

# Touch

Pointing and clicking in the physical world

Intro  
Physical hyperlinks link things, places or people to digital stuff.



The Touch project started in 2004.

Over 20 million wallet phones in Japan.

Nokia, Samsung and Motorola releasing RFID enabled mobile phones.

## Physical

Things  
Places  
People

## Digital

Content  
Applications  
Services

The grand idea behind physical hyperlinks is to connect the digital to the physical.

This idea is explored in many disciplines like ubiquitous and pervasive computing, and tangible or physical computing.

But why am I not talking in more general terms about ubiquitous or tangible computing? I want to talk about the technologies that link the digital and the physical that have the most direct relevance to the web world.

One of the key issues is “being in the world” versus “being in the screen”.

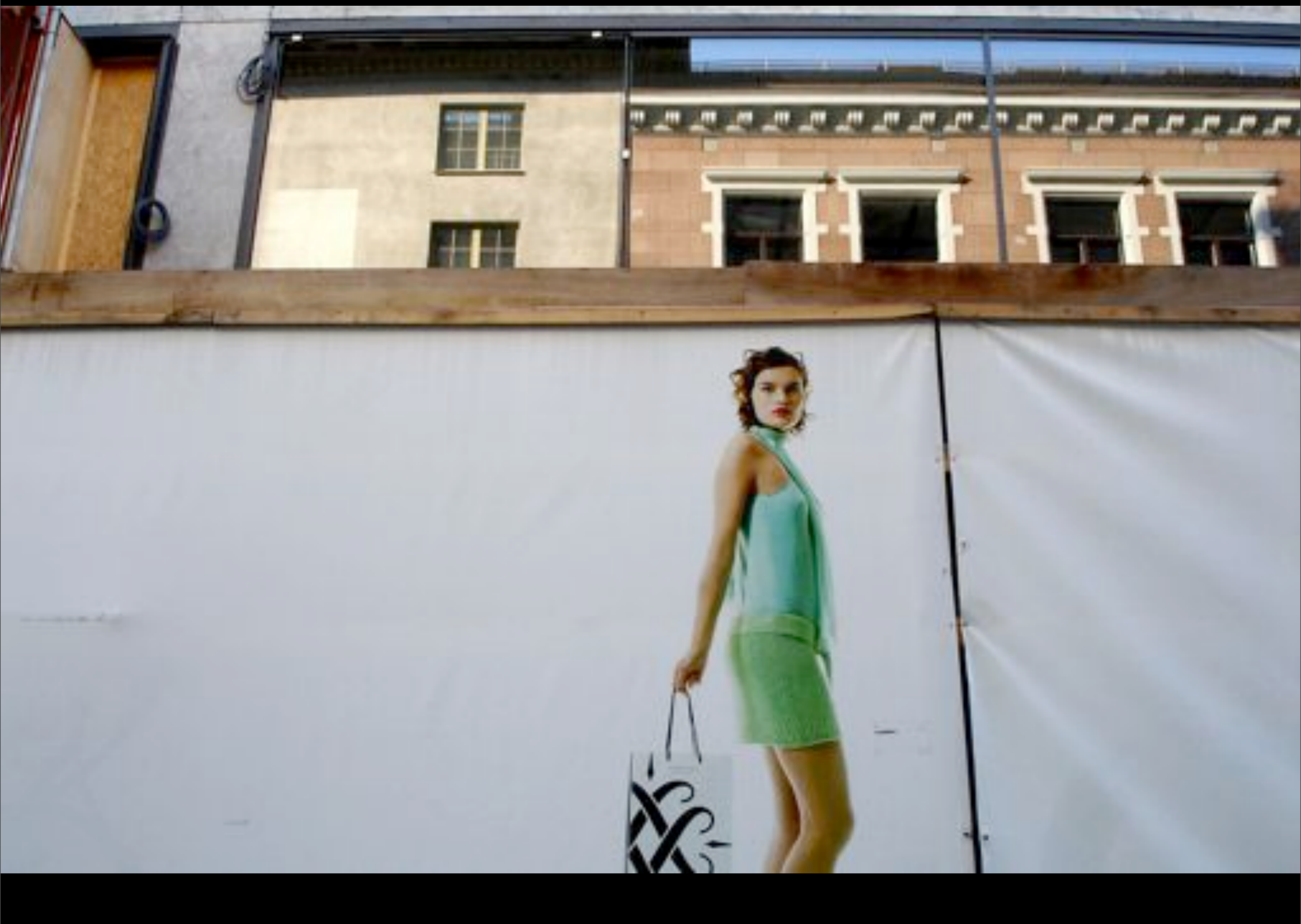


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Critically, (from a european/asian perspective) it's the mobile phone that is pushing this merging of digital and physical. 2.6 billion phones!

The idea of a 'universal controller', a device that not only communicates but allows us to control things in our surroundings.

Physical hyperlinks are potentially a nice way of allowing access to content, applications and services, without having to delve into context awareness: it's user driven, point and click!



Where does the general motivation for such digital/physical crossover emerge from?

These are some key motivations, not definitive.

Of course advertisers and marketers want us to engage with their offerings and services in a richer, more involved way. They want to make ads interactive, to offer us brand touchpoints that reach into our personal devices.

The holy grail of marketing is to get into our most personal devices, to get us using branded services and applications. This is currently difficult as mobile usability of service discovery is not that great.



Retailers and consumer goods industry—the pioneers of the machine readable world (barcode)—want to take tagging beyond the supply chain: to offer us richer shopping experiences, to make us more ‘loyal’ with offers, discounts and such.

