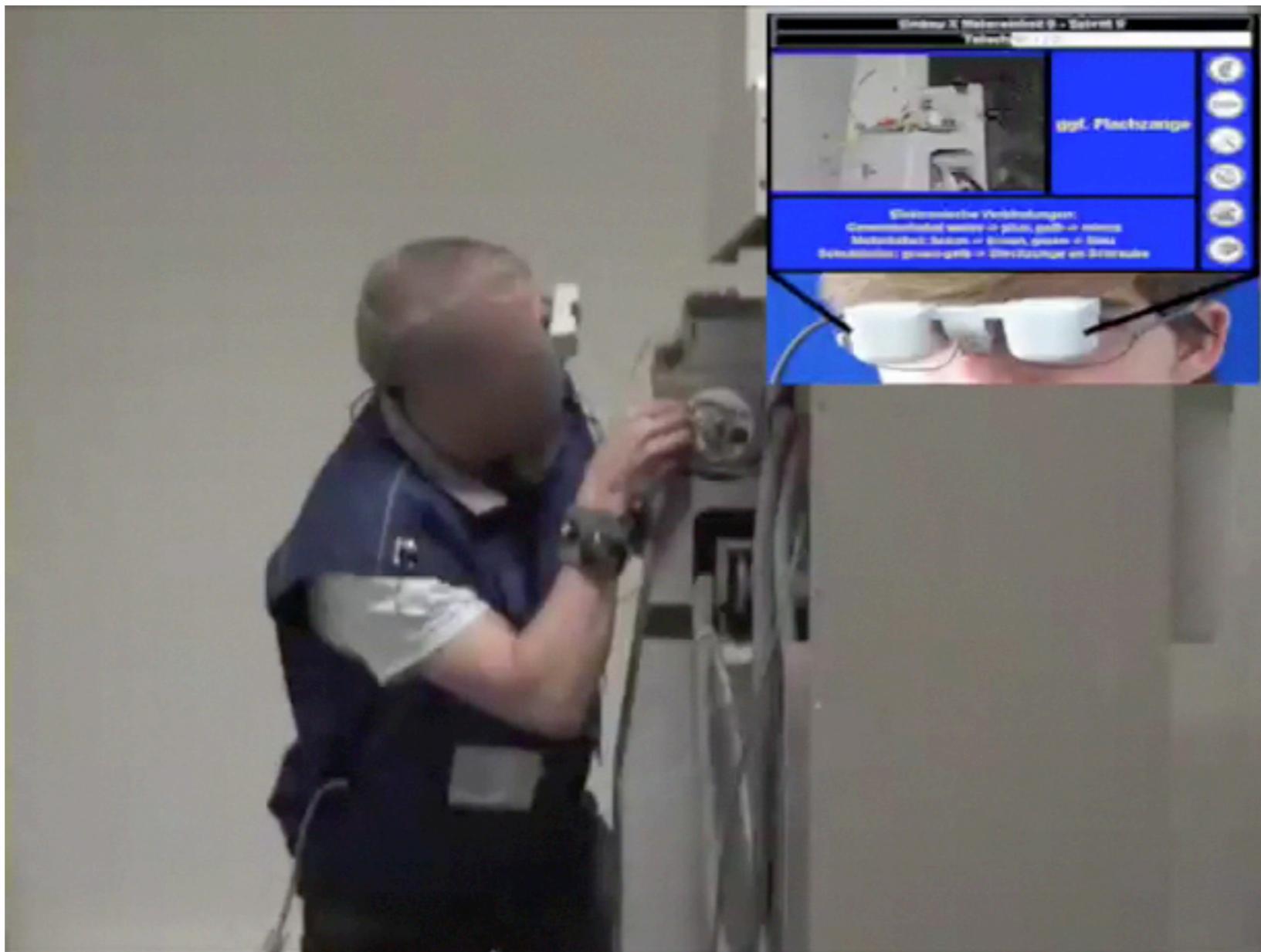


Hacking Glass

Kai Kunze

Wearable Computing in Industry



25c3 Talk: About
Cyborgs and
Gargoyles
[http://
www.youtube.co
m/watch?
v=jex8z57-tQU](http://www.youtube.com/watch?v=jex8z57-tQU)

Kai Kunze, Florian Wagner, Ersun Kartal, Ernesto Morales Kluge, Paul Lukowicz: Does Context Matter ? - A Quantitative Evaluation in a Real World Maintenance Scenario. Pervasive 2009, Nara, Japan.



