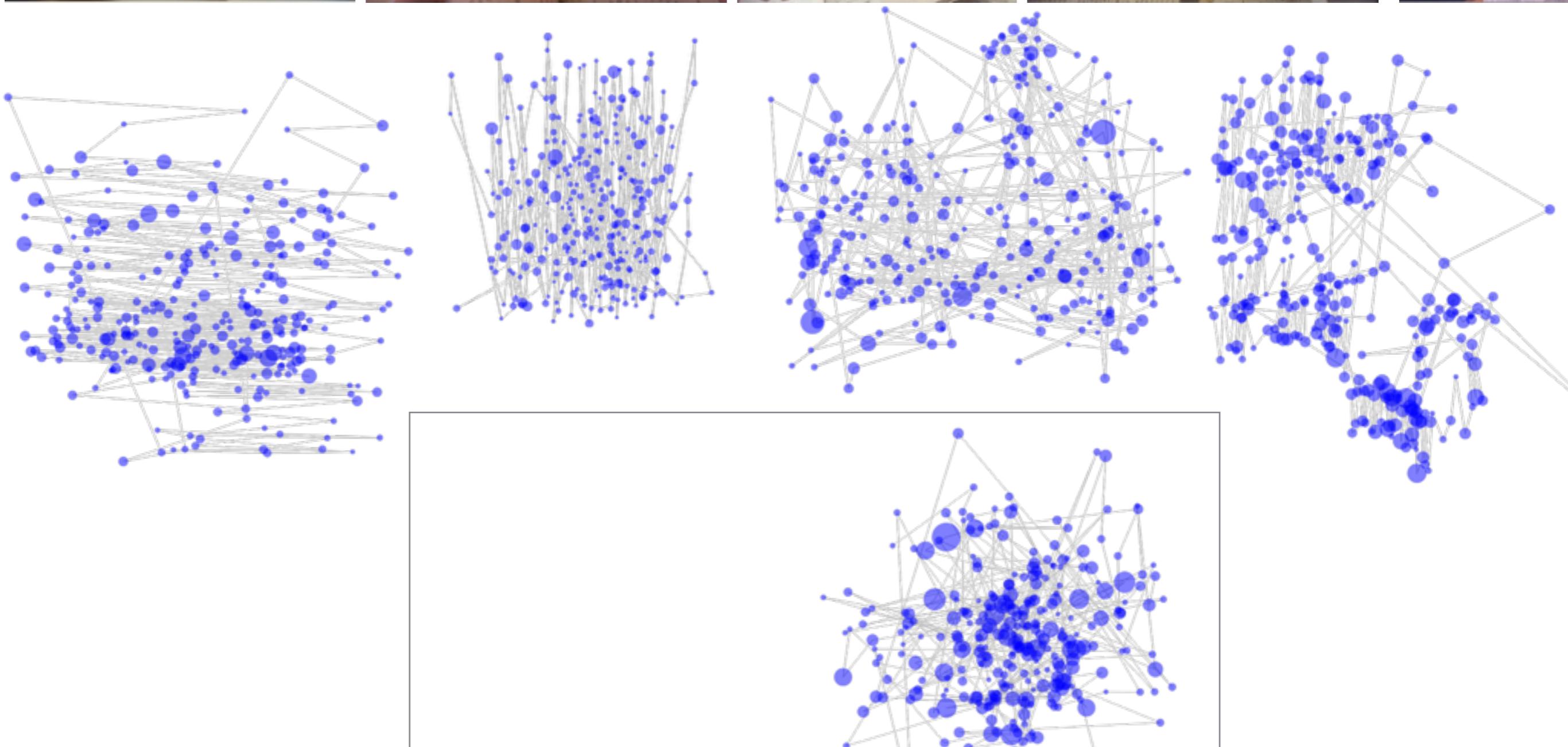
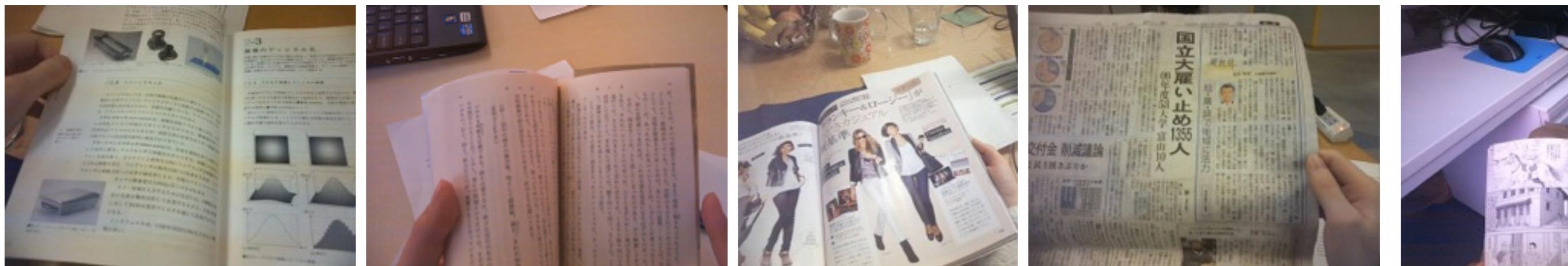