But people may be interested in aspects of products that retailers don’t always give us, such as the impact of products, personal food preferences, allergies and such.

Many projects deal with the ability to see products surrounded with new information. This is also part of a ‘design for all’ initiative, where labels can be accessed by people with vision impairment or motor difficulties.

Future store:  
<http://www.future-store.org/>

When products communicate  
<http://www.innovationlab.dk/sw22694.asp>



Flickr photo: boncey

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The blue plaques in London are 140 years old.  
They commemorate links between people and places.  
They show some desire to layer information in our physical world.

<http://www.english-heritage.org.uk/server/show/nav.1494>

Photo: Boncey: <http://www.flickr.com/photos/boncey/25416701/>



GAMLA



Does some of this stem from a desire to annotate the world?

Many concepts in this area mimic some of the forms of expression that are used daily in public life: graffiti, stickering and flyposting are models of public expression that could be re-created in digital form.

To use technology as a way of having more access and agency in public space.

Also some ideas about more formal monuments and history.



A feeling that we have become too removed from our immediate surroundings, that mobile phones have instigated this.

The small screen is often intensely anti-social, removing us from people and places.

Having information in the physical world may reduce our reliance on screens, or provoke awareness of information in other ways.



An idea that we might use all of the things that surround us, including more of their social and cultural richness, in our everyday interactions instead of relying on the screen.

Blogjects and spimes. Giving things a voice within the social web!

These technologies are bridges between the physical and digital, and may well allow these kinds of things to emerge.

# Technologies

So let's have a look at the technologies that enable physical hyperlinking.  
Visual markers, Bluetooth, SMS, RFID

# Bluetooth

Although I really want to focus on technologies that act more like hyperlinks: pointing and clicking, Bluetooth is a technology that is being touted as a link between places and information so it's worth mentioning.



At the moment there is interest from advertisers and marketers in making interactive, place-based advertising, this is a bluetooth poster that offers video ads directly to your phone.



Bluetooth marketing

An advert for Diesel that says “Turn on bluetooth to receive something naughty” or some such.

# Bluetooth

- Works at a relatively long range
- The 'interaction field' is large and difficult to visualise
- Accepting a transfer or pairing devices can be slow, lengthy
- The ideal medium for 'location spam'

# SMS

I wanted to quickly talk about SMS because it has been used successfully as a way of connecting digital data to physical things.

SMS shortcodes have been very successful for magazine adverts, events and such, offering ways of getting quick access to URLs. Very basic service discovery that turns the tedious task of typing an URL into a short message.



Yellow Arrow is an early project that used the mobile phone and SMS as a platform.

It asked people to tell stories about places, and offered yellow arrows to mark the places of those stories.

Very nicely visual and recognisable.

# SMS

- Simple to implement
- Requires users to read & type codes
- Relies on the network and have to wait for feedback

Barcodes



I had a look around my kitchen, and this is what I found.

Barcodes have become truly ubiquitous





Product from Zambia



Product from Canada.





INGREDIENTS:  
COCOA

Produced in the UK for  
J. Sainsbury plc  
Barnet Street  
London SE1 9JL



PO819



Product from Finland



The number of ways that barcodes have been integrated into physical packaging.

Product from Finland



Product from UK



Product from UK



**Lemons Primofiore**  
15 MAY  
PRODUCT OF  
**Italy**

CLASS  
**II**

COUNT/WEIGHT  
**x4** 

SIZE  
**53-62mm**



20000009

Product from Italy



From the thousands of products, I found one that didn't have a barcode.



But the sell by date was in 1981 (and it only cost 36p)

Barcodes were invented in 1948, had their first commercial use in 1966, and became truly widespread in the 1980s.

Data matrix



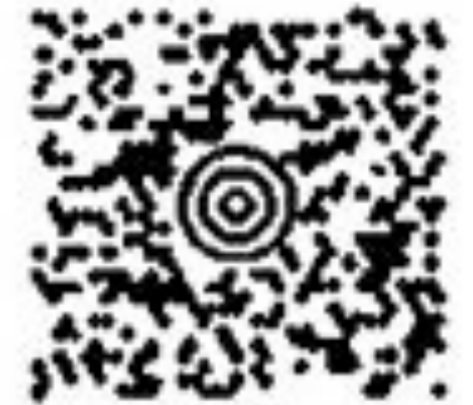
Codablock



QR code



Maxicode



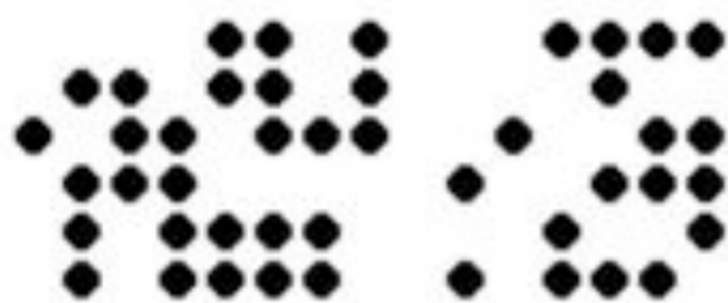
Aztec code



Shotcode



DMT code



UPC/EAN



They come in many shapes and sizes

The difference between them is about data size, reliability and robustness.

Each one gives a slightly different experience when reading.



Many of these codes can be scaled. Here is a QR code with two different contents. An increased data size causes the barcode to scale up.