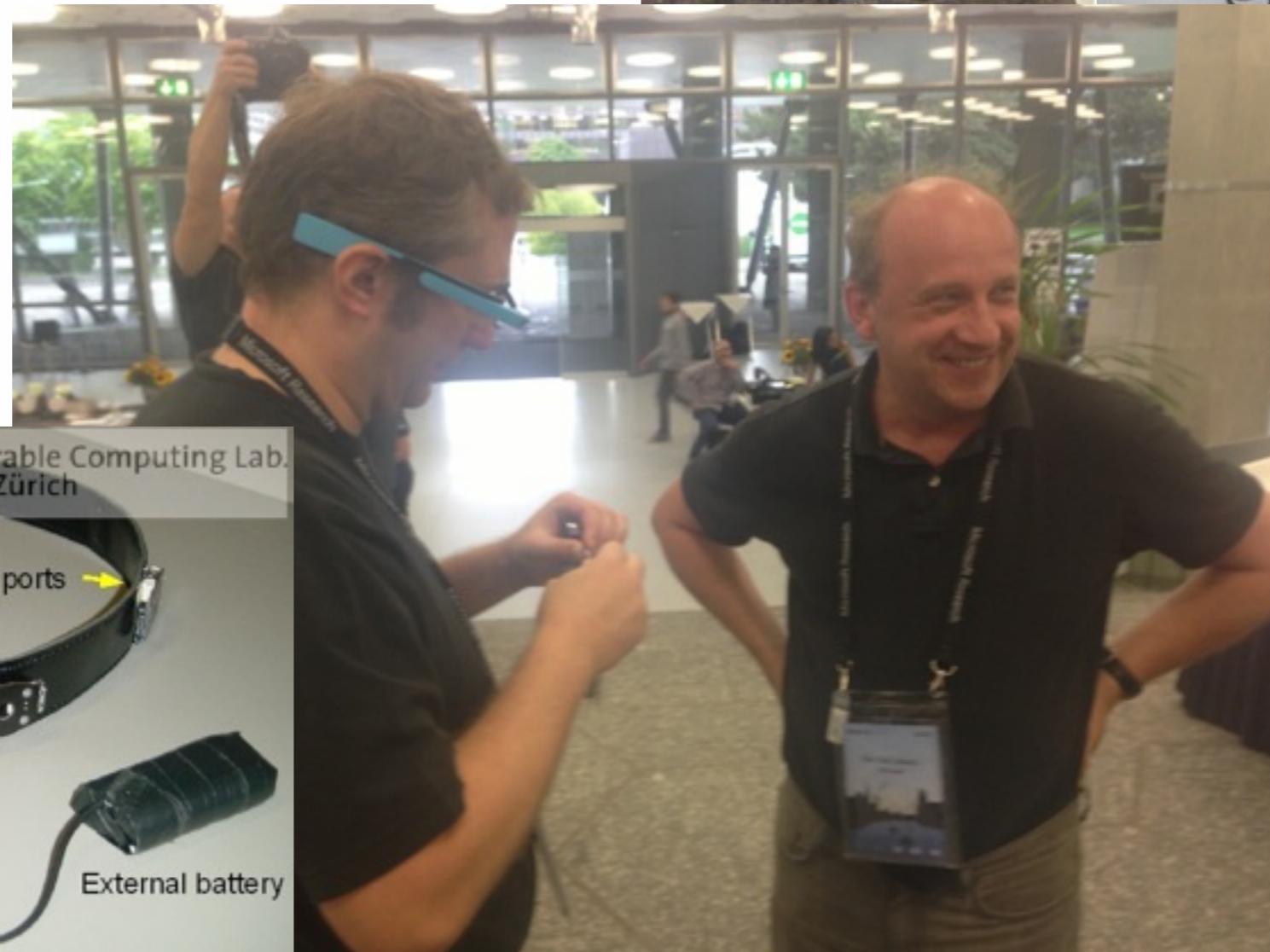
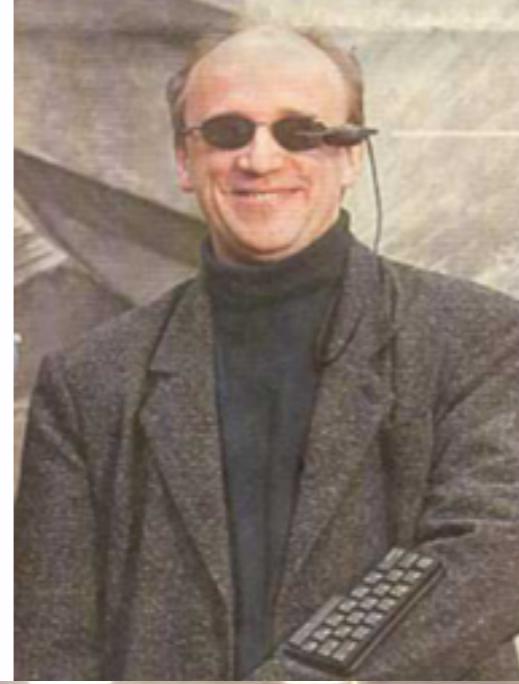
My Background