# How much are you reading?

using eye tracker to count  
number of lines read  
-> estimate words read.  
Wordometer

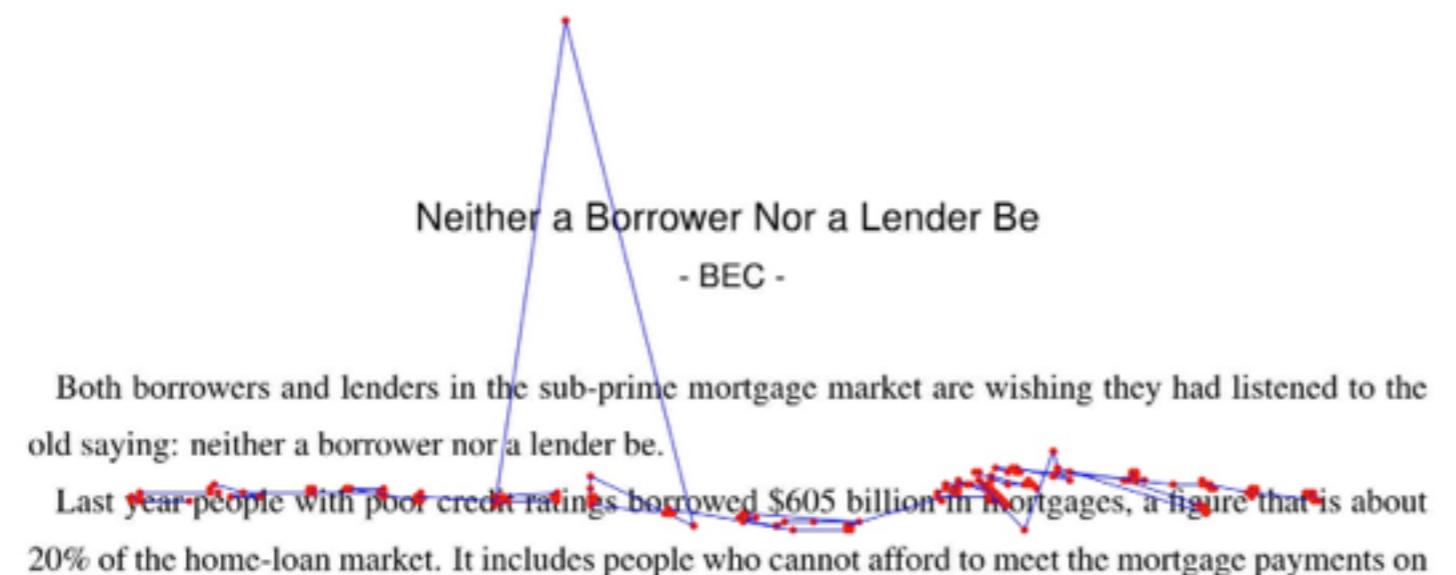


K. Kunze, H. Kawaichi, K. Yoshimura, K. Kise. The Wordometer – Estimating the Number of Words Read Using Document Image Retrieval and Mobile Eye Tracking ICDAR 2013. Best Paper Award