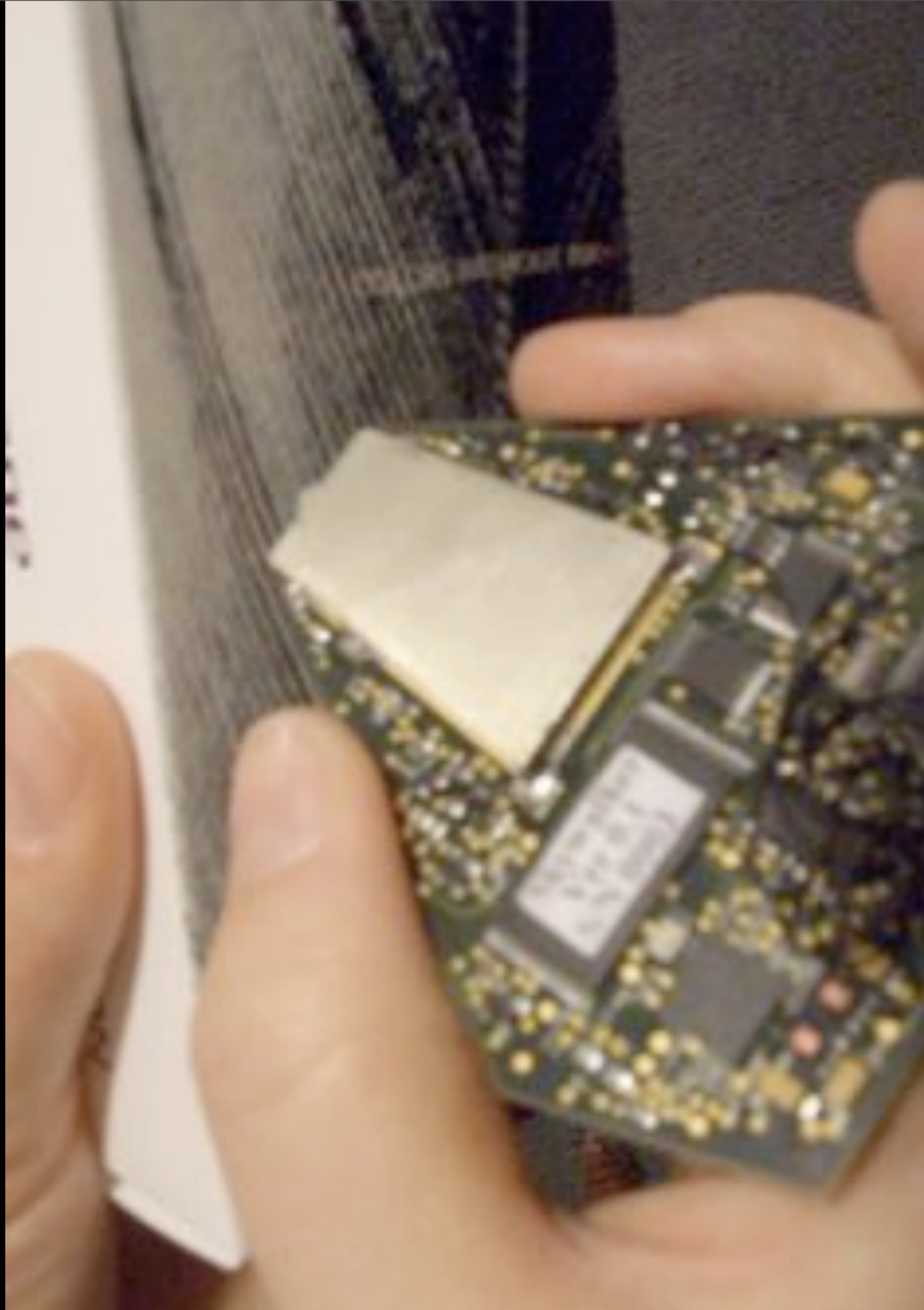
The large one will be difficult to read using a standard cameraphone because the resolution is so high.



This is a code embedded in text in a project by Enrico Costanza.

