

# Physical hyperlinks

Detail the technologies that link things, places or people to digital data.



The inspiration for physical hyperlinks seems to come from things like this  
The blue plaques in London, show places of historical significance.

A desire to annotate the world?

To connect the web to physical space.



A history of 'spatial annotation projects'

Murmur



A history of 'spatial annotation projects'

Geostickies



### UPDATES

Annotate Space DUMBO was featured in Steven Johnson's [column](#) on the future of location-based media, in the February 2003 issue of *Discover Magazine*.

The demo is currently offline (look [here](#) for screen shots), but an Annotate Space DUMBO beta for Web-enabled devices is now [under construction](#).

- about
- research
- development
- news
- talk back

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[GeoURL](#)

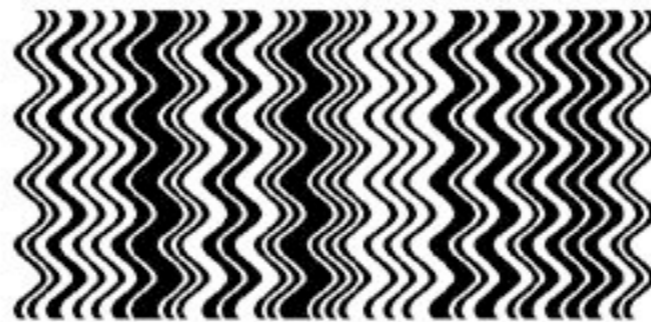
# annotate space

...is a project to develop **experiential forms of journalism and nonfiction storytelling for use at specific locations**. Stories are presented through text, images and audio files that participants can download from the Web to their **handheld computers** and take with them to the place of interest. The prototype experience is **Annotate Space DUMBO**, an interactive, anytime walking tour of the Brooklyn waterfront neighborhood of DUMBO (Down Under the Manhattan Bridge Overpass).

Annotate Space is being developed by me, **Andrea Moed**. It began as my master's thesis project for the **Interactive Telecommunications Program** at New York University's Tisch School of the Arts.

A history of 'spatial annotation projects'  
Annotate Space by Andrea Moed.

cooltown  
experience the vision



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

To provide infrastructure for nomadic computing,  
More specifically, the project's aim was to apply lessons learned from the success of the Web to nomadic computing, via two objectives.

“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.

01 Oct 2002 @ 19:20 h

ETC Grande restaurant      what we ordered

HP612 camera  
5.1mm f8 1/60s flash

Goteborg, SE  
57N 11E 5m

20C 68%RH

UtiComp.2002

Swedish  
Tourism Board

Villa Antinori fine  
Italian wines

Stanford      U of Washington  
UC Berkeley

HP      EM  
intel

Anind  
Armando  
Armando's wife  
Dan  
Elke  
Florian  
Gastano  
Gene  
Jen  
John (took picture)  
Rakhi  
Roy  
Tim



Ⓜ

Their concepts extended to letting people annotate media with their IDs.

## GREYSCALE

- + quicker scan
- + no colours

## SPEED

- + quicker, easy to use
- + paper tray

## Save To

- + multiple files, multi page
- + address, search page

DATE FEBRUARY

## COLOUR

- + colour image
- + glossy print

## SCANNING QUALITY

## LOW

- + quicker scan
- + less detail

## HIGH

- + more detail
- + slower scan

## SCANNING RESOLUTION

## FEEDER

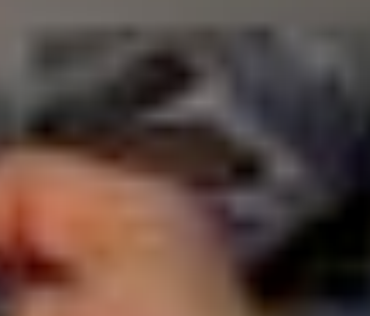
document is placed in the sheet feeder



To use the feeder, place your document in the feeder. The scanner will automatically scan the document and save it to the selected location.

## GLASS

document is placed on the scanner glass



To use the scanner, place your document on the scanner glass. The scanner will automatically scan the document and save it to the selected location.

SCAN

to folder

SCAN

to email

SAVE

my phone

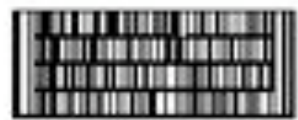
But there are more complex interactions that can be achieved with this 'hyperlinking' technology.