Kai Kunze, Andreas Bulling, Yuzuko Utsumi, Koichi Kise. I know what you are reading – Recognition of document types using mobile eye tracking, ISWC 2013, Zurich.

# Detecting Difficult Words



Eye-gaze translated to  
Document coordinate  
System using LLAH

Horizontal projection  
To a line

Last year people with poor credit ratings borrowed \$605 billion in mortgages, a figure that is about 20% of the home-loan market. It includes people who cannot afford to meet the mortgage payments on

Both borrowers and lenders in the sub-prime mortgage market are wishing they had listened to the old saying: neither a borrower nor a lender be.

Last year people with poor credit ratings borrowed \$605 billion in mortgages, a figure that is about 20% of the home-loan market. It includes people who cannot afford to meet the mortgage payments on

histogram

# Future Work -A Fitbit for the Mind?-

The screenshot shows the read.it dashboard interface. At the top, there's a toolbar with various icons and a "read.it" logo. Below the toolbar, the navigation menu includes "Dashboard", "Log", "Community", "Premium", and a "STORE" button. On the right side, there are user profile icons for a yellow figure, a speech bubble, and a gear.

The main content area displays the following data:

- Activity**: A bar chart titled "words read" showing word count over time (00-24). The chart has several peaks, with the highest peak around 12:00 reaching approximately 1,300 words.
- word count**: A circular gauge showing 8497 words read.
- Manga**: A circular gauge showing 15 pages read.
- Science Papers**: A circular gauge showing 20 pages read.
- Concentrated Reading**: A circular gauge showing 30 min of concentrated reading.
- Japanese**: A partial circular gauge.
- Overview**: A partial circular gauge.
- Friends**: A list of friends with their activity counts:
  - You: 67,071 (rank 1)
  - codysumter: 36,155 (rank 2)
  - Sulistyo: 24,538 (rank 3)
  - Jessy: 13,868 (rank 4)
  - Shoya I.: No recent activity
  - ubiquitousdude: No recent activity
  - James: No recent activity
- Top Badges**: A section showing progress towards badges, with a red progress bar.

A cartoon character with orange hair and a thinking bubble is visible in the bottom right corner.

# Mind Kit

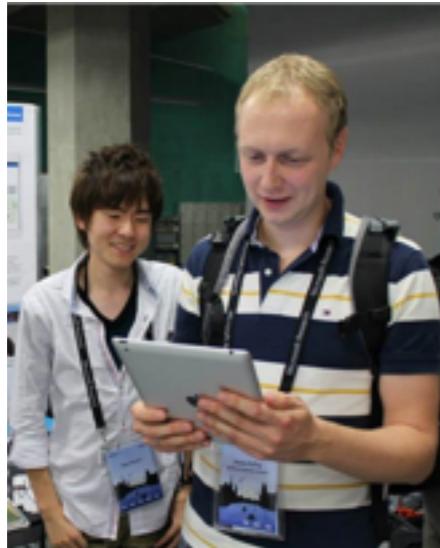
How can we build cognitive tools to enhance the collective mind of our society?