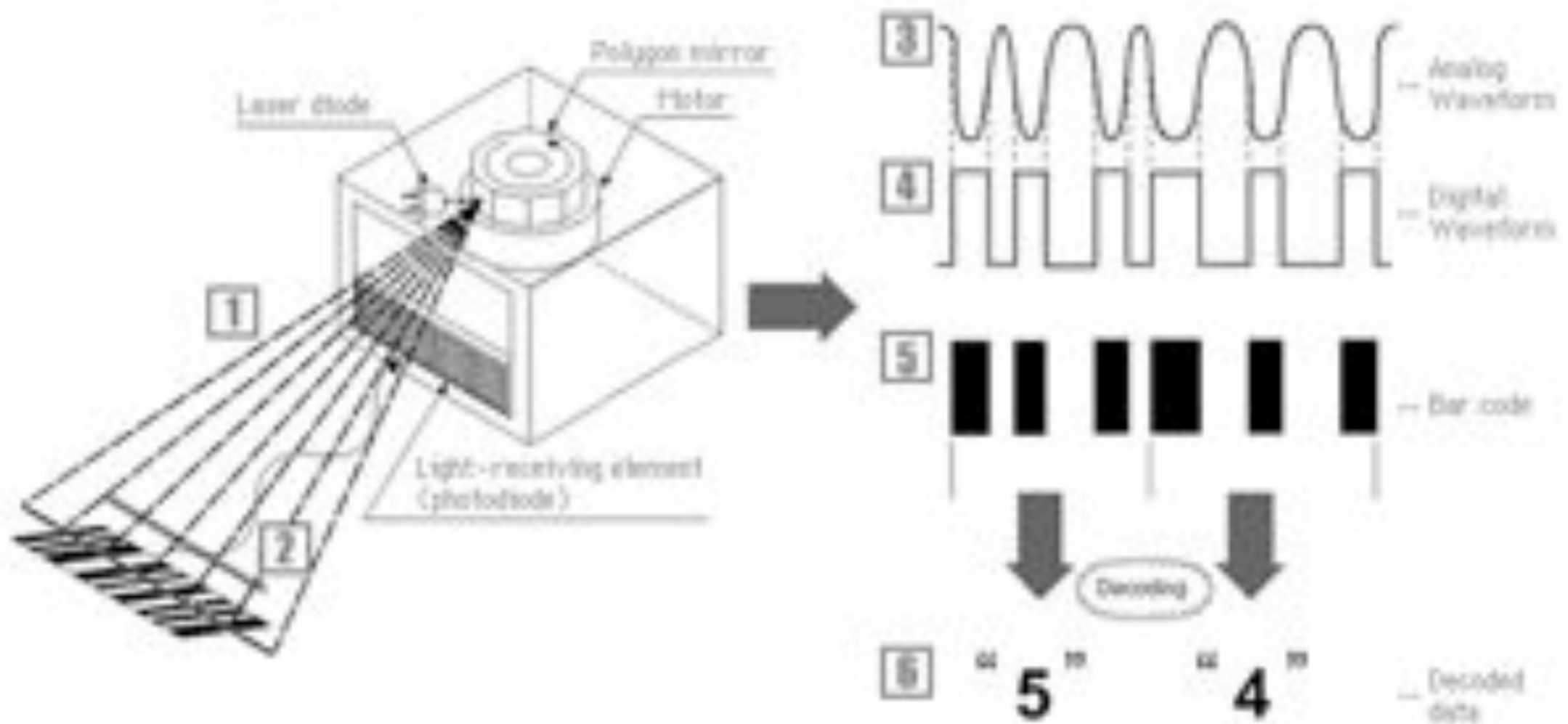
It's interesting because it's both human and machine readable.

<http://web.media.mit.edu/~enrico/research/research.php?projectTitle=Visual%20Markers%20Design>



Inkbyte uses invisible, conductive ink to tag objects, and a reader that must come into contact with the surface to read.

What is clear here is that the kind of barcode technology changes the experience of using it significantly.



Visual markers need line of sight to be read.

The reading technologies are LEDs, Lasers and scanners, cameras and cameraphones.

The experience of reading barcodes with a mobile phone can be very different from technology to technology.

In particular it's important to know what phones come pre-installed with barcode readers (S60 for instance), and thus who might have to install new applications or services.

## Wahlrecht gegen den untreuen Willen

(Studantenblog)

Erkrankung verleiht am nächsten Morgen Wahlrecht  
Wahlrecht in Dänke, um einbestimmten Kandidat zu wählen ist  
weder glücklich noch unglücklich darüber. Wahlrecht lässt den  
wählerin Angst an, auch wenn er sich an diese gewisse  
Kriterien und ihre letzte Stimme gewöhnt hat. Er hat sich nicht  
für Wahlrecht entschieden. Wahlrecht hat für ihn entschieden.  
Über die Situation hat Frage erlaubt. Über eine Wahlrecht  
wurde ...

Weiter in

Das Thema in Wahlrecht & Wahlrecht : 14. November 2014

Link & Kommentare

## Sozialpunkte 3-3

(Studantenblog)

Das Thema hat auf Anfrage im Internet, dass Wahlrecht  
3-3 Punkte für die Themen mit Wahlrecht zu haben sind.  
Und dies, obwohl es doch eine Wahlrecht für die Punkte von  
Wahlrechtgütern haben. Wahlrecht hat sich auch nicht  
kreativ genug sein. Wahlrecht, Wahlrecht soll nicht versuchen,  
sich Wahlrecht die verschickten Tage und  
Wahlrecht Wahlrecht mit Wahl Wahlrecht zu lassen.  
Wahlrecht sei ...

Weiter in

Das Thema in Wahlrecht & Wahlrecht : 14. November 2014

Link & Kommentare

## Job Hopper & Festnetz

(HeadHunter-Blog)

Wenn die Anzahl der Stellenverträge ansteigt es heißt ist die  
die Anzahl Jahre Berufserfahrung und jeder gute  
Berufswahlendeinstellung. Wichtig sind die Gründe für  
mangelnde Funktionen im beruflichen Werdegang persönlich

Yves

## Themen

- Wahlrecht & Wahlrecht
- Wahlrecht & Wahlrecht
- Wahlrecht & Wahlrecht
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- Wahlrecht & Wahlrecht

## QR Code

Was ist das?



QR Code

## Service

- Wahlrecht
- Wahlrecht
- Wahlrecht

Powered by WordPress



They can be used from almost any imaging device, that means that mobile phones, laptops, urban screens can all \*display\* barcodes that are usable.

In fact barcodes work very well on screens, less problems with lighting and contrast.



Can be graphically embedded in interesting ways.

But most barcodes are very susceptible to visual distortion: curved surfaces are not a good idea.

# Barcodes

- Visible, but need line of sight
- Up to 2 kilobytes
- 2D tags can be slow to interact
- Focus and lighting problems
- One-way unless you have a printer
- Can scale, from a few cm to anything you can point a camera at
- Visually complex and 'technical' looking

RFID

So lets move on to RFID



RFID is seen as a replacement for barcodes.