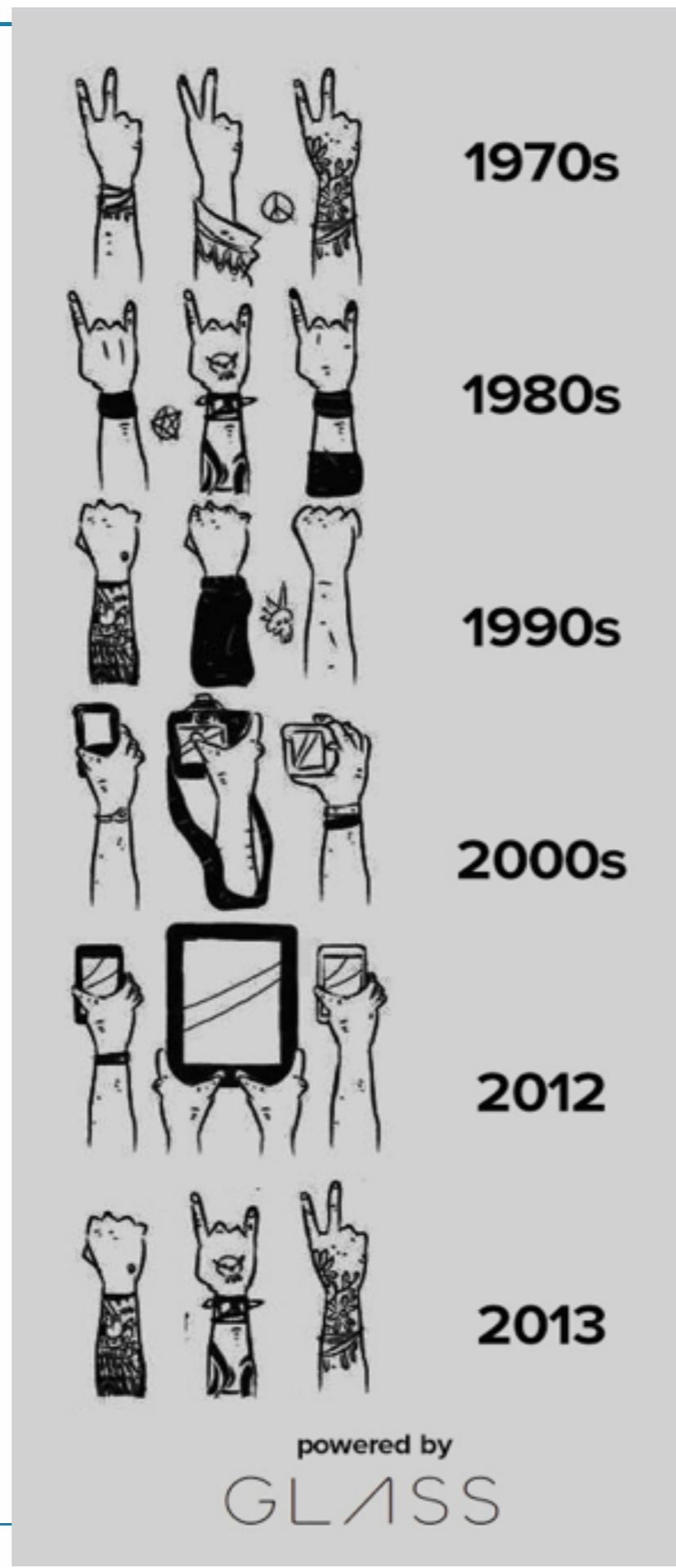
phd. thesis in wearable computing

specifically activity recognition

supervised by

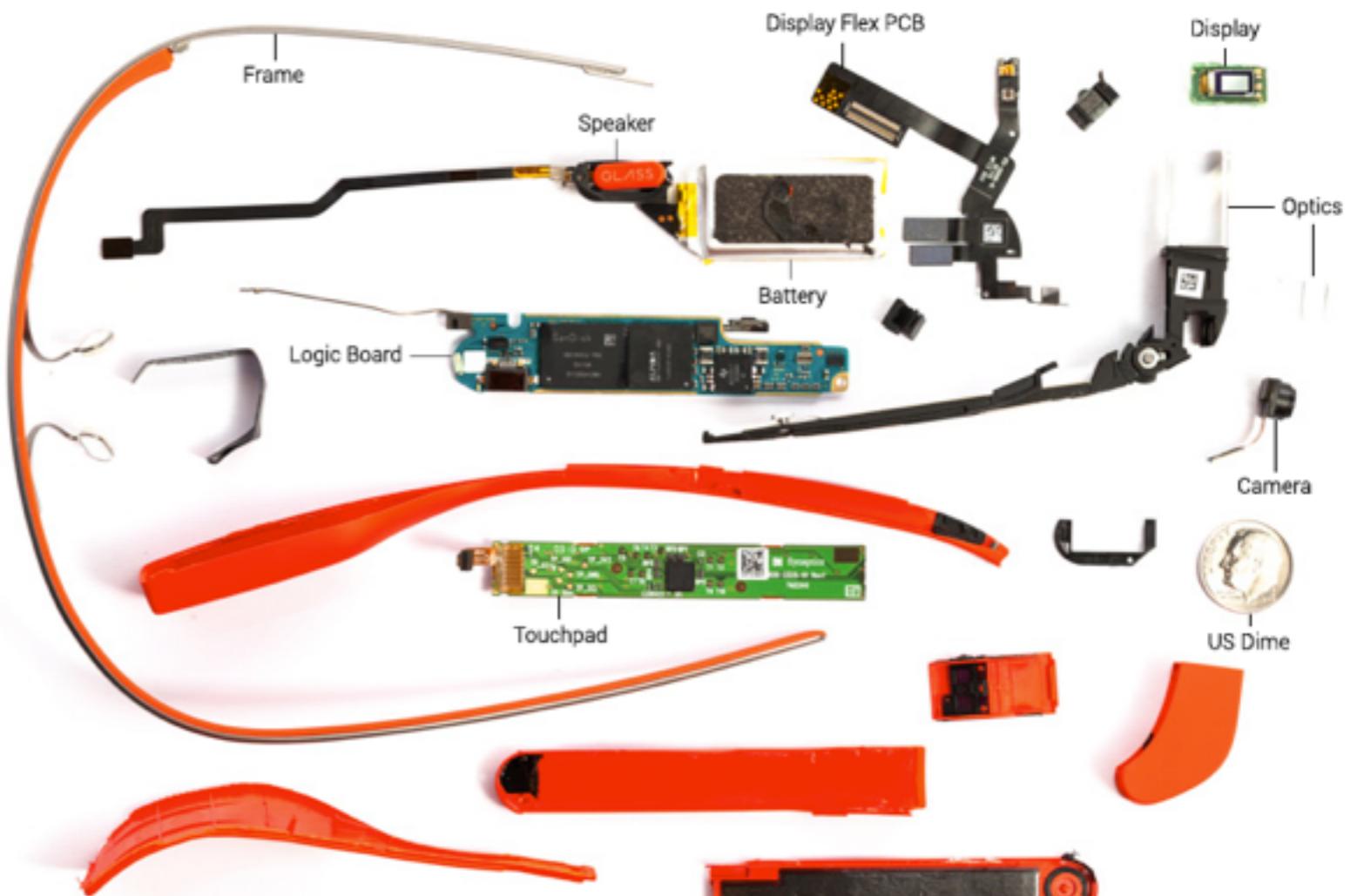
Pau Lukowicz





What's inside?

Android 4.0.4
640×360 display
5-megapixel camera,
Wi-Fi 802.11b/g
Bluetooth (4 LE but not usable)
16GB storage (12 GB available)
Texas Instruments OMAP 4430 SoC
1.2Ghz Dual(ARMv7)
682MB RAM "proc".
3 axis gyroscope
3 axis accelerometer
3 axis magnetometer (compass)
Ambient light sensing and
proximity sensor
Bone conduction transducer

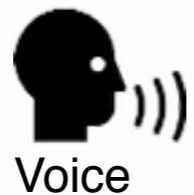


<http://www.catwig.com/google-glass-teardown/>

User Interface

“OK Glass...

take a picture
record video
get directions to
hang out with”