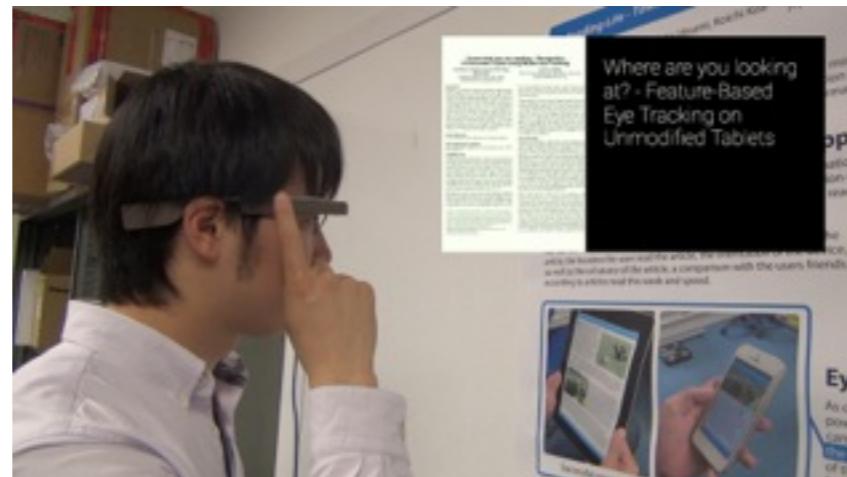
# Cognitive Activity Recognition for Everybody

Eye trackers are expensive and for tracking learning habits we should apply the technology to a lot of people

Is there technology that can be used more broadly ..



Eyetracking on Tablets

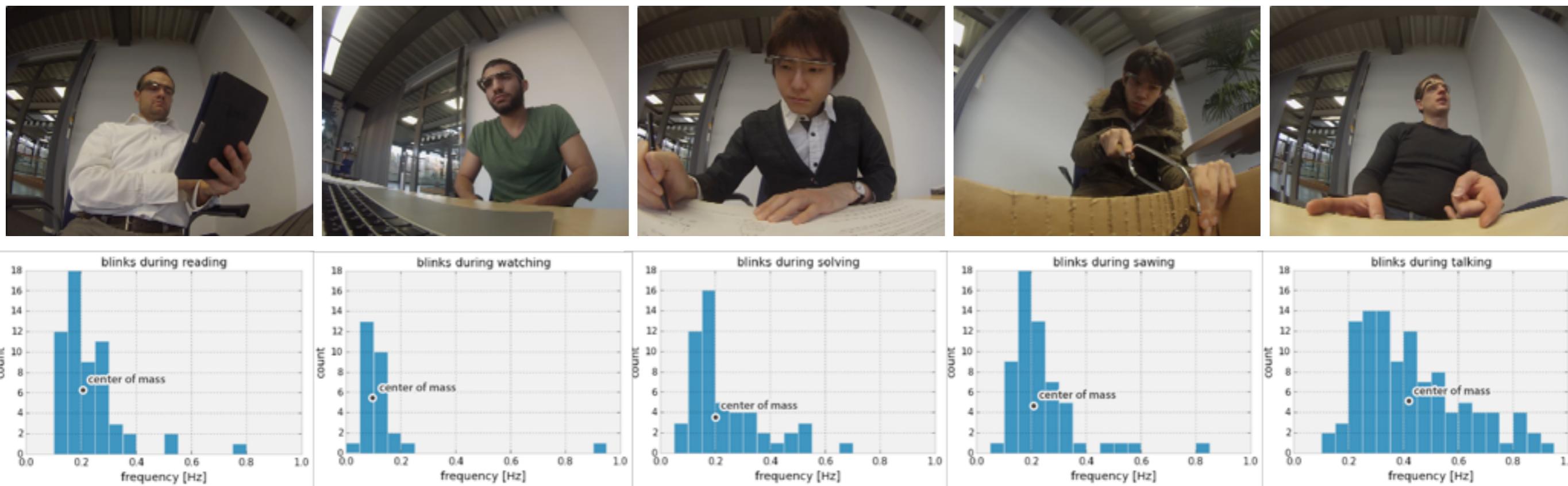


Google Glass



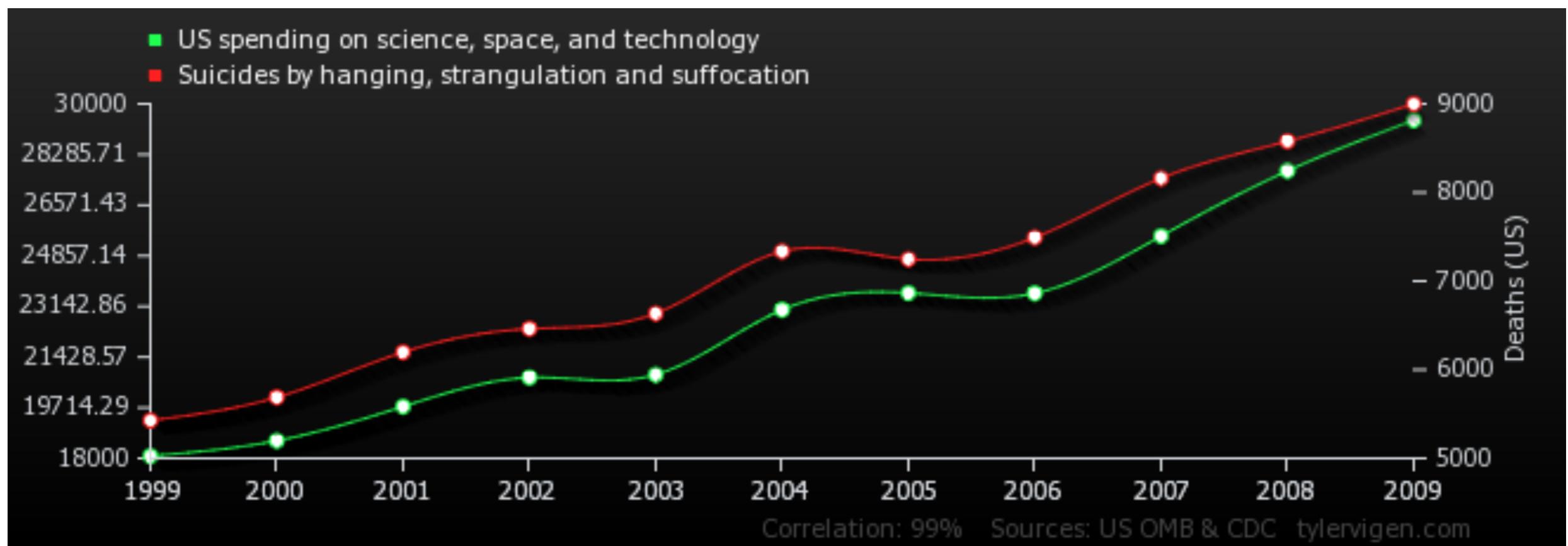
JINS MEME  
(Electrooculography)

# What can you do with it?



- **reading** a book on an eBook reader
- **watching** a video on laptop PC
- **solving** mathematical tasks
- **sawing** a cardboard
- **talking** with another person

# The problem with BIG DATA



spurious correlations

<http://tylervigen.com>

# J!NS M3ME

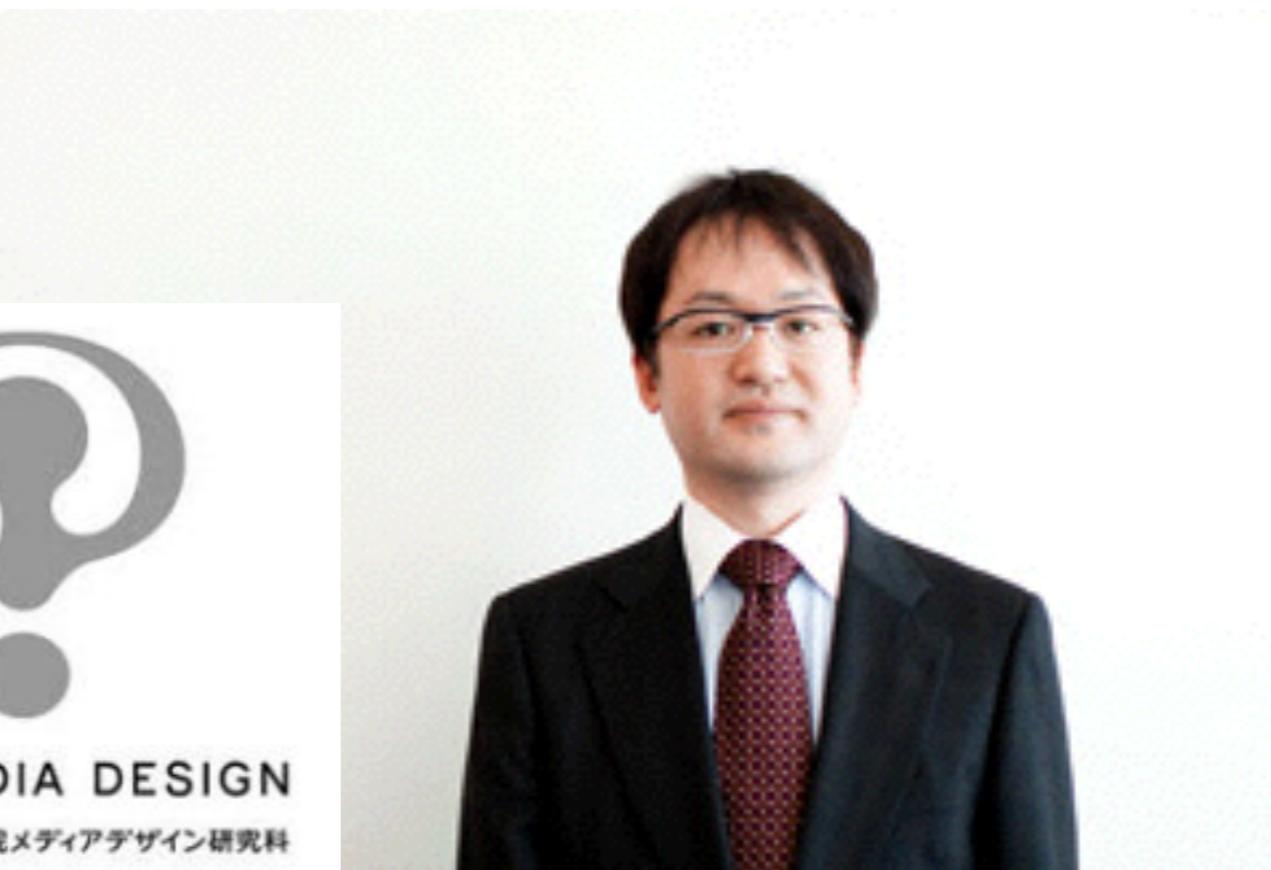


Very different idea from Google Glass  
... not a full fledged computer just a sensing device.



Electrooculography and motion sensors  
(accelerometer and gyroscope)

We are working with Inami-Sensei  
from Keio Media Design and J!NS  
directly on the prototype



KEIO MEDIA DESIGN

慶應義塾大学大学院メディアデザイン研究科

# Mindkit — Towards Tools for Intelligence Amplification

Similar with sports trackers:  
can we identify good habits and progress?

Recognition and tracking of:

Fatigue, Alertness, Attention, Concentration  
Cognitive Load, Stress, Concentration  
Memory, Recall ...

Decision making process

# NIRS Experiments



# Questions, Remarks, Violent Dissent?

<http://kaikunze.de>



twitter: @k\_garten  
app.net: @kkai  
[kai.kunze@gmail.com](mailto:kai.kunze@gmail.com)

<http://github.com/kkai>

Workshop on Ubiquitous Technologies  
for Augmenting the Human Mind, Ubicomp Seattle,  
<http://recall-fet.eu/wahm2014/>  
Paper Deadline: 27 June

Talk at the Chaos Communication Congress  
<http://bit.ly/30c3mind>

New Scientist Article: Fitbit for the mind: Eye-tracker watches your reading  
<http://bit.ly/fitbitmind>