This is the idea of the 'happy warehouse manager' who knows exactly where everything is at all times.

But in industry RFID is having trouble with reliability and implementation.

In practice the read-ranges for passive RFID are quite low, and materials and environments affect their reliability.

So actually they are much more suitable for interactive, user-centred stuff. Great from our perspective!



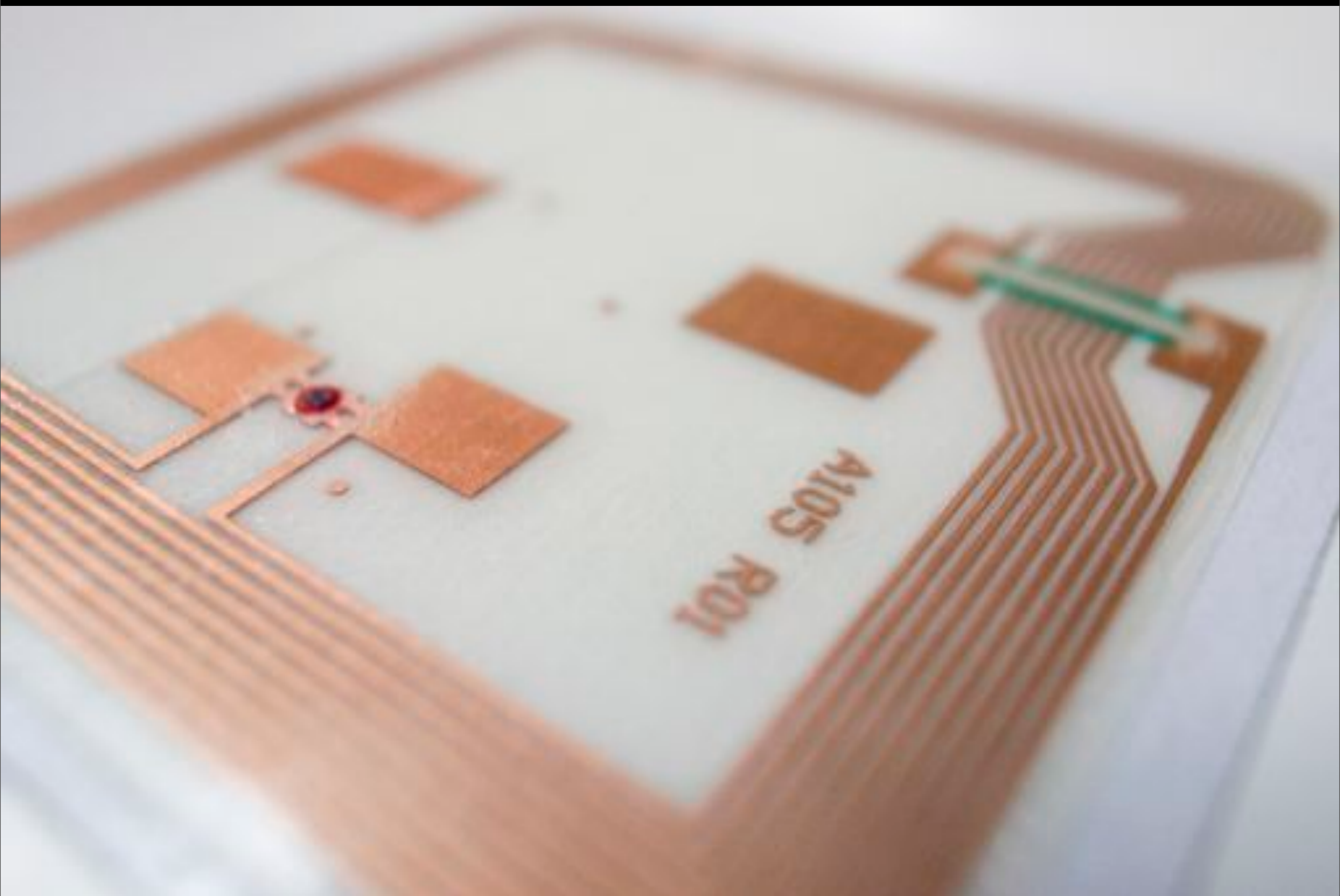
RFID phones are a relatively new platform.

They read from and write to Mifare compatible tags (the same as Oyster cards in London)

The phones are being trialled in many places, and in Japan there are over 20 million phones that are capable of doing RFID interactions.



The interaction is almost instant, small data is transferred from the tag to the phone.



The tags at the moment hold up to 4 kilobytes of data, but larger tags are planned.

Tags can be more than pointers in a database.

They can contain content such as URLs, SMS, phone numbers or short texts.

# RFID

- Invisible
- Fast interactions
- The 'interaction field' is about 10cm
- Two way with the same device
- Data up to about 4 kilobytes, maybe more
- Often break down when there is more than one tag
- Susceptible to moisture, physical damage

# Applications

So lets have a look at how people are using this technology.



andrea moed

interactive  
telecommunications  
program, new york  
university

winter 2002

## annotate space: interpretation and storytelling on location

Annotate Space is a project to develop experiential forms of journalism and nonfiction for use at specific locations. Annotate Space DUMBO, the prototype Annotate Space experience, is an electronically delivered walking tour of the old Brooklyn waterfront neighborhood of DUMBO (Down Under the Manhattan Bridge Overpass).

The tour materials consist of a website designed to be viewed on a palmtop PDA (personal digital assistant) running the AvantGo web client, plus a number of MP3 audio clips that can be played on a portable digital audio player. Tour users download these materials from the web to their handheld devices. Then they go to DUMBO and walk a prescribed route through the neighborhood, following directions given on their PDAs and stopping at a sequence of locations. At each location, they can read and listen to the tour materials to learn how the neighborhood came to look and function as it does, and get the viewpoints of specific people who live and work there. They can also submit comments and reports about the places they encounter; play a game that challenges them to search for hidden signs in the environment; and get information about local restaurants, shops and art galleries.

The content of Annotate Space DUMBO was assembled as one would typically research a journalistic story about a changing neighborhood—by conducting interviews with residents and looking and historical and contemporary documents. The prototype is intended to model a new form of nonfiction storytelling in which the reader/traveler's presence on the scene enriches, supplements and challenges the story.

There is a long history of 'spatial annotation projects'.

This is Annotate Space by Andrea Moed.

This is the canonical project and the many projects that have followed have not really added to the form.

Do people really want to tell stories about places through these media, and if they do, why should I have to go there to listen/read it? How should these interfaces work as part of my daily life?

cooltown  
experience the vision



HP's cooltown project investigated how to extend the web to encompass the physical as well as the virtual world.

They called it an infrastructure for 'nomadic computing'.  
The project's aim was to apply lessons learned from the success of the Web to nomadic computing.

"everything has a web page": each entity in our physical world, whether electronic or not, is to have an associated web resource called a web presence.

Didn't really offer compelling use cases...



Thinglinks is a project that starts to look at the motivations for linking things to the web. It is focusing on designers and crafters, and the ability for things to have histories, creators and communities attached to them.

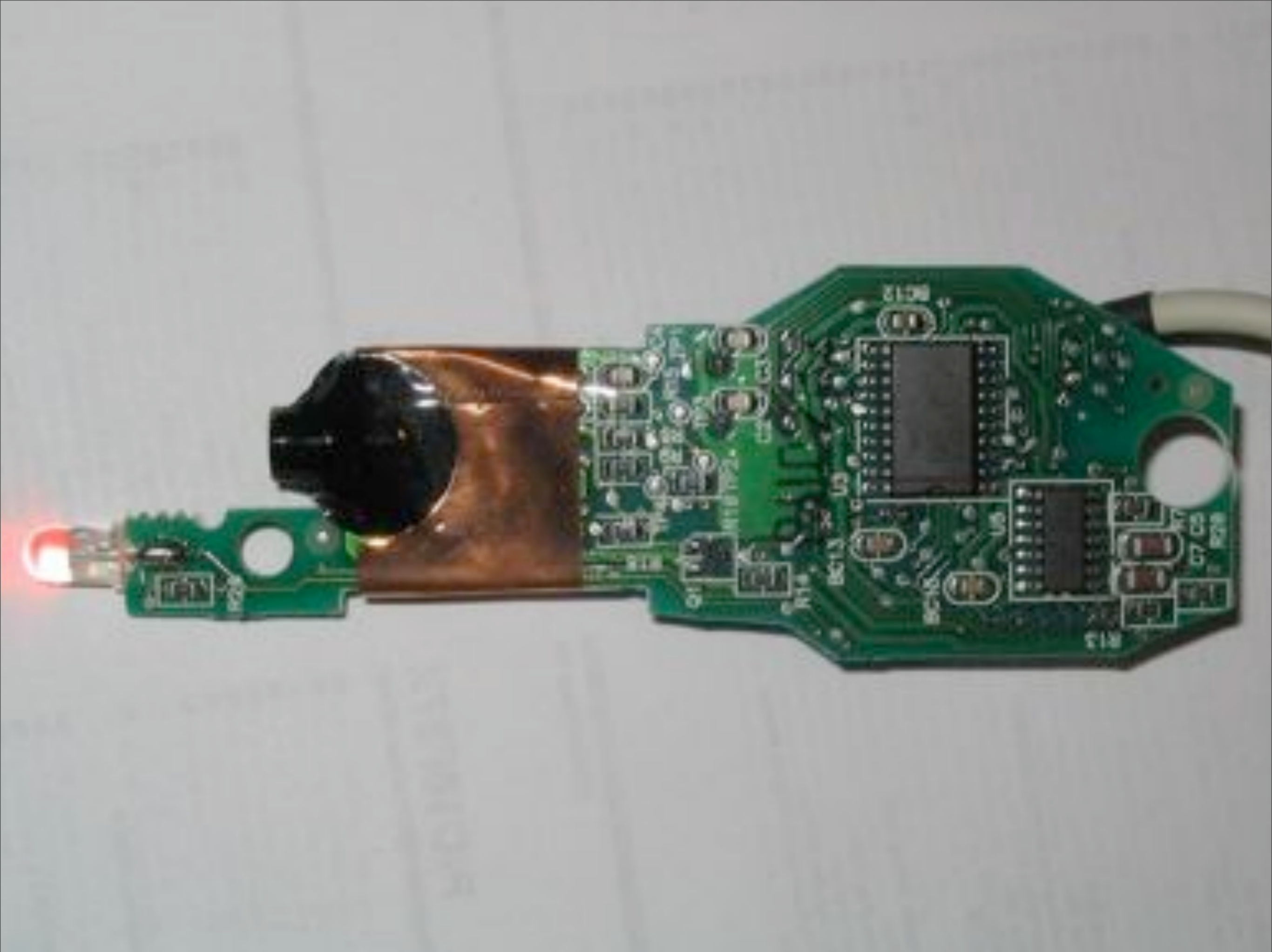
It's an interesting project because it focuses on very specific communities.



A cat-shaped handheld barcode reader released in 2000.

It was a system that linked barcode IDs to advertisers websites





They have also been hacked (with protests from the parent company)

Each CueCat has a unique serial number, and users suspected that Digital Convergence could compile a database of all barcodes scanned by a given user and connect it to the user's name and address.



Flickr photo: Akaalias

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Here, QR codes are being used extensively in Japan.

McDonalds provides links to its website from its packaging.



Slim Flare  
 color # 5500 / 4size  
 ¥14,490(13,800)



Lowrise  
 Boots Cut  
 color # 5450 / 4size  
 ¥16,590(15,800)



Straight Leg  
 color # 5400 / 4size  
 ¥14,490(13,800)



Olive Green  
 Straight Leg  
 color # 5400 / 4size  
 ¥14,490(13,800)



Purple  
 Straight Leg  
 color # 5400 / 4size  
 ¥14,490(13,800)



BLUE WAY COMPANY [HEAD OFFICE] 0847-52-3111 ● ONYON TOKYO 22-22-22-22

Flickr photo: Akaalias

A shop offers you links to find out more about items and to order.

Photo: Akaalias: <http://flickr.com/photos/74845103@N00/425606803/>



Flickr photo: Superlocal

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Infrastructure is labelled and identified, perhaps with login or setup information.

Photo: Superlocal: <http://flickr.com/photos/superlocal/459403476/>



People print their own. This Tshirt is a phone number.



Semapedia is a project that intends to 'hyperlink your world'.

“Our goal is to connect the virtual and physical world by bringing the right information from the internet to the relevant place in physical space.”

<http://www.semapedia.org/>



Photo: NY Times

60

Interestingly they can be used at a variety of scales, from small printed magazine adverts up to building sized banners.

Image: <http://www.nytimes.com/2007/04/01/business/01code.html?ex=1333080000&en=8bb1180541c7a895&ei=5088&partner=rssnyt&emc=rss>



Urban Seeder by Maya Lotan.

Uses more complex visual codes, and more sophisticated pattern recognition.

<http://www.urbanseeder.com>



It's a small community of people using these patterns as part of their everyday objects.



The really nice thing here is that the codes can be integrated subtly with existing things, clothes, accessories etc. The code reveals itself to a select few that know about the service...



FOTO: ROLF DAMM

Thranes gate 98. Selv  
er oppløselig i  
brannvesenet å ikke

spyle vekk malingen for å unngå  
at gaten skulle bli heldekkende  
hvit.



andre verdisker ved 03.30-ti-  
den i natt. Gjerningsmannen skal  
ha afrikansk utseende, og for-  
svant fra café Coma i Brugata.

## Våknet på toalettet

SENTRUM: Bakfull og med et  
sterkt ønske om frisk luft ringte  
en mann fra toalettet på Parkte-  
ateret café klokken 07.09. Kveld-  
den i går var såpass vellykket at  
han falt i dyp søvn. I morges  
kunne han rusle ut i friluft for  
egen maskin.

## Bulket bil

GRØNLAND: En beruset kvinne  
(39) brukte krykken til å lage  
bulker i en parkert bil i Brugata  
ved 23-tiden. Bileieren kom til  
og var fornøyd med at hun gjør-  
de opp for seg med en tusen-  
løpp.

## I Adams drakt

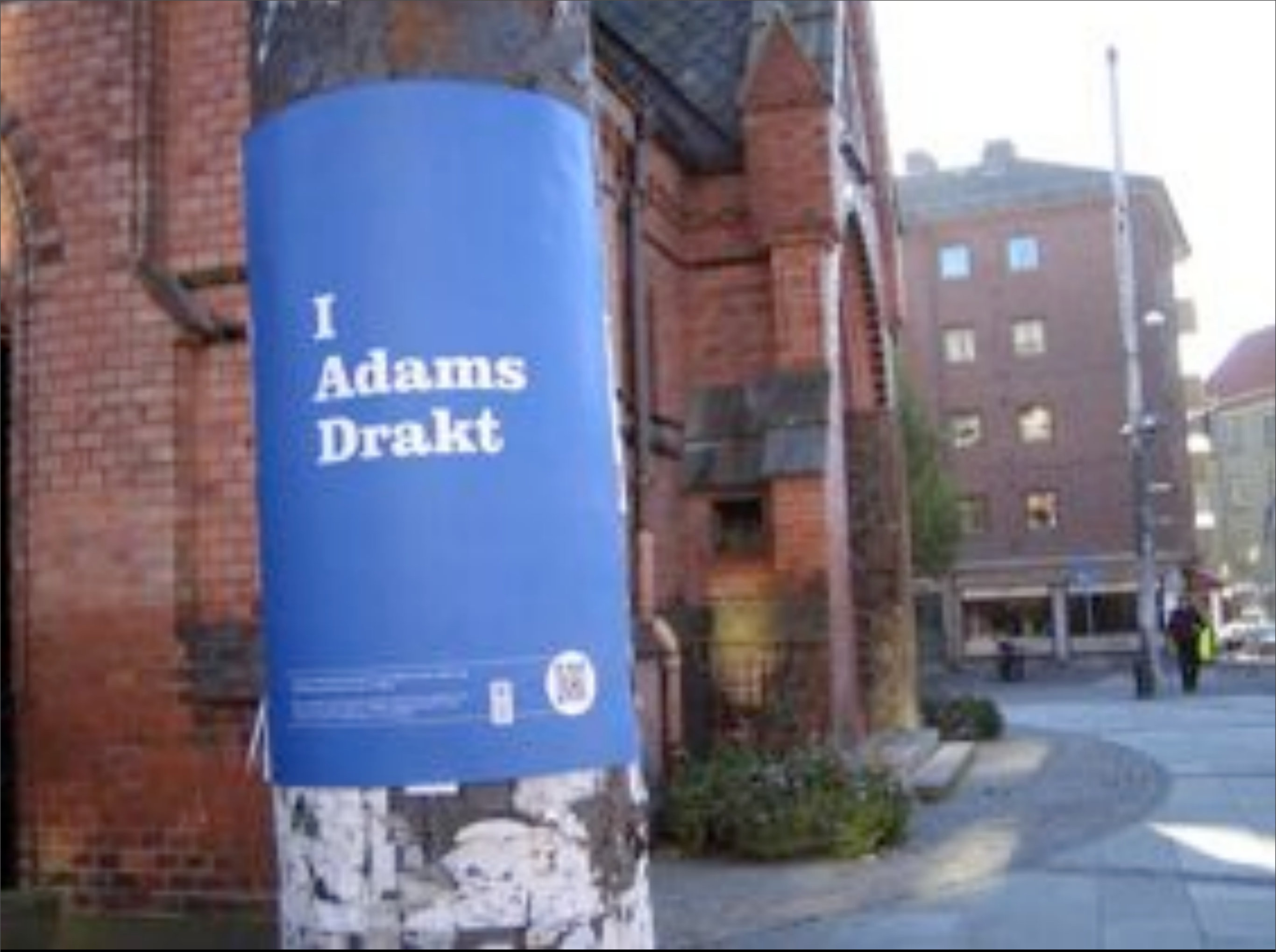
SAGENE: Politiet stusset litt da  
en naken mann kom ved Sagene  
kirke ved 04.20-tiden. Hendel-  
sen skyldtes trolig mer oversta-  
dig beruselse enn at 27-åringen  
følte seg spesielt varm i septem-  
berregnet.