Visual markers, Bluetooth, SMS & RFID

Now go through many of the technologies that are available to use for physical hyperlinking.

Visual markers



Codablock



DataMatrix



Maxicode



QR Code



Data Matrix Code



Aztec Code



Rolls-Royce DMT Code



Barcodes 1948 invented, 1966 commercial use, 1980s successful

They come in many shapes and sizes

“Barcodes are widely used to implement Auto ID Data Capture (AIDC) systems that improve the speed and accuracy of computer data entry.”

UPC: “automating the grocery checkout process could reduce labor costs”

# ambient intelligence

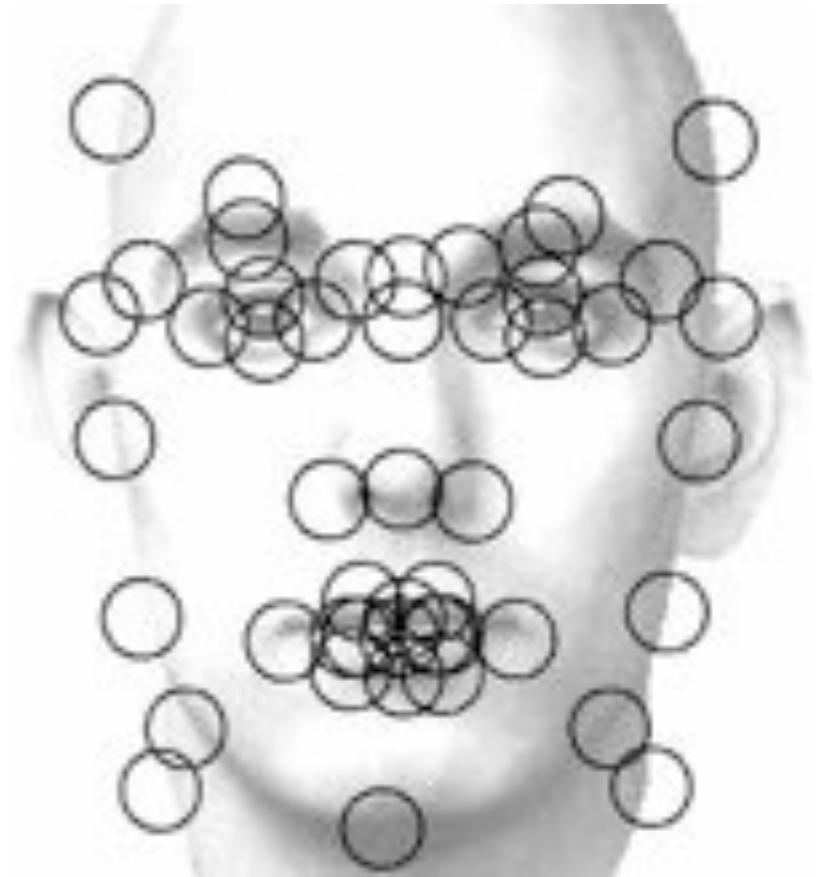
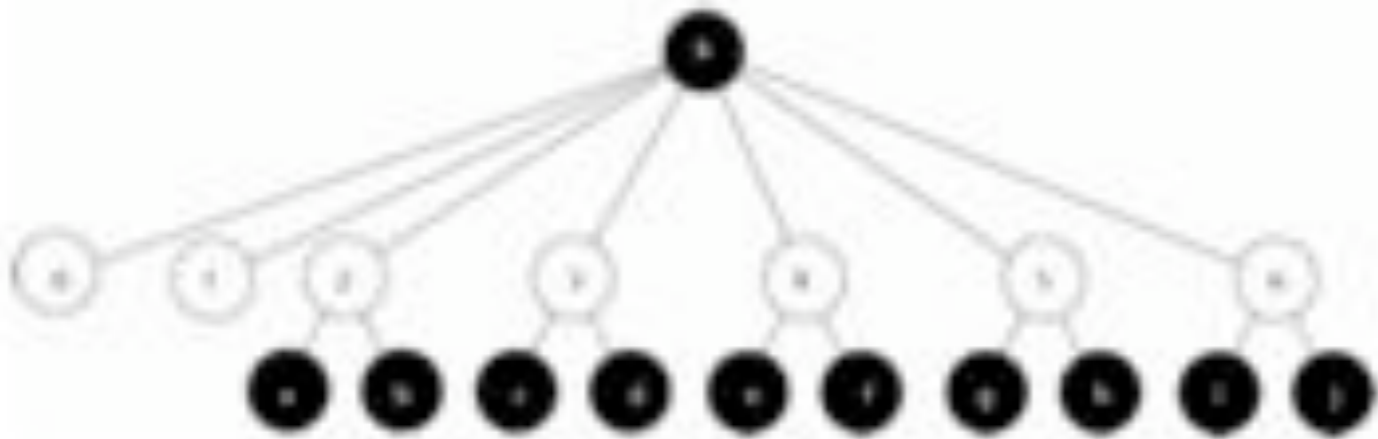
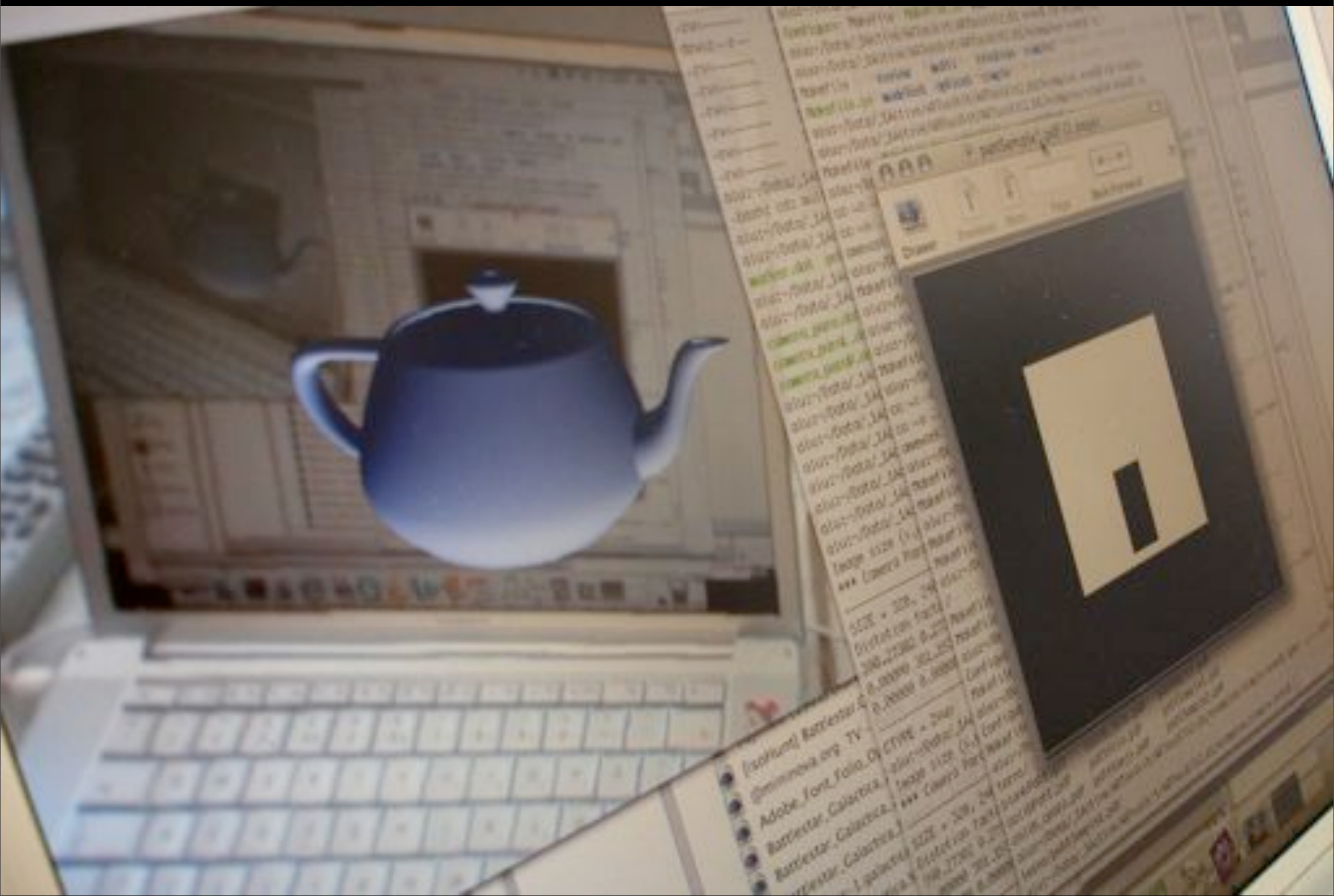


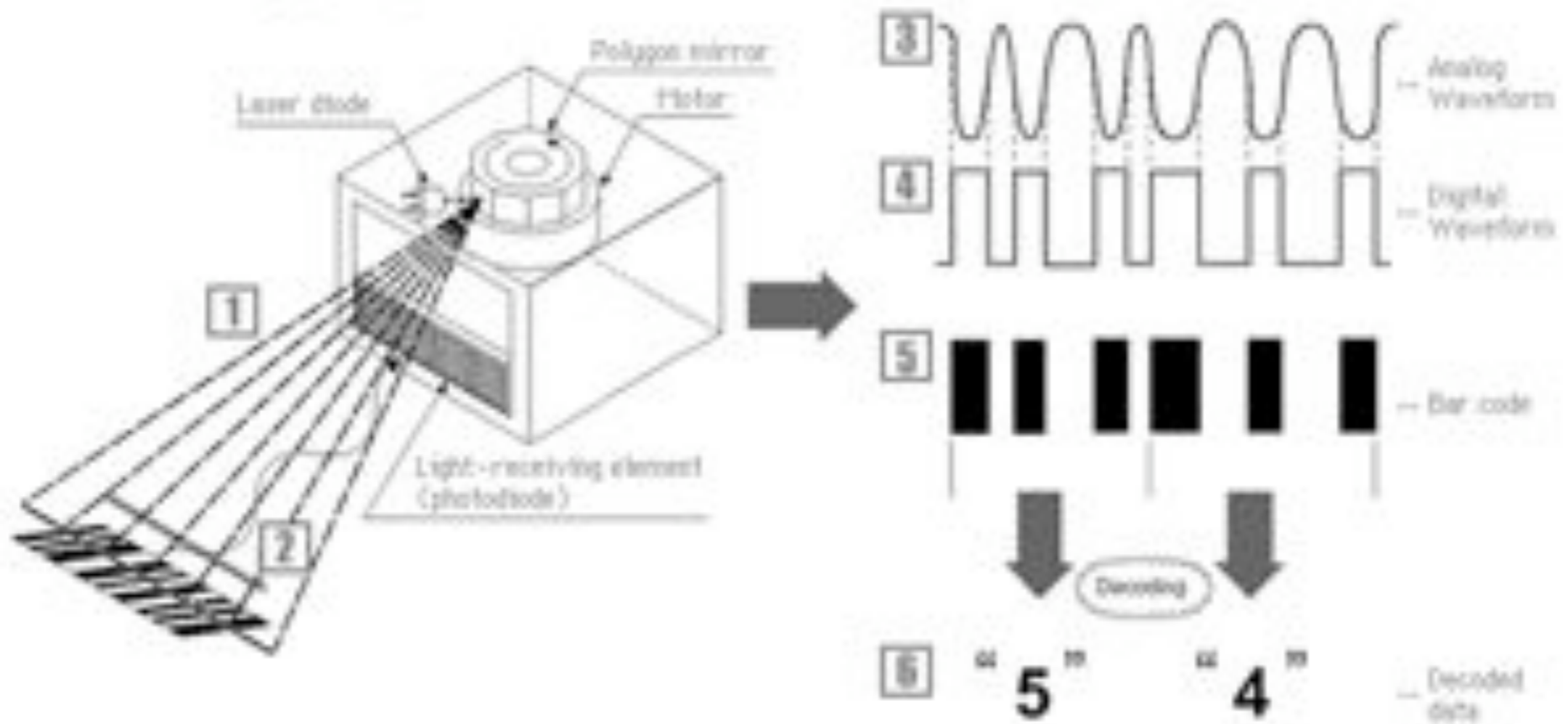
Image and pattern recognition.  
This is a code embedded in text.  
But could also be facial recognition or pattern recognition.

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



AR markers are markers that can be tracked in time and space.

### 1-1. Reading principle



Visual markers need line of sight to be read.

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



So here are examples of 2D barcodes in use, mainly in Japan.  
McDonalds provides links to its website



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



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



Boots Cut  
 color # 5500 / 4size  
 ¥14,490(13,800)



Boots Cut  
 color # 5500 / 4size  
 ¥14,490(13,800)



Boots Cut  
 color # 5500 / 4size  
 ¥14,490(13,800)

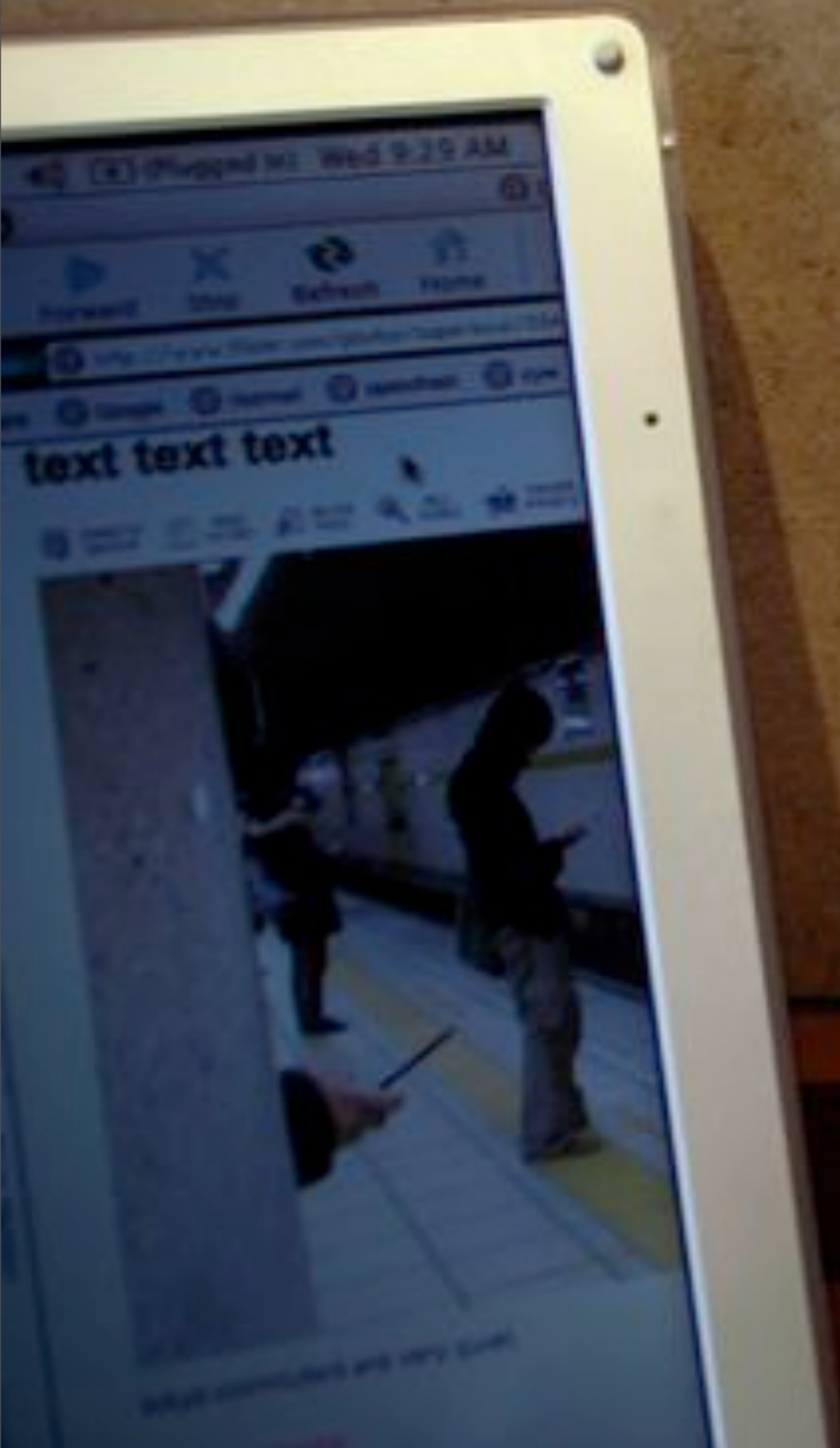


BLUE WAY COMPANY [HEAD OFFICE] 0847-52-3111 ● ONYON TOKYO 2200-0000


Shops allow you to find out more about items and to order.

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





店内の場所によりましては、電波が弱いところもございます。  
※ご利用にはプロバイダへのお申し込み及びパソコン等の事前設定が必要です。  
各プロバイダのお問い合わせ先 <http://www.bbnp.jp/> (携帯URL)  
お問い合わせ先:BBモバイルポイント コールセンター  
0085-22-6104  
9:00~18:00(年中無休)

 パソコン用コンセントです  
ご自由にお使いください。



Infrastructure is labelled and identified, perhaps with login information.

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




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



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>



# USE YOUR MOBILE TO GET MORE FROM YOUR FAVOURITE BANDS

BY [Name] | [Date]

It's not just about the music anymore. For many fans, the experience of seeing their favourite bands live is now intertwined with the convenience of mobile technology. From downloading songs to scanning QR codes for exclusive content, the way we consume music has changed significantly. This article explores how mobile devices can enhance your listening experience and provide access to exclusive content from your favourite artists.

One of the most common ways mobile technology is used in the music industry is through QR codes. These small, square black and white patterns can be scanned by a smartphone to access a wide range of digital content. For example, a band might use a QR code to direct fans to a new album, a live performance video, or even a special discount. This method is highly effective because it allows fans to interact with the music in a more direct and personalized way. Additionally, many streaming services now offer mobile-exclusive content, such as behind-the-scenes footage or interviews, which can only be accessed through a mobile device. This creates a sense of exclusivity and encourages fans to use their phones more frequently to stay connected with their favourite bands.



## Widerstand gegen den untreuen Willen

(Studantenblog)

Erziehung verläuft am nächsten Weges. Man muss die  
Möglichkeit zu denken, ein erfolgreiches Konzept ist  
nicht glücklich nach unglücklich darüber. Man muss sich über  
sich selbst sagen, auch wenn es sich an dem gewissen  
Körper und dem besten Wissen gewöhnt hat. Es hat sich nicht  
für manchen entschieden. Man muss sich für die entscheiden.  
Über die Situation hat Frage erhoben. Oder eine Maßnahme  
wird ...

Weiter in

von Maria in Lesezeit & Lesezeit: 16. November 2019

[Link & Kommentare](#)

## Sozialpunktente 3-9

(Studantenblog)

Das Ziel steht hier auf Anfrage im Internet. Das bedeutet  
nicht nur für die Themen mit Nachhaltigkeit zu haben und  
und dies, obwohl es doch eine Richtlinie für die Vergabe von  
Kurspunkten haben. Man muss sich mit einem nicht  
kann die Zeit sehr schnell ändern. Man muss sich mit  
mit nachfolgend die verschiedenen Tage und  
durchsuchen muss mit dem sprechen zu lassen.  
Schrittweise ...

Weiter in

von Maria in Lesezeit & Lesezeit: 16. November 2019

[Link & Kommentare](#)

## Job-Hopper & Postings

(Headhunter-Blog)

Wenn die Anzahl der Stellenanzeigen bereits so hoch ist wie  
die Anzahl der Bewerberinnen und jeder gute  
Personenverwalter einsteht. Wichtig sind die Gründe für  
mangelnde Karriere im beruflichen Fortschritt.

Text

## Themen

- Anzeigen & Postings
- Lebenslauf & Lebenslauf
- Bewerbungen & Interviews
- Karriere & Gehalt
- Geld & Jobs
- Stellen & Stellen
- Stellen & Stellen
- Stellen & Stellen
- Stellen & Stellen

## QR Code

Was ist das?



QR Code

## Service

- Service
- Service
- Service

Powered by ...



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



Can be graphically embedded in interesting ways.



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/>



a cat-shaped handheld barcode reader

It was a system that linked barcode IDs to advertisers websites





**Color Express™  
color covers for Nokia  
2110 series phones**

Change the look of your phone with a sleek case of a color that fits your personality. Choose from 10 colors that fit all Nokia 2110 series phones. Just \$19.

See our website for a full selection of Nokia Express color covers every day.



**Analogue cellular  
with easy-to-use features**

Nokia 2110. Features include 12 hours of talk time and other convenient items for optimal calling between the USA, UK and elsewhere. Select features: Power saving mode up to 10 hours, frequently used numbers, and numbers from last dialing location. The dual processor speeds essential dialing, holds and speed-dialing. Includes 12 hours of talk time for easy carrying on. 170 numbers book view. 24 hours standby time. **\$19**



**Dual-mode digital  
extends your call area**

Nokia 2110. Features include 12 hours of talk time and other convenient items for optimal calling between the USA, UK and elsewhere. Select features: Power saving mode up to 10 hours, frequently used numbers, and numbers from last dialing location. The dual processor speeds essential dialing, holds and speed-dialing. Includes 12 hours of talk time for easy carrying on. 170 numbers book view. 24 hours standby time. **\$19**



**Dual-mode with  
optional templates**

Nokia 2110. Features include 12 hours of talk time and other convenient items for optimal calling between the USA, UK and elsewhere. Select features: Power saving mode up to 10 hours, frequently used numbers, and numbers from last dialing location. The dual processor speeds essential dialing, holds and speed-dialing. Includes 12 hours of talk time for easy carrying on. 170 numbers book view. 24 hours standby time. **\$19**

**Redmond University**  
with the Internet Digital Lab  
bring students to learn  
online and saving.

**Redmond** has an award-winning  
flexible online learning system by  
which students can learn and be  
assessing performance. After an  
initial assessment from which you  
can choose an individual  
course, a number of ways to  
learn and a variety of ways to  
assess.

For roughly a year, starting in October, 2000, The Dallas Morning News and other Belo-owned newspapers added the barcodes next to major articles (Belo had invested in Digital Convergence).

The data format was proprietary, being scrambled so as not to be usable as plain text.



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.

# Barcodes

- Visible!
- Need line of sight
- 1D and 2D
- Hold very little data
- 2D tags are slow
- focus and lighting problems
- one-way unless you have a printer
- very small data (mostly a pointer)
- Can scale, from a few cm to anything you can point a camera at

Bluetooth & SMS



Yellow Arrow is an early project that looked at putting digital information into places, and used the mobile phone and SMS as a platform.



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



Bluetooth marketing

“Turn on bluetooth to receive something naughty” or somesuch.

# Bluetooth

- Works at a relatively long range
- Have to pair devices for data transfers, can be a unusable process
- The 'data bubble' is large and difficult to visualise



# SMS

- Requires typing on the keypad
- Requires users to read/enter the codes
- Have wait for feedback
- Relies on the network
- Simple to implement

RFID

So lets move on to RFID



RFID is seen as a replacement for barcodes.



In practice RFID is having trouble with reliability and implementation.



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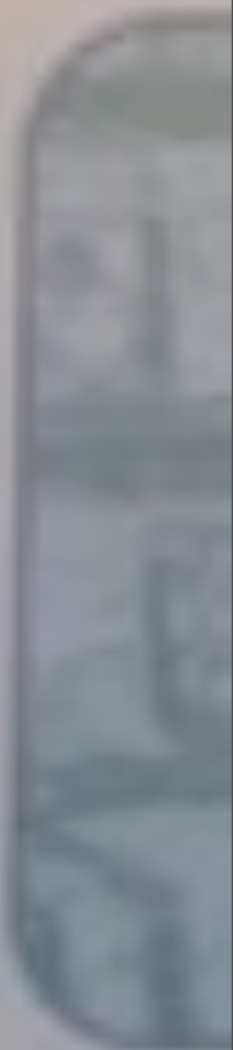
This is Nokia's early vision of NFC in use with 'Smart posters'



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

# Tap for Restaurant Locations



Here RFID is being used in a trial in NYC.

THE NEW YORK WORLD JOURNAL | 100 | THE JOURNAL NEWS

# Tap n' Go!

Tap the icons below to Access NYC Mobile Trial Info

Tap here to view trial info and updates

Tap here to view the current status



Smart posters implemented.





Testing of RFID posters in Finland:

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)

# RFID

- Fast feedback
- Invisible (can be a bad thing)
- Two way with the same device
- More data than barcodes
- Often break down when there are more than one tag
- Susceptible to moisture, physical damage
- In most cases requires J2ME development

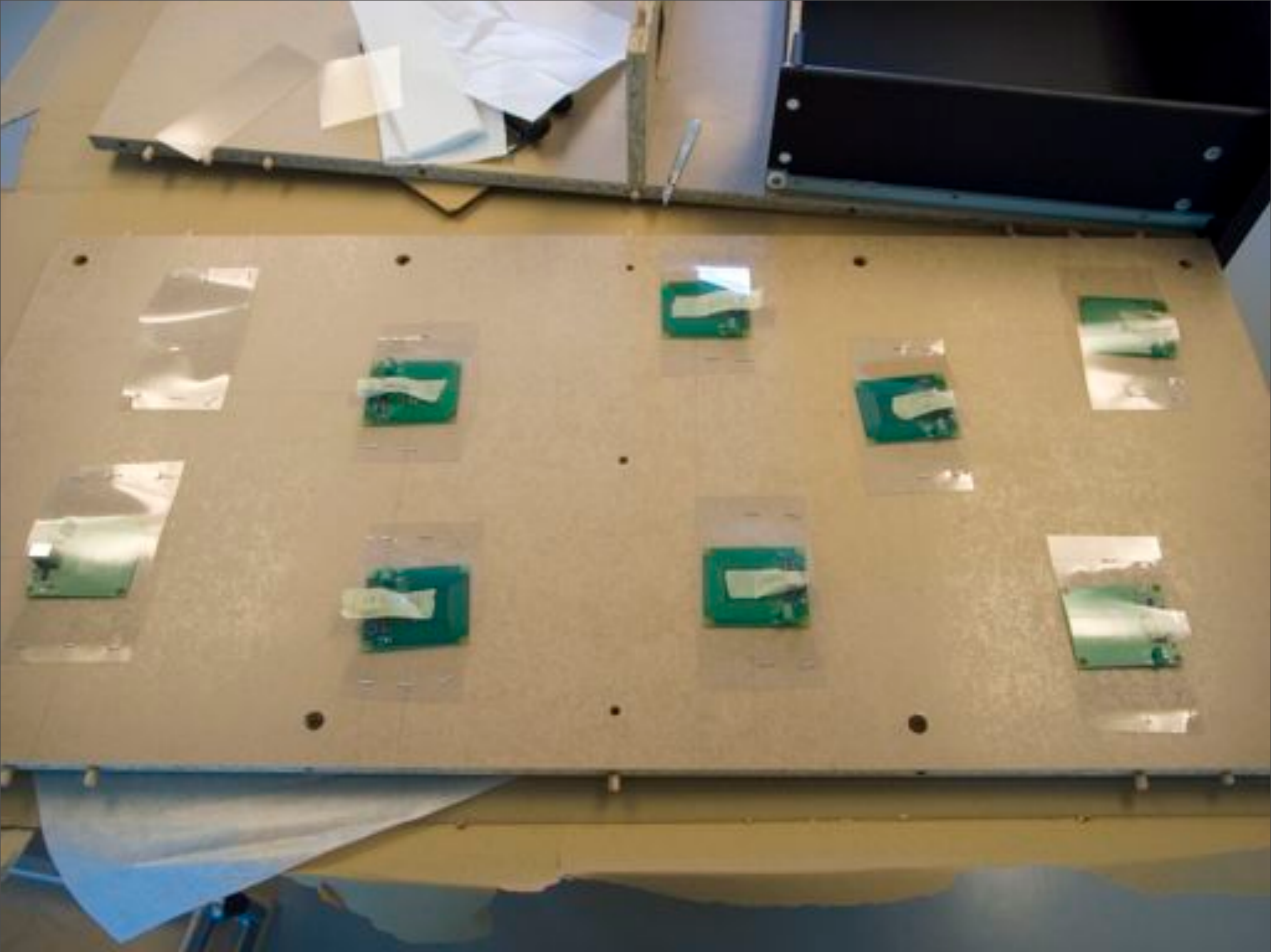
# Some physical prototyping with RFID

Just some quick notes on hardware prototyping with RFID.



Phidgets work really well and are very simple USB devices.  
Get up and running quickly with tags and objects and media.

<http://www.trossenrobotics.com/RFIDhome.aspx>



We used nine readers in the Orooni table.



Different kinds of low frequency tags (mostly standard packaging)



The Innovations ID-12 readers are very small, self-contained readers and antennae.

<http://www.id-innovations.com/products.htm>



We have them working with the Arduino platform, and students have created these robust modules.





Started to test all of the tags with relative read ranges.