http://upload.wikimedia.org/wikipedia/commons/6/64/Creaci%C3%B3n_de_Ad%C3%A1n_%28Miguel_%C3%81ngel%29.jpg

DIY. Ihr sollt lernen es selber kostengünstig zu implementieren.

WE ARE...

JURI WOLF

B.A. Student

JORDI TOST

M.A. Student

FABIAN MORÓN ZIRFAS

Interface Lab Supervisor

Studenten vorstellen

PROJECT TIMETABLE

Day 1 || Mo 06.10 LW 126:

Introduction, Juri, Jordi, Fabian, MT, Examples

- Workshop
- Form groups
- Exercise

Day || 2 - 5 Di 07.10 - Do 10.10 LW 126:

- development and prototyping LW 126

Day 6 - 10 || Mo 13.10 - Do 16.10 Home & Hallway:

- development and prototyping home and LW hallway

Day 10 || Fr. 17.10 Exhibition

PROJECT AIM

learn multitouch basics by using:

Computer Vision (Bare Bones)

Physical Computing (Capacitiv & Acoustic)

Open CV (Adavanced)

TUIO

Exhibition 17. 10. 2014

[DIY Multitouch]

4 TYPES OF TOUCH(SCREEN) TECHNOLOGY

http://www.ijcaonline.org/volume6/number8/pxc3871433.pdf
https://ecs.victoria.ac.nz/foswiki/pub/Groups/Elvis/Multi-touchTable/schoening2008multitouch.pdf

RESISTIVE

CAPACITIVE

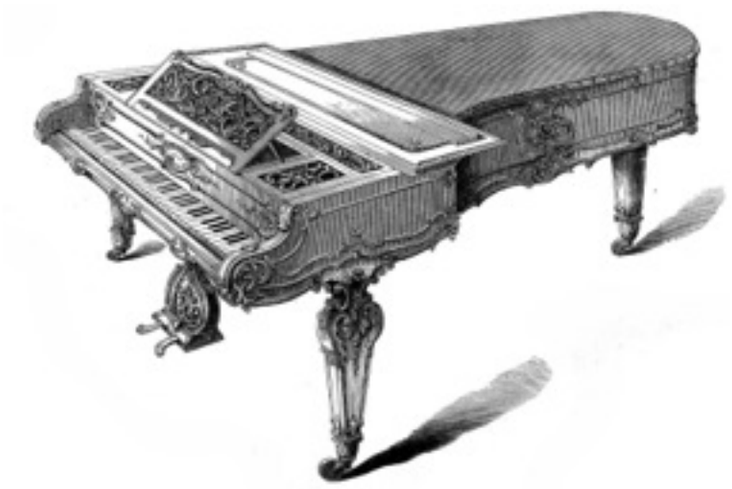
OPTICAL

ACOUSTIC

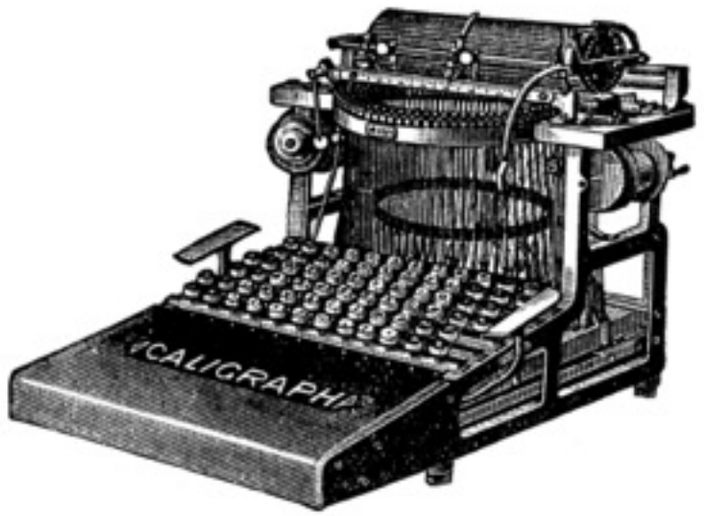
HISTORY OF (M)T

Bill Buxton: Multi-Touch Systems that I Have Known and Loved

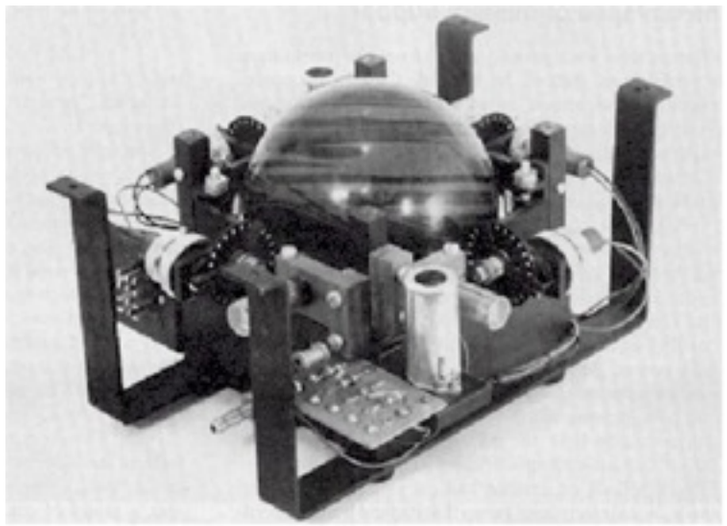
incomplete history



resistiv

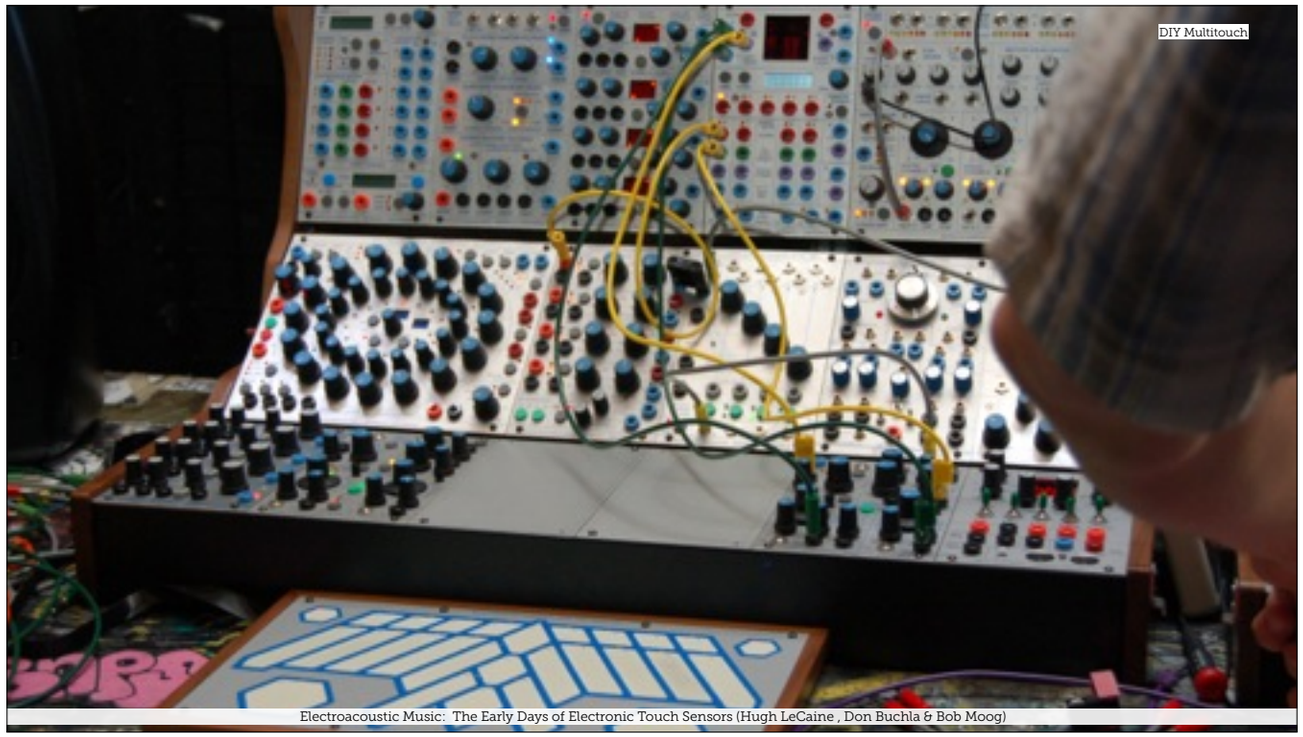


resistiv



1945: Trackball (Ralph Benjamin)

trackball



Electroacoustic Music: The Early Days of Electronic Touch Sensors (Hugh LeCaine , Don Buchla & Bob Moog)

capacitive

1960s: Mouse (Douglas Engelbart & Bill English)

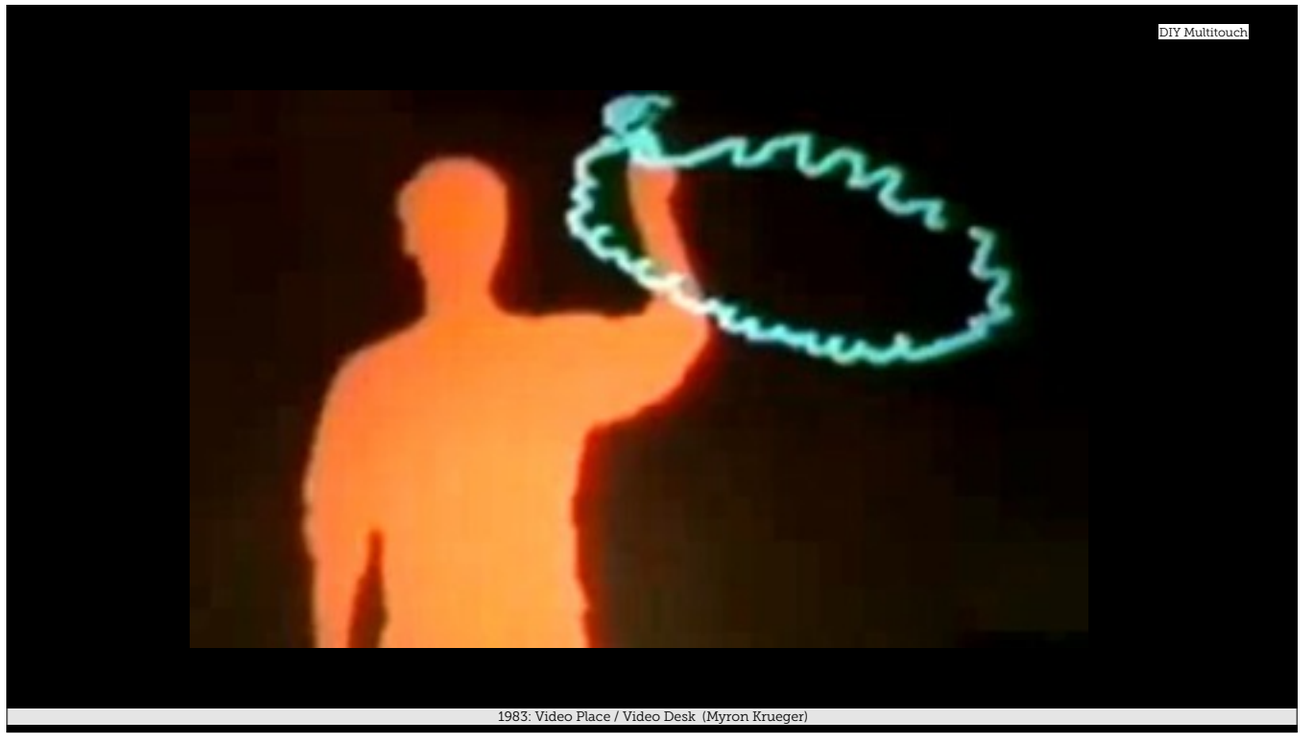
mechanical

1965: Touch Screen Technology (E.A. Johnson of the Royal Radar Establishment)

single touch capacitive

1972: PLATO IV Touch Screen Terminal

Plato IV optical (IR)



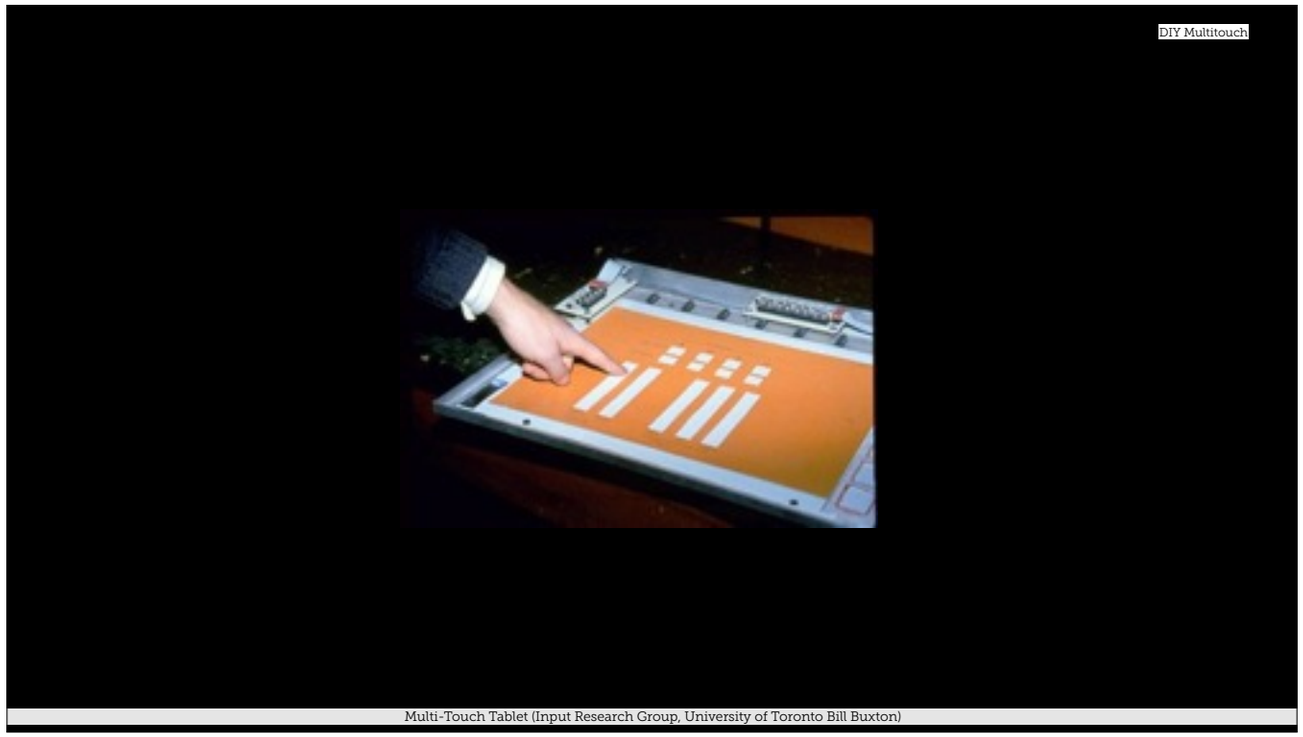
1983: Video Place / Video Desk (Myron Krueger)

optical Video https://www.youtube.com/watch?v=dmmxVA5xhuo

DIY Multitouch

1984: Multi-Touch Screen (Bob Boie, Bell Labs, Murray Hill NJ)

capacitive



Multi-Touch Tablet (Input Research Group, University of Toronto Bill Buxton)

capacitive

1985: Sensor Frame (Carnegie Mellon University Paul McAvinney)

The device used optical sensors in the corners of the frame to detect fingers.

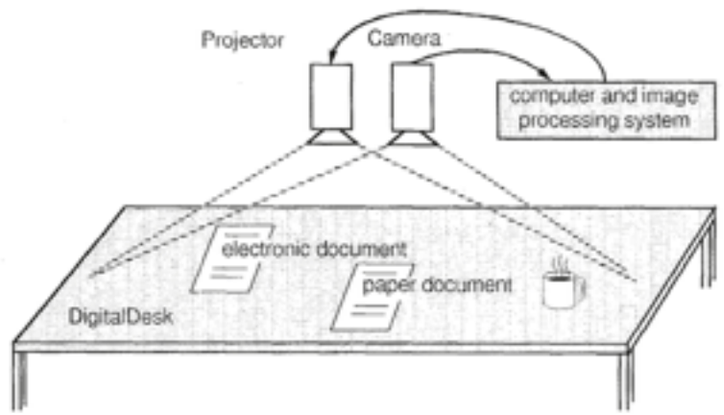


Figure 1. A DigitalDesk system

1991: Digital Desk (Pierre Wellner, Rank Xerox EuroPARC, Cambridge)

An early front projection tablet top system that used optical and acoustic techniques to sense both hands/fingers as well as certain objects, in particular, paper-based controls and data. https://www.youtube.com/watch?v=S8lCetZ_57g

1992: Simon (IBM & Bell South)

IBM and Bell South release what was arguably the world's first smart phone, the Simon.

What is of historical interest is that the Simon, like the iPhone, relied on a touch-screen driven “soft machine” user interface.

While only a single-touch device, the Simon foreshadows a number of aspects of what we are seeing in some of the touch-driven mobile devices that we see today.

Sidebar: my two working Simons are among the most prized pieces in my collection of input devices.

AND MANY MORE

see Bill Buxtons site for further research

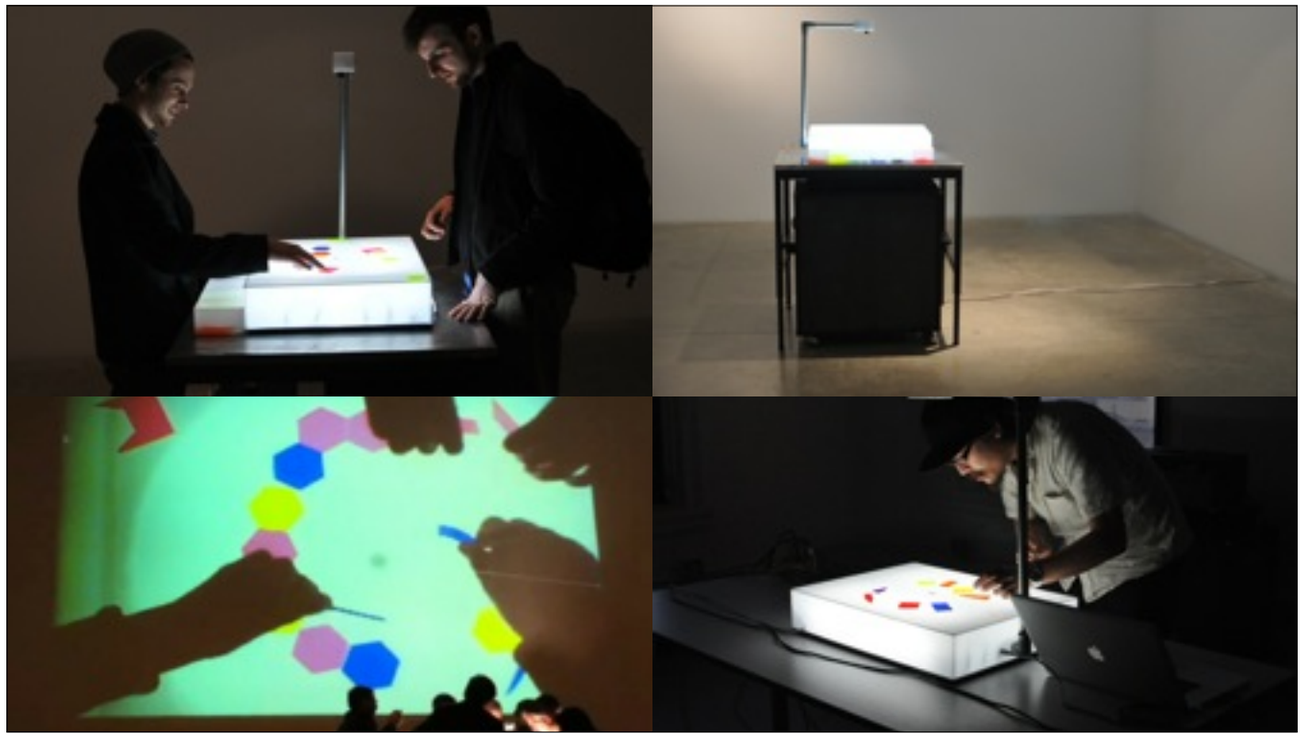
1992: Wacom, 1992: Starfire, 1994-2002: Bimanual Research, 1995: Graspable/Tangible Interfaces, 1995/97: Active Desk, 1997: T3, 1997: The Haptic Lens, 1998: Tactex Controls, ~1998: Fingerworks, 1999: Portfolio Wall, 2001: Diamond Touch, 2002: HandGear + GRT. DSI Datotech, 2002: Jun Rekimoto Sony Computer Science Laboratories, 2003: University of Toronto, 2003: Jazz Mutant, 2004: Neonode N1 Mobile Phone, 2004: TouchLight, 2005: Reactable, 2005: Blaskó and Steven Feiner, 2005: PlayAnywhere, 2005: Jeff Han, 2005: Tactiva, 2005: Toshiba Matsusita Display Technology, 2005: Tomer Moscovich & collaborators, 2006: Benko & collaborators, 2006: Plastic Logic, 2006: Synaptics & Pilotfish, 2007: Apple iPhone, 2007: Microsoft Surface Computing, 2007: ThinSight, 2008: N-trig, 2011: Surface 2.0

From here on the already existing techniques get extended.

EXAMPLES

http://www.ryanraffa.com/parsons/thesis/category/concept/

https://vimeo.com/25090948



http://www.ryanraffa.com/parsons/thesis/category/concept/

https://vimeo.com/25090948

VIDEO

https://vimeo.com/25090948

crapple (2005: Golan Levin) is an audiovisual performance in which everyday objects placed on a table are interpreted as sound-producing marks in an “active score.” The Scrapple system scans a table surface as if it were a kind of music notation, producing music in real-time from any objects lying there. The 3-meter long table produces a 4-second audio loop, allowing the performers to improvise audiovisual compositions in real-time.
https://vimeo.com/2379890

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VIDEO & VIDEO

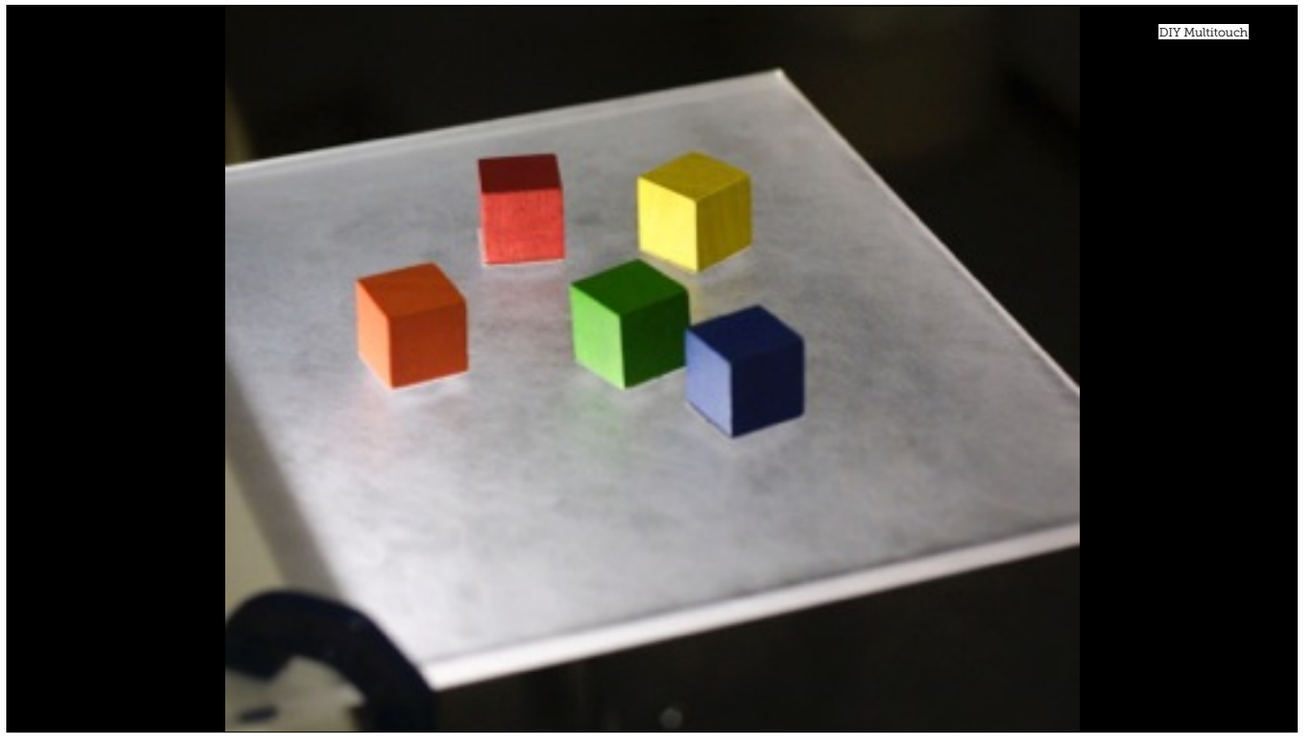
https://vimeo.com/2379890 & https://vimeo.com/2379389

TRACKMATE

Adam Kumpf, Jean-Baptiste Labrune, Keywon Chung, Daniel Leithinger, Jamie Zigelbaum, Hiroshi Ishii / 2009 @ MIT Media Lab - Tangible Media Group

Optical system

Trackmate is an inexpensive, do-it-yourself tangible tracking system that allows your computer to recognize tagged objects and their corresponding position, rotation, and color information when placed on a surface. Trackmate sends all object data via LusidOSC (a protocol layer for unique spatial input devices), allowing any LusidOSC-based application to work with the system.



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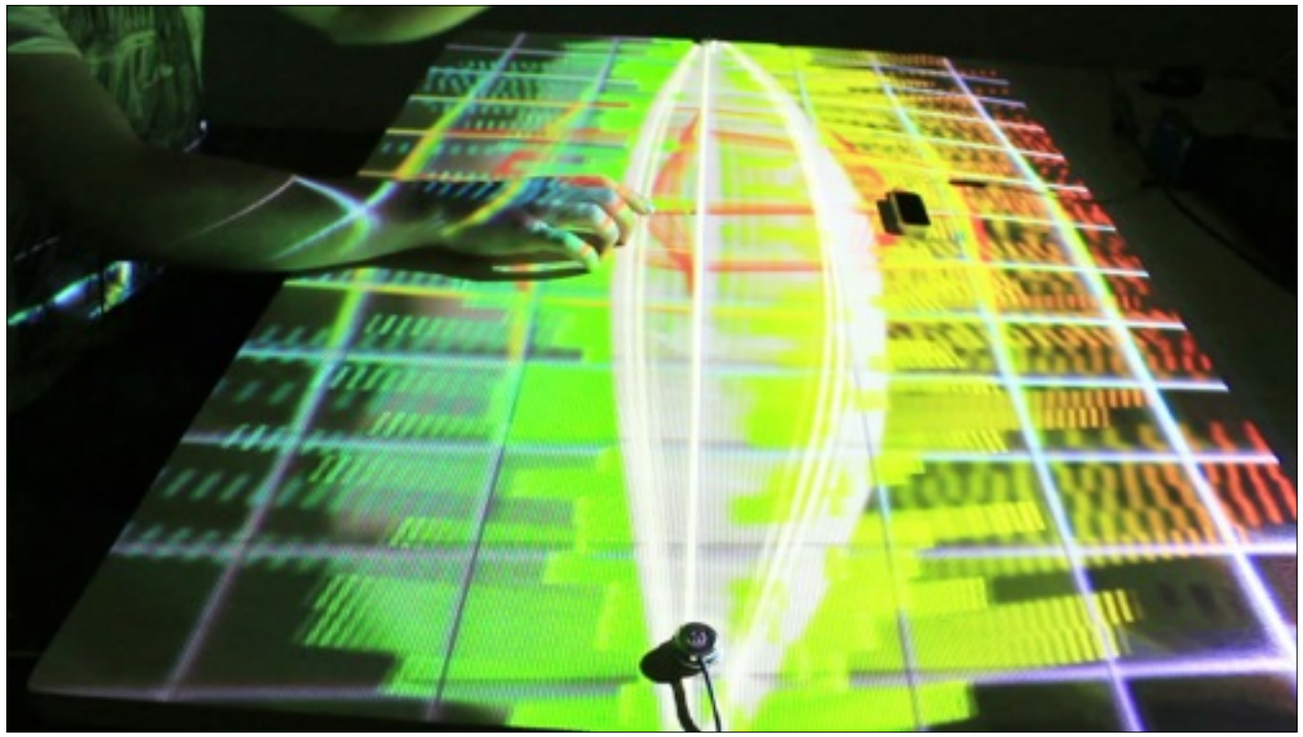
VIDEO

https://vimeo.com/6730765

CONTACT

by Felix Faire

http://felixfaire.com/portfolio/contact/



VIDEO

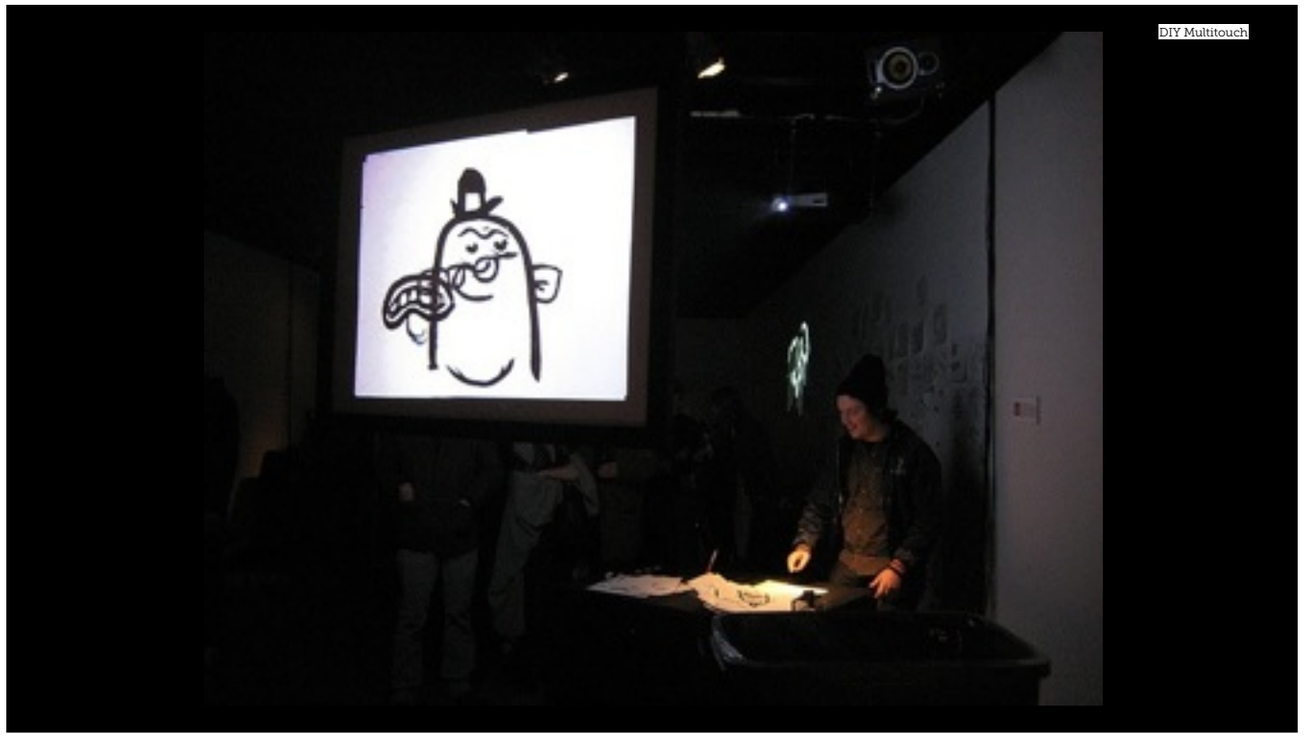
https://vimeo.com/82107250

DRAWN

by Zachary Lieberman

http://thesystemis.com/projects/drawn/

http://v2.nl/archive/works/drawn



This project presents a whimsical scenario in which painted ink forms appear to come to life, rising off the page and interacting with the very hands that drew them. Inspired by early filmic “lightning sketches,” in which stop-motion animation techniques were used to create the illusion of drawings escaping the page, drawn presents a modern update: custom-developed software alters a video signal in real time, creating a seamless, organic and even magical world of spontaneous and improvised performance of hand and ink.

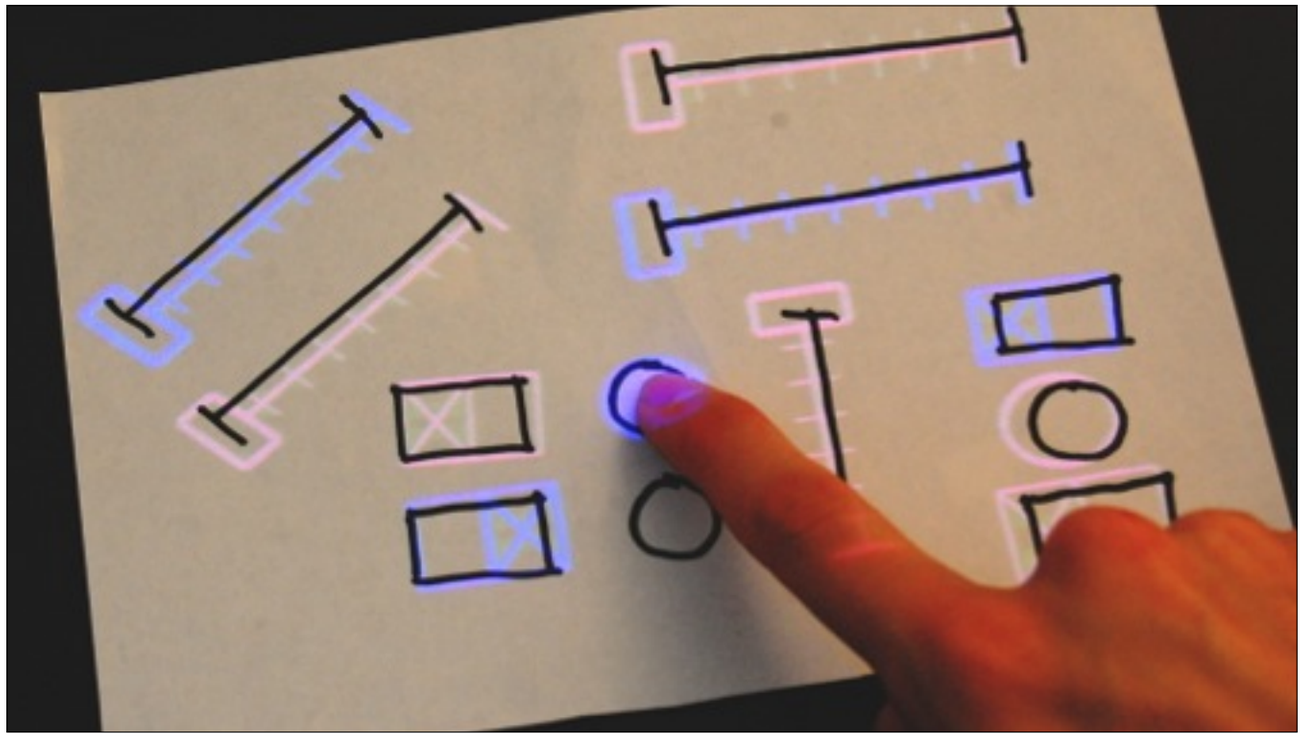
VIDEO

https://vimeo.com/4732884

SKETCHSYNTH

SketchSynth: A Drawable OSC Control Surface by Billy Keyes

https://github.com/bluekeyes



SketchSynth: A Drawable OSC Control Surface

SketchSynth lets anyone create their own control panels with just a marker and a piece of paper. Once drawn, the controller sends Open Sound Control (OSC) messages to anything that can receive them; in this case, a simple synthesizer running in Pure Data. It’s a fun toy that also demonstrates the possibilities of adding digital interaction to sketched or otherwise non-digital interfaces.

VIDEO

https://vimeo.com/42053193

Juri is going to show you how you can create with a USB camera, a box, a sheet of paper and processing a basic touch interface.

HTTPS://GITHUB.COM/FH-POTSDAM/2014-2015-WISE-15PP-PW-DIY-MULTITOUCH

Sourcecode repo

WHAT ELSE IS IN THE BOX?

OPENCV

You going to learn some basic usage of opencv

OPENCV

(Open Source Computer Vision Library)

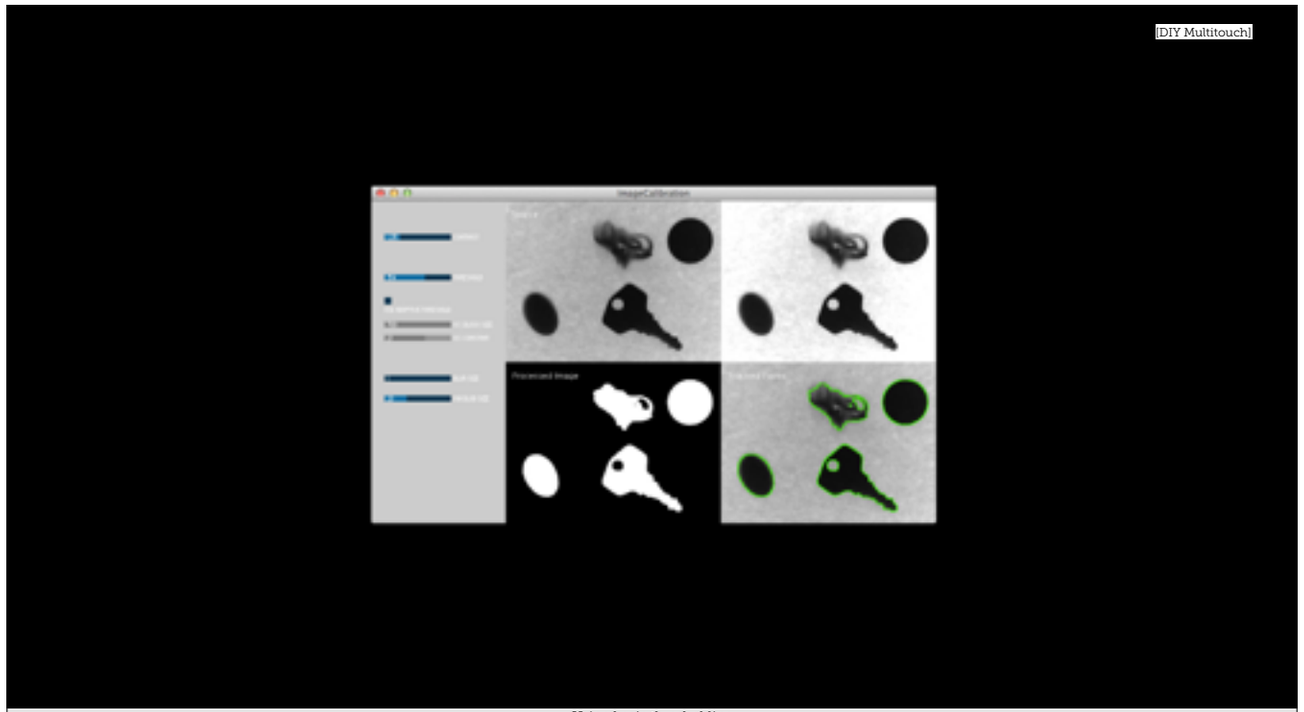
is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products.

http://opencv.org/

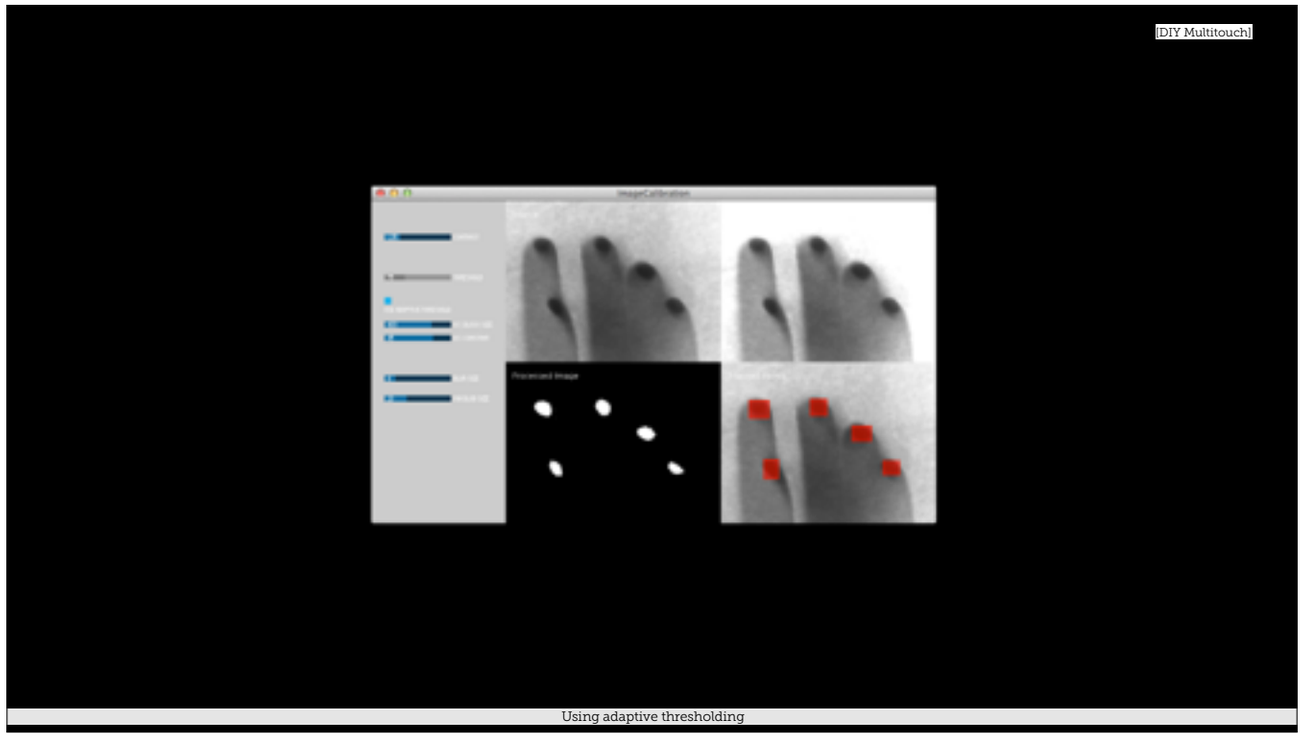
OPENCV-PROCESSING

https://github.com/atduskgreg/opencv-processing by Greg Borenstein

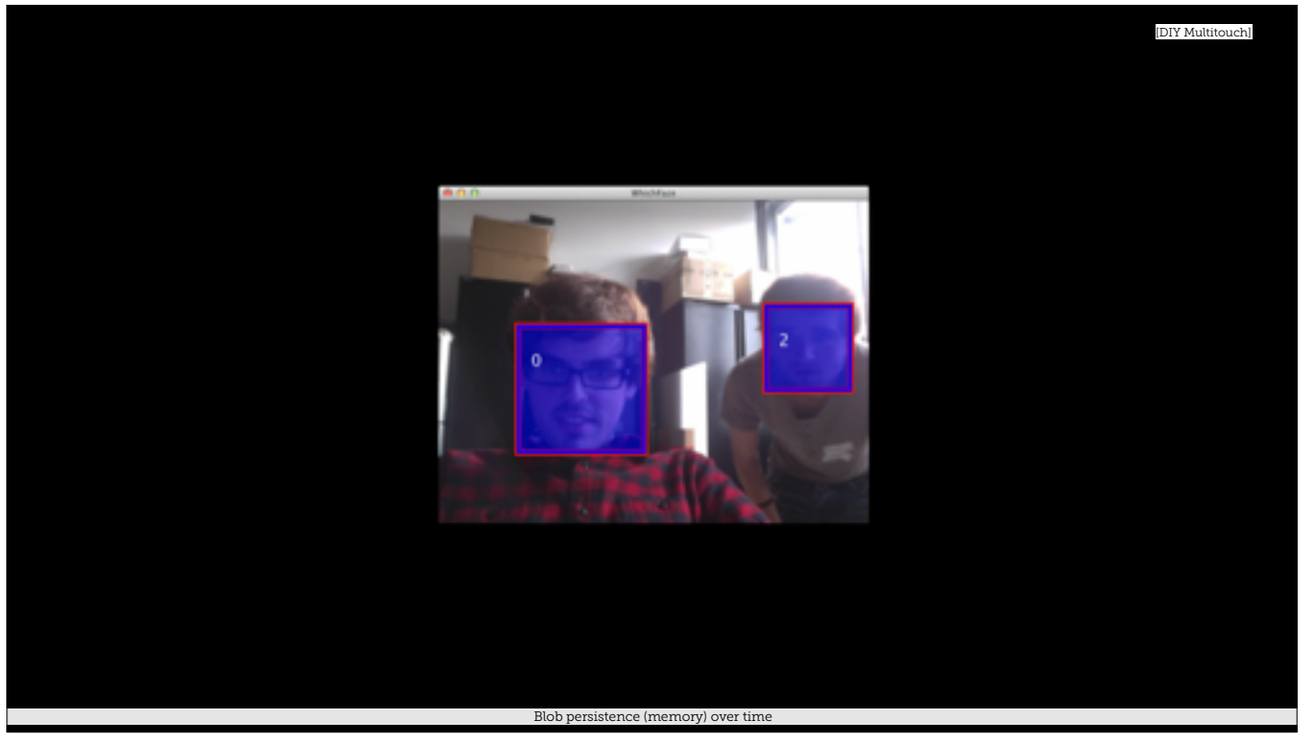
http://gregborenstein.com/



Using basic thresholding



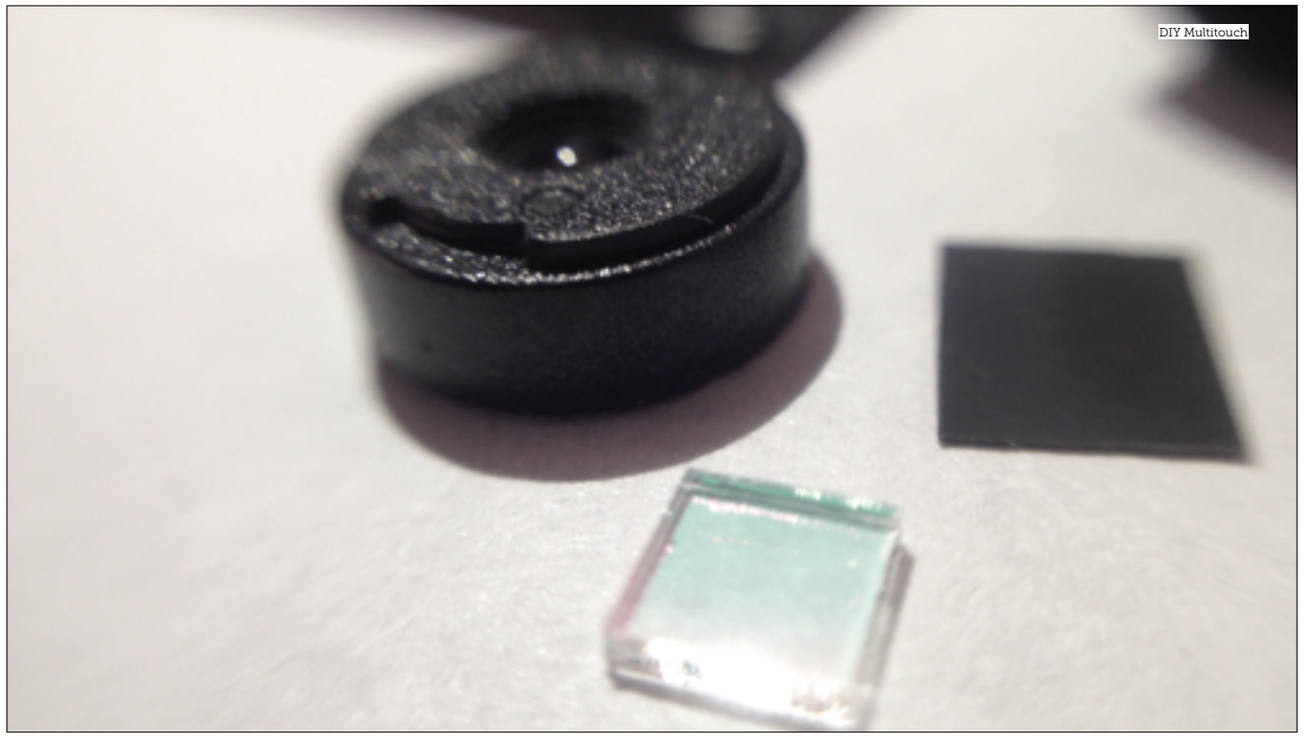
Using adaptive thresholding

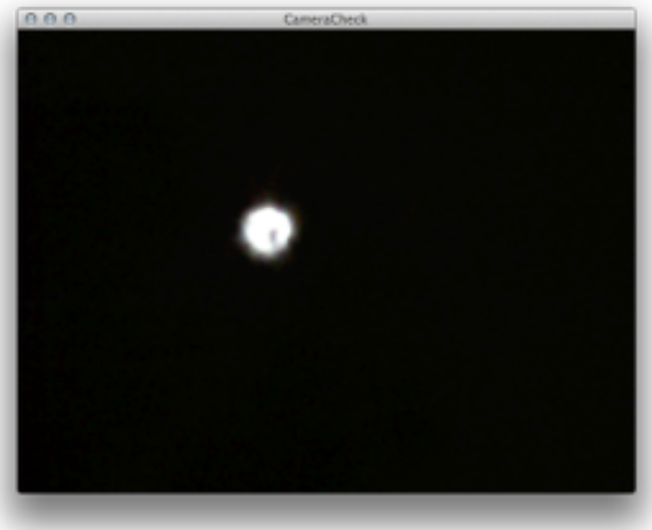


Blob persistence (memory) over time

DIY IR CAMERA

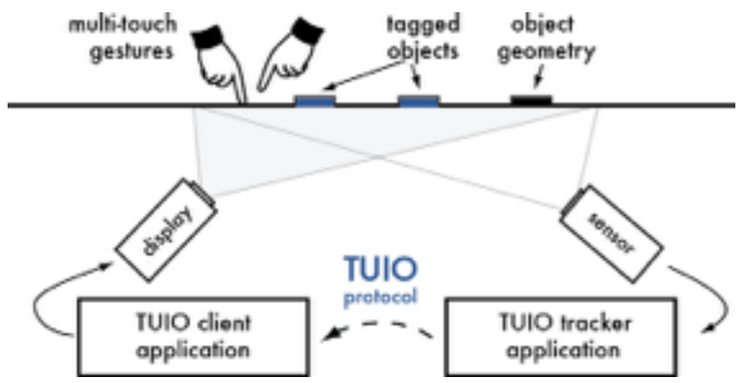
We will show you some nice camera hack

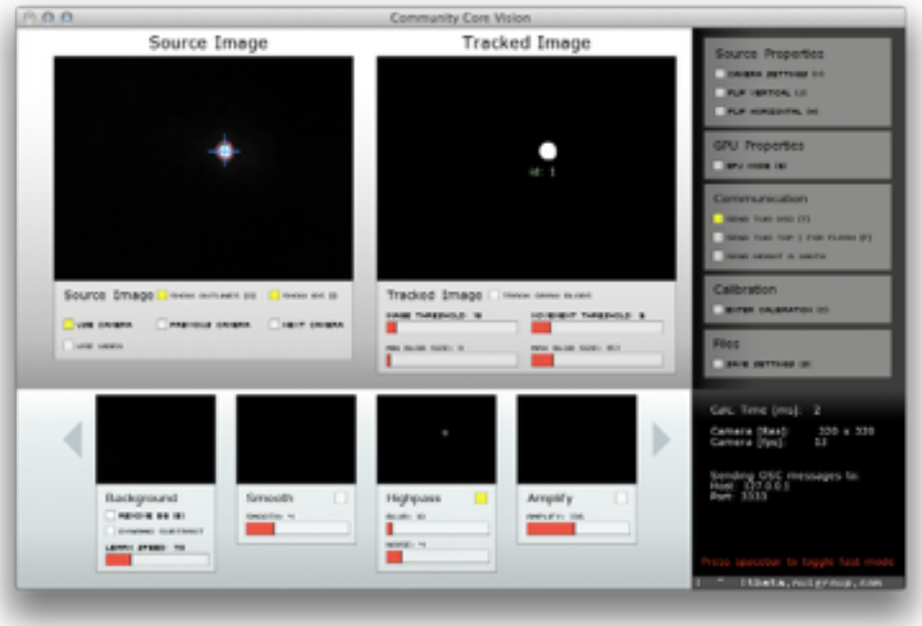

DIY Multitouch


CameraCheck

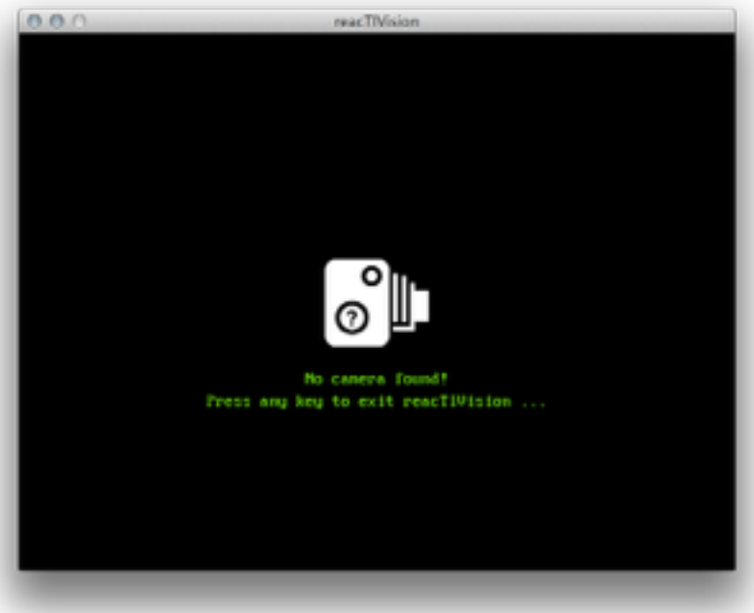
TUIO

TUIO is an open framework that defines a common protocol and API for tangible multitouch surfaces. The TUIO protocol allows the transmission of an abstract description of interactive surfaces, including touch events and tangible object states. This protocol encodes control data from a tracker application (e.g. based on computer vision) and sends it to any client application that is capable of decoding the protocol. There exists a growing number of TUIO enabled tracker applications and TUIO client libraries for various programming environments, as well as applications that support the protocol. This combination of TUIO trackers, protocol and client implementations allows the rapid development of table based tangible multitouch interfaces. TUIO has been mainly designed as an abstraction for interactive surfaces, but also has been used in many other related application areas. Technically TUIO is based on Open Sound Control - an emerging standard for interactive environments not only limited to musical instrument control - and can be therefore easily implemented on any platform that supports OSC. Since the initial publication of the TUIO protocol specification to the public domain as part of the Reactable

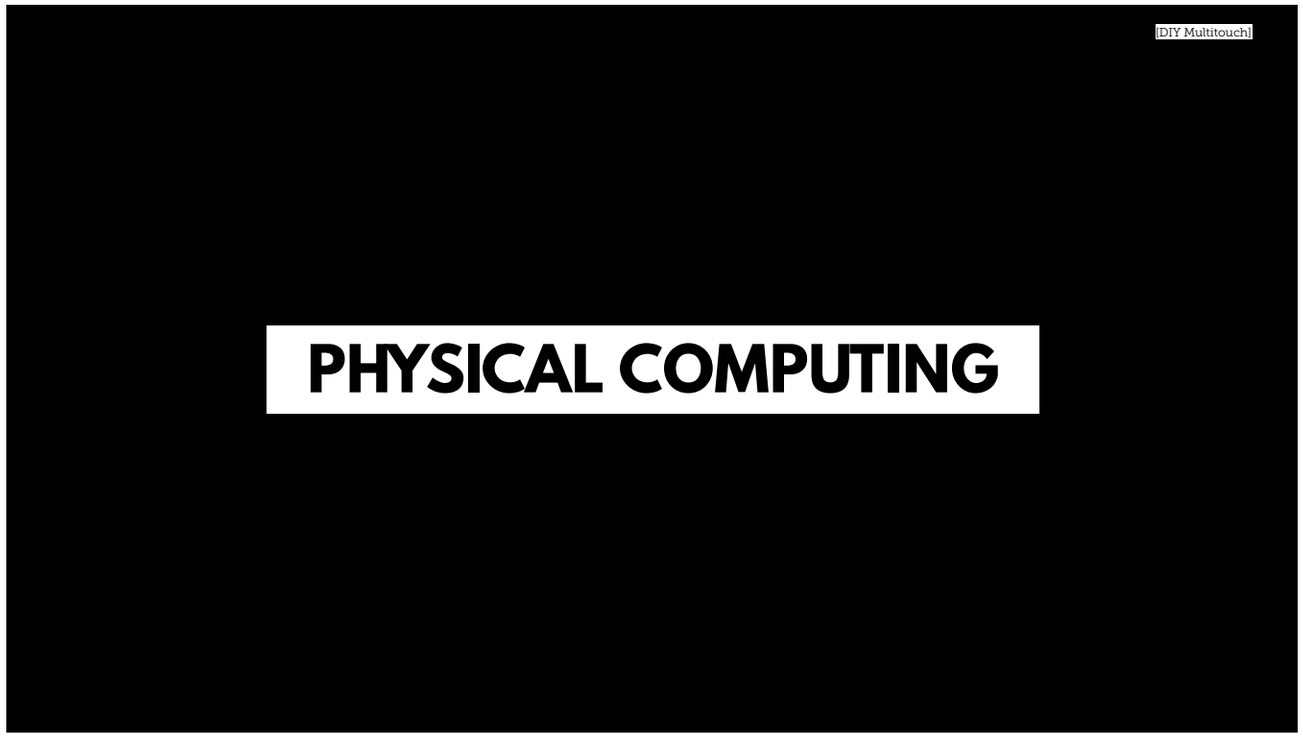

multi-touch gestures
tagged objects
object geometry
display
sensor
TUIO protocol
TUIO client application
TUIO tracker application



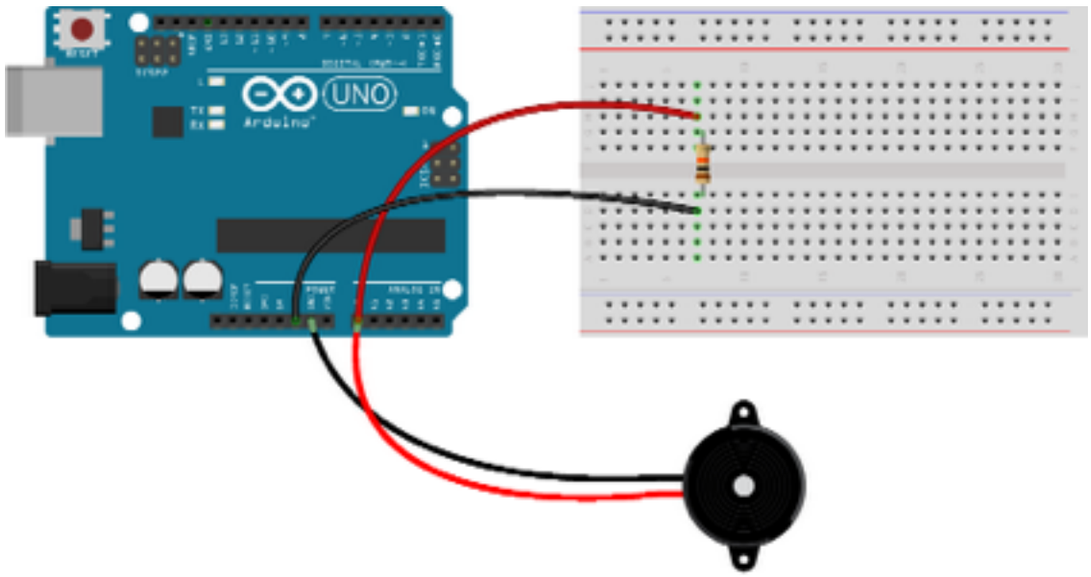
CCV app mit IR Camera