## Hissig kunde

SENTRUM: Da han ikke fikk byttet  
plagget han hadde kjøpt i en for-



So one of our students, Marianne Hollum Lydersen created a lovely project where she took the strange content from the 'last page' of newspapers. She placed them back in the places where these odd things took place.



She offered people the stories via barcodes on posters.



Although this was a lovely project, nothing could overcome the fact that interacting with barcodes in the street seems odd, awkward and uncomfortable experience. Like picking up rubbish.

It shows that the context of public interaction is badly understood.



This was an experiment that tested various hyperlink technologies in Finland.

It found interesting results

Barcodes frightening people by looking too technical

Expected the camera just to 'sense' the barcode without initiating

People didn't understand the different ways that the interactions worked: the pull of barcodes vs the push of RFID.

Paper showing the differences between linking technologies:

[http://www.hcilab.org/events/mirw2006/pdf/mirw2006\\_belt.pdf](http://www.hcilab.org/events/mirw2006/pdf/mirw2006_belt.pdf)



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This is Nokia's early vision of NFC in use with 'Smart posters'

In fact the specification for NFC devices includes a 'smart poster' standard that is designed for discovering services embedded in our environment.



Swiping a poster would view content, buy tickets, etc.



Industry sees applications in payments, unlocking, printing, sharing and downloading in the physical world.

Phones come with a simple application that will send messages, open websites and make phonecalls.

The interactions here are richer than simple downloads of information.



Here RFID is being used in a trial in NYC.

Smart posters implemented.

# Tap for Restaurant Locations



It's being used for mundane tourist information, but it's an interesting interaction example.



Photo: Jan Chipchase

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A 'Suica' phone paying for a seat on a train.  
No ticketing or checkin required.  
This points to ways in which our use of space can be re-configured by these interactions.

A lot of it is moving towards 'frictionless commerce'.

Photo: Jan Chipchase: [http://www.janchipchase.com/blog/archives/2006/01/post\\_36.html](http://www.janchipchase.com/blog/archives/2006/01/post_36.html)



But there are richer, deeper interactions that can be achieved with this technology.

This is a poster that controls a scanner from HP. It uses gestures to take the interface out into physical space.

# Summary

This is an interesting new interaction form.  
But the interactions, contexts and experience have not been yet fully explored.

# Summary

## Interactions

There is much more than just hyperlink interactions: analogous to the difference between web and web 2.0: now your clicks do a whole lot more than just load pages.

If this technology just overloads us with more screen-based information, then it has failed in a very important way. There are more subtle interactions that allow us to use the physical world as interface without relying on the screen: particularly through sound and haptics.

We should design interactions with the physical world that don't require us to confirm through on-screen dialogues.

# Summary

## Interactions

## Experience

It's clear that the interactions are qualitatively and experientially very different. The technology has a great effect on the overall experience.

In evaluating these ideas we have to ask, are they better than a simple poster or other visual information like signage? What do they offer that cannot be created physically?

# Summary

Interactions

Experience

Context

Don't reinvent the wheel. If you want to put stories into places, check out the reasons why existing services have failed. If you want to create object-based services, consider how you'll implement them on the mobile phone.

If there is one lesson to take away from this, it's that these applications and services will first be successful in very limited contexts. It's difficult to achieve critical mass and network effects when things are physically bound.

What are the kinds of content, services and applications that work in very local situations?

[www.nearfield.org](http://www.nearfield.org)

Thankyou.