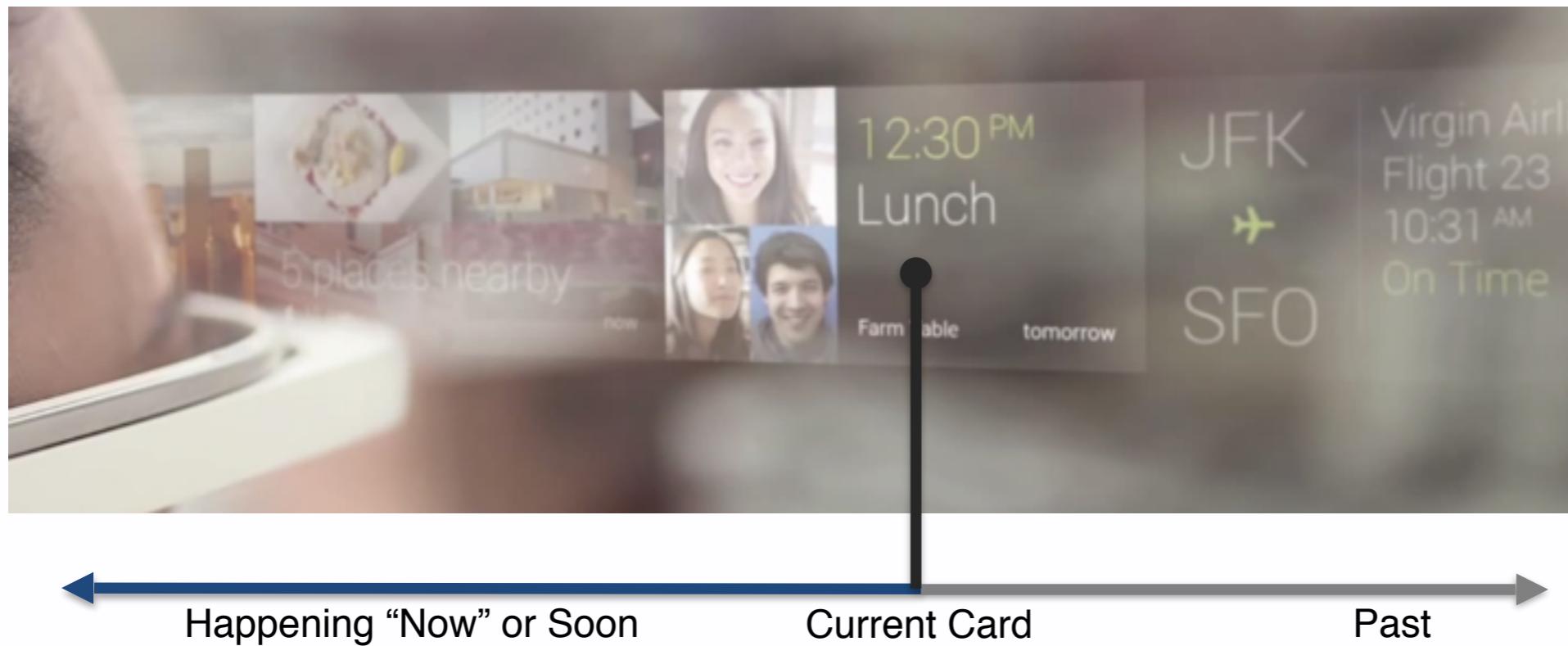


Voice



Touch

Timeline Card Interface



Demonstration

Micro-Interactions with Google Glass



Very Hackable Hardware

Warning: you void your warranty and might leave the device in an unrecoverable state!

you can easily get root

installing stock Android/ Ubuntu/ Debian is straight forward

Google provides you with the factory firmware

Check out “How to void your warranty”:

<https://developers.google.com/events/io/sessions/332704837>

```
adb devices  
adb reboot-bootloader  
fastboot devices  
  
fastboot oem unlock
```

```
fastboot flash boot boot.img  
fastboot reboot  
adb root  
adb shell
```

“Thanks! You are awesome!”



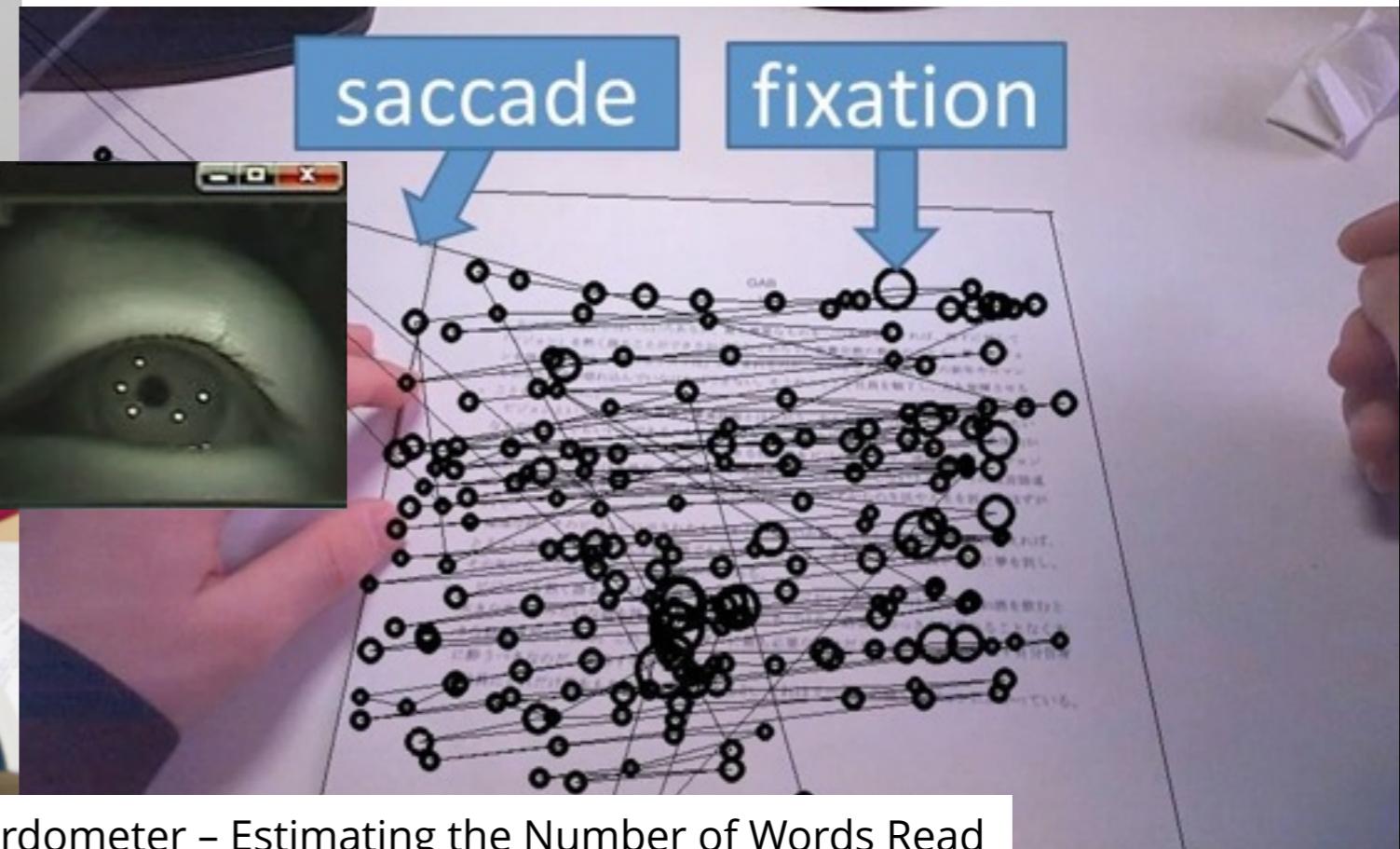
```
fastboot flash boot boot.img  
fastboot flash system system.img  
fastboot flash recovery recovery.img  
fastboot flash userdata userdata.img  
fastboot erase cache
```



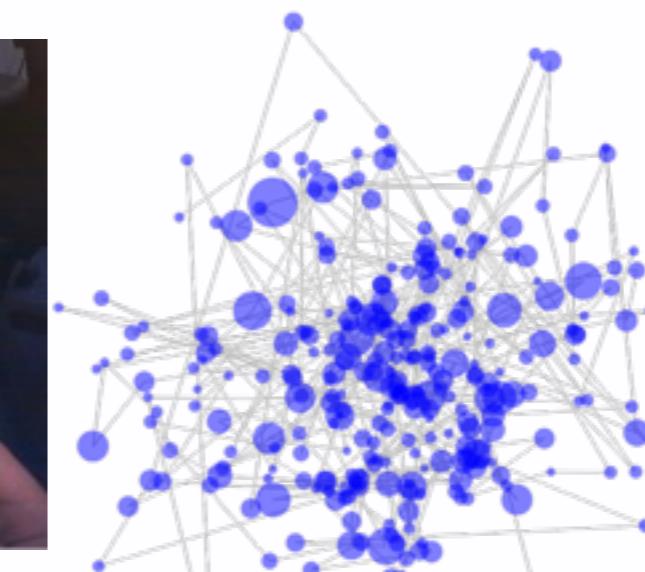
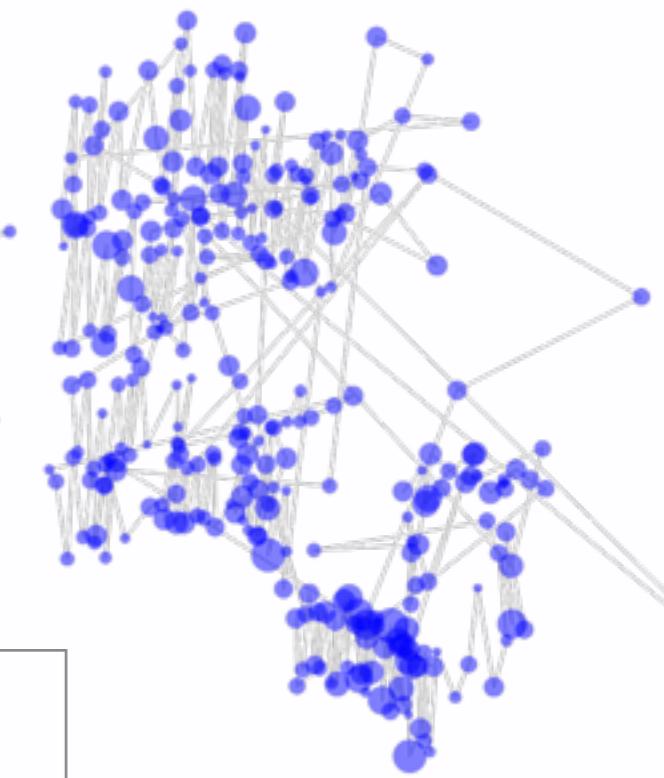
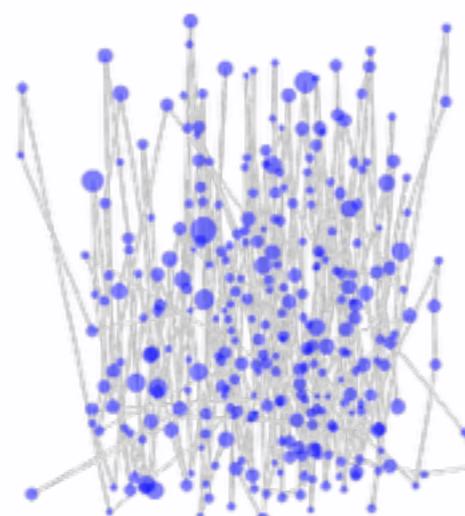
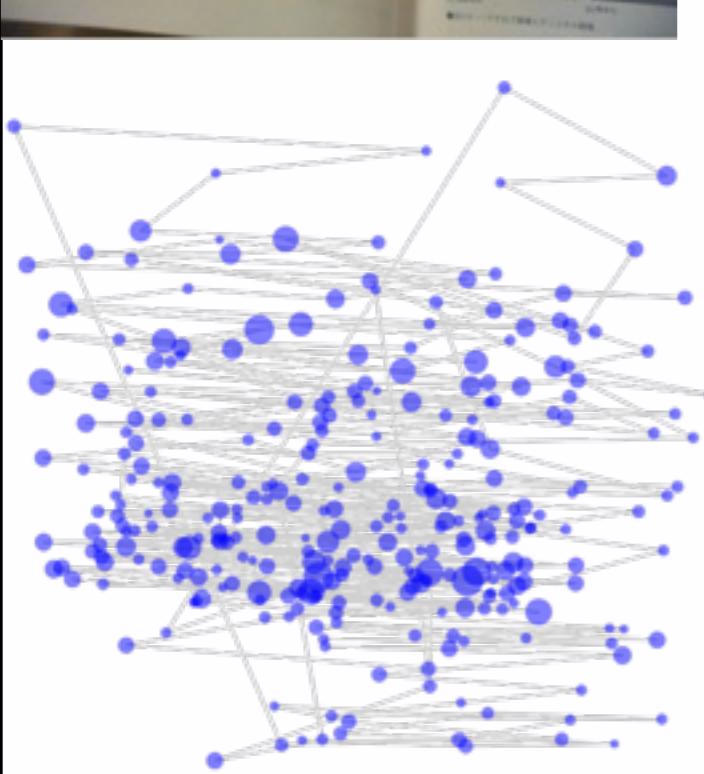
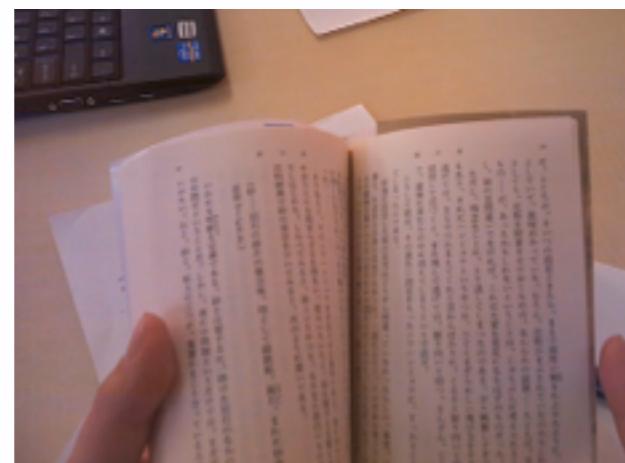
Eye Gaze Research

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

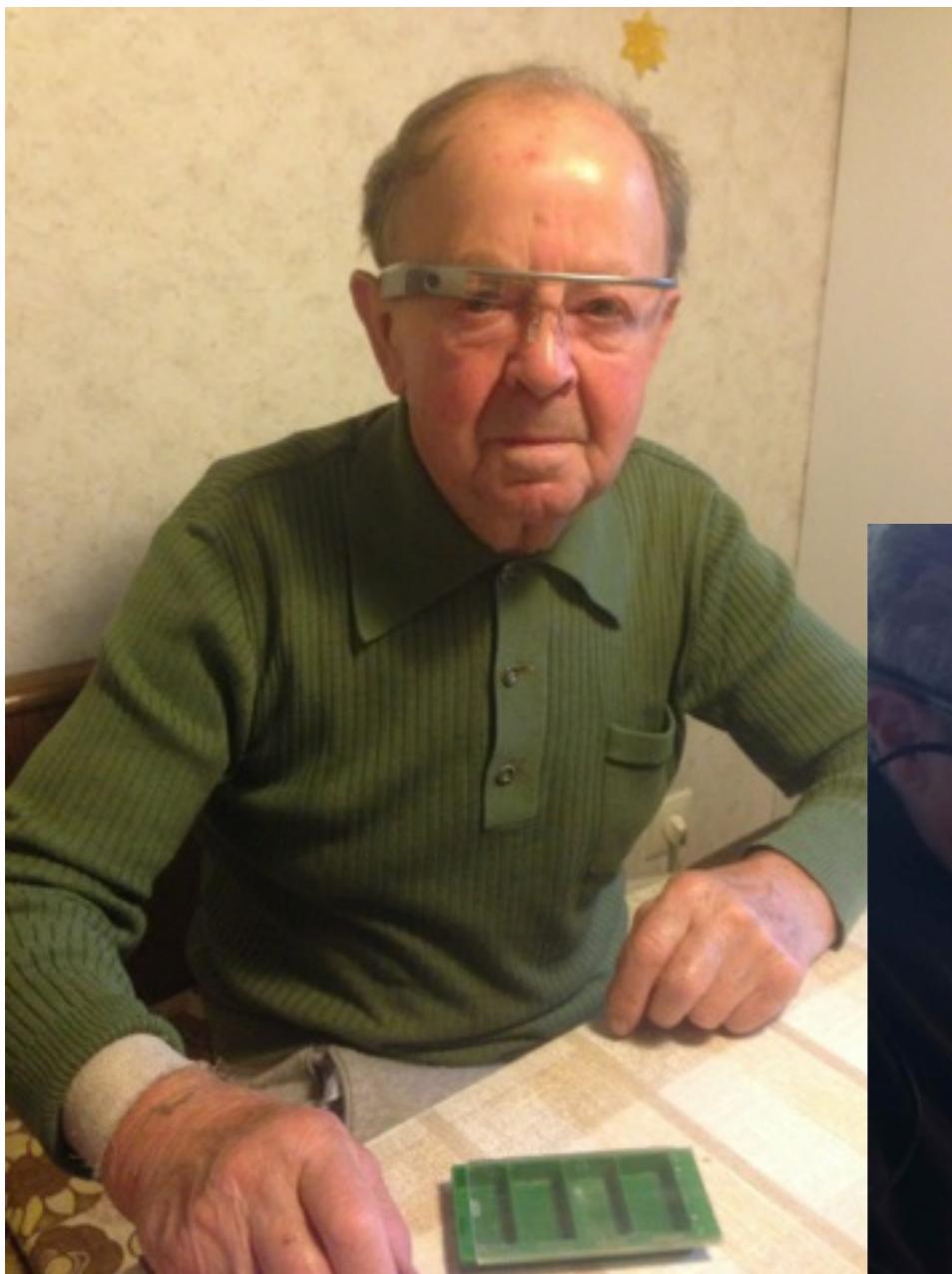


Kai Kunze, Andreas Bulling, Yuzuko Utsumi, Koichi Kise. I know what you are reading – Recognition of document types using mobile eye tracking, ISWC 2013, Zurich.

"Reality Test"



<http://kaikunze.de/posts/a-week-with-glass/>



I don't care about the scene camera ...

Ok ... there's no camera,

yet can we do something else with Glass?

Demonstration



Eye Gaze on Unmodified Tablets

Privacy Issues

more perception than actual problem ...

there are cheaper ways to record video/pictures etc.

privacy is a complex issue and Google needs to be careful how to handle it.

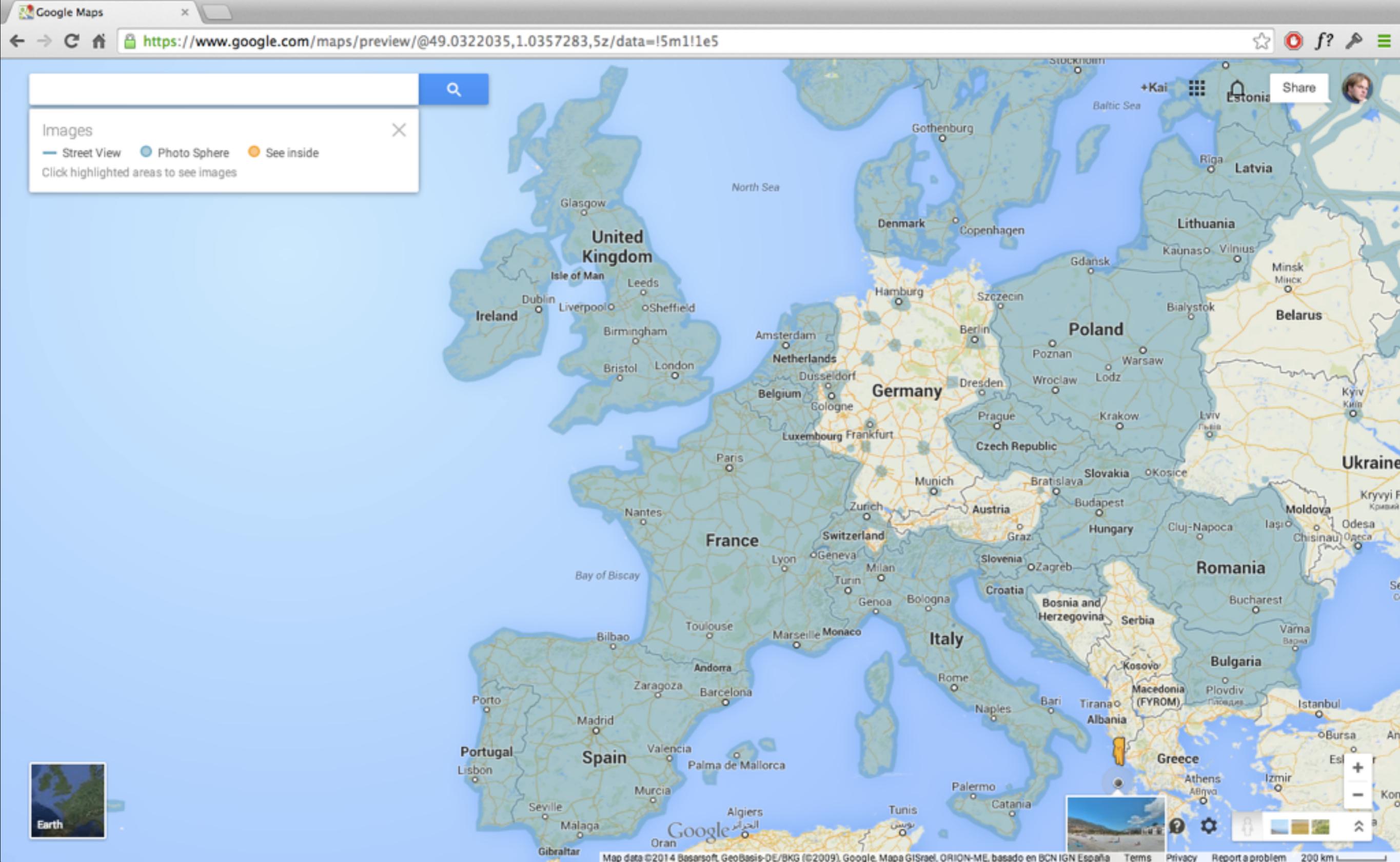
Let's take a look at Germany:

Regular people don't seem to care about the US spying.

Swift agreement (bank transactions), PRISM etc.

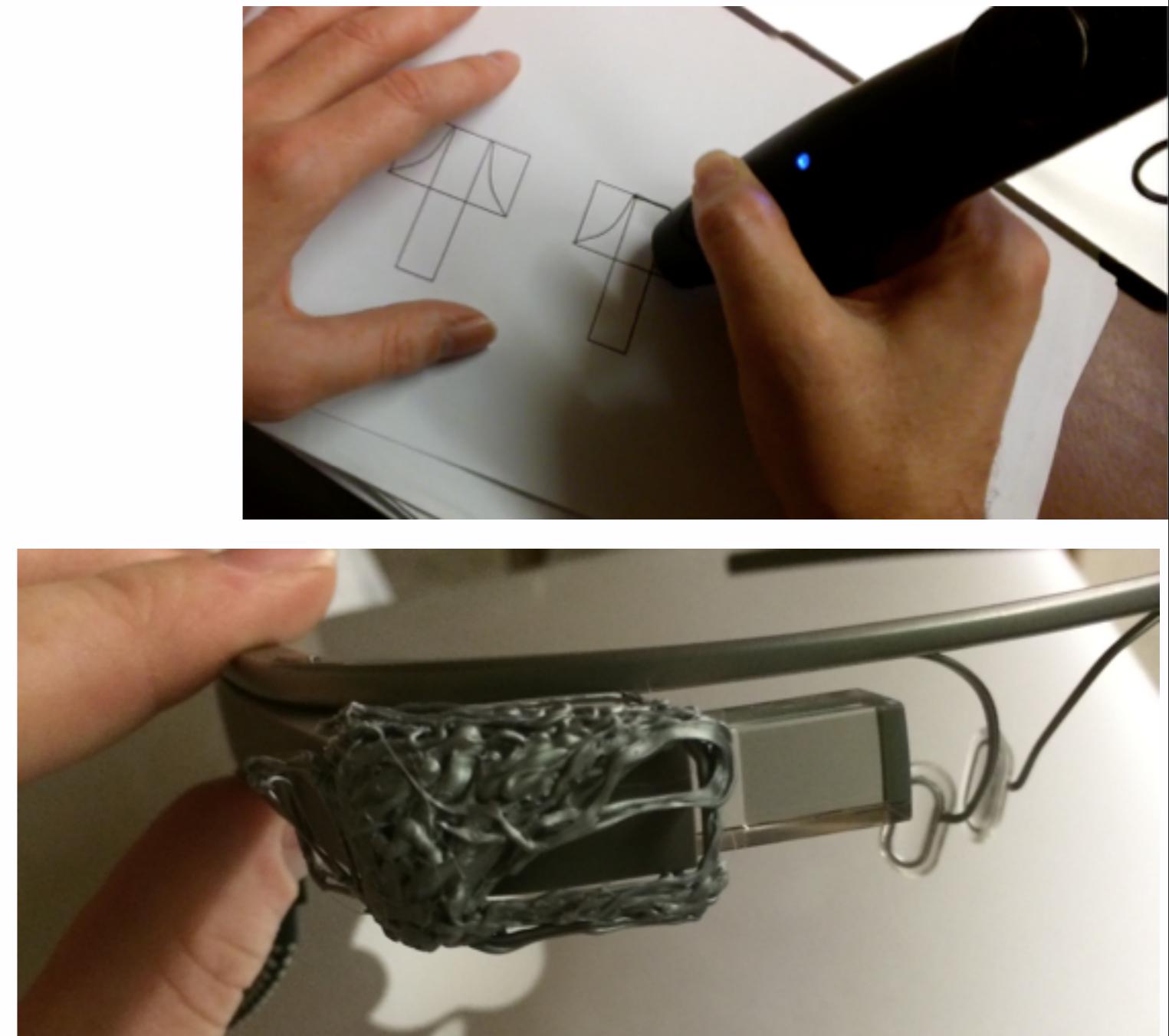
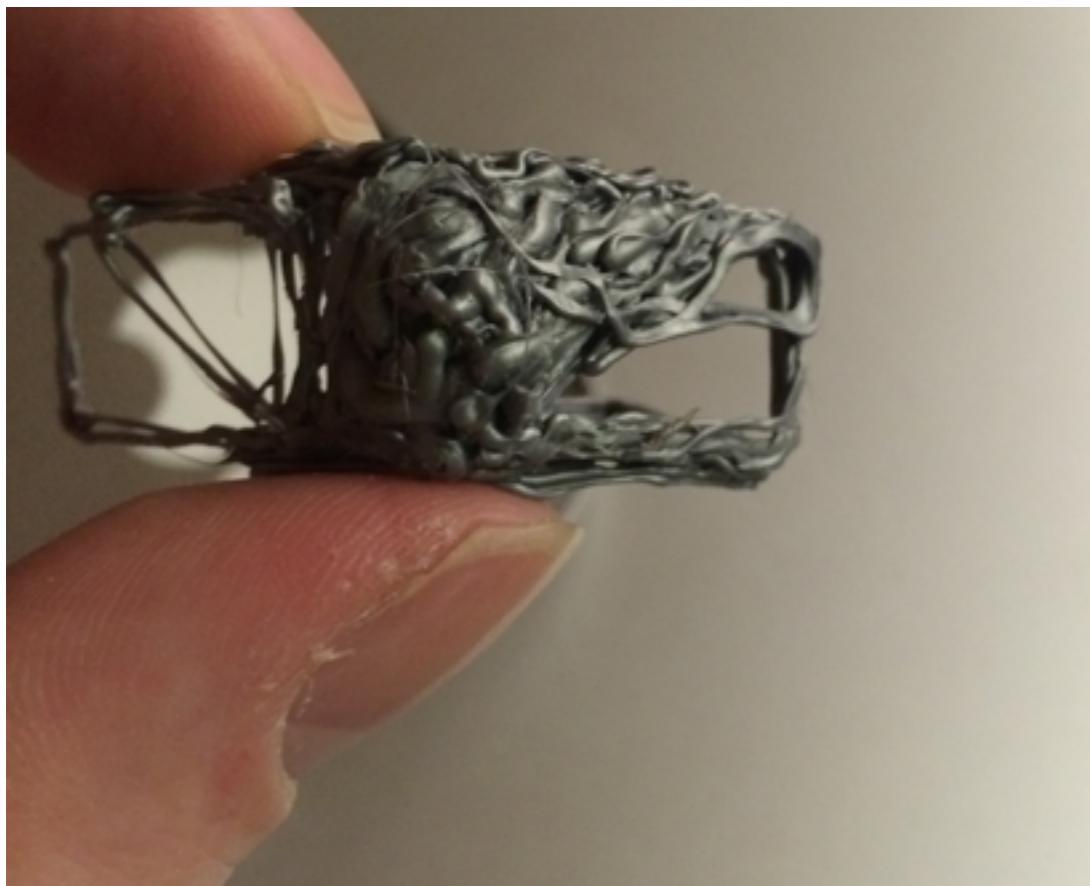
But they seem to care if you takes pictures of their streets.



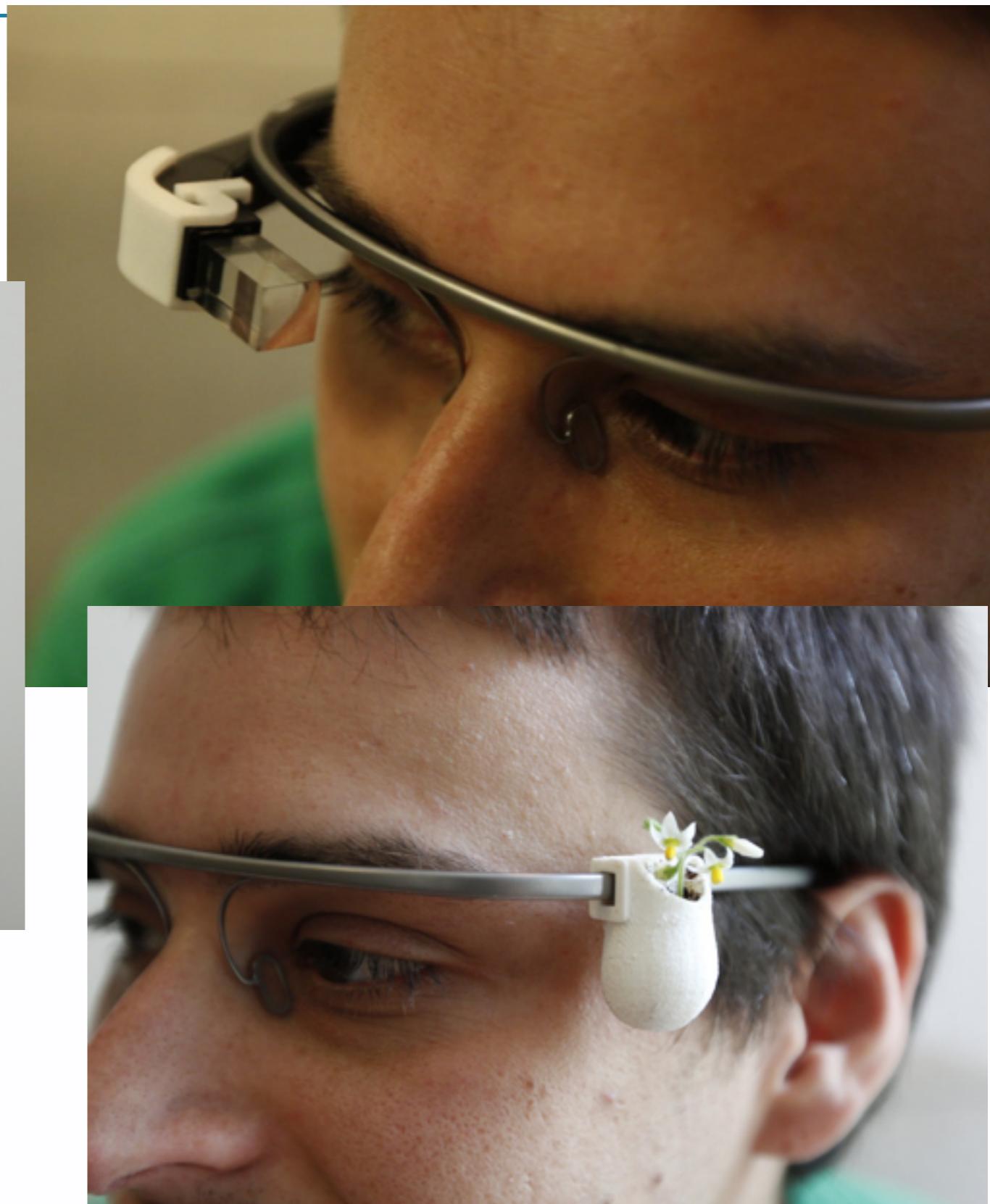


Privacy Enhancement for Google Glass

Scene Camera ... why???



GlassKap



<https://www.kickstarter.com/projects/baltimore/glasskap-a-lens-cover-and-fun-accessories-for-goog>

Useful Projects, Tools etc.

<https://developers.google.com/glass/>

Instructions for the SDK setup etc.

<https://github.com/kaze0/launchy>

For managing applications

<https://code.google.com/p/android-screen-monitor/>

For Screencast

<https://github.com/space150/google-glass-playground>

Source for some apps

OpenCV for Android

<http://opencv.org/platforms/android.html>

Thanks to ...

Christoph Schuba,

Cody Sumter,

Paul Lukowicz,

Katsuma Tanaka,

Shoya Ishimaru



Questions, Remarks, Violent Dissent?

<http://kaikunze.de>



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app.net: @kkai
kai.kunze@gmail.com

<http://github.com/kkai>

shameless advertisements:

Talk at the Chaos Communication Congress

“Toward A Cognitive Quantified Self”

<http://www.youtube.com/watch?v=LrARH4KJRro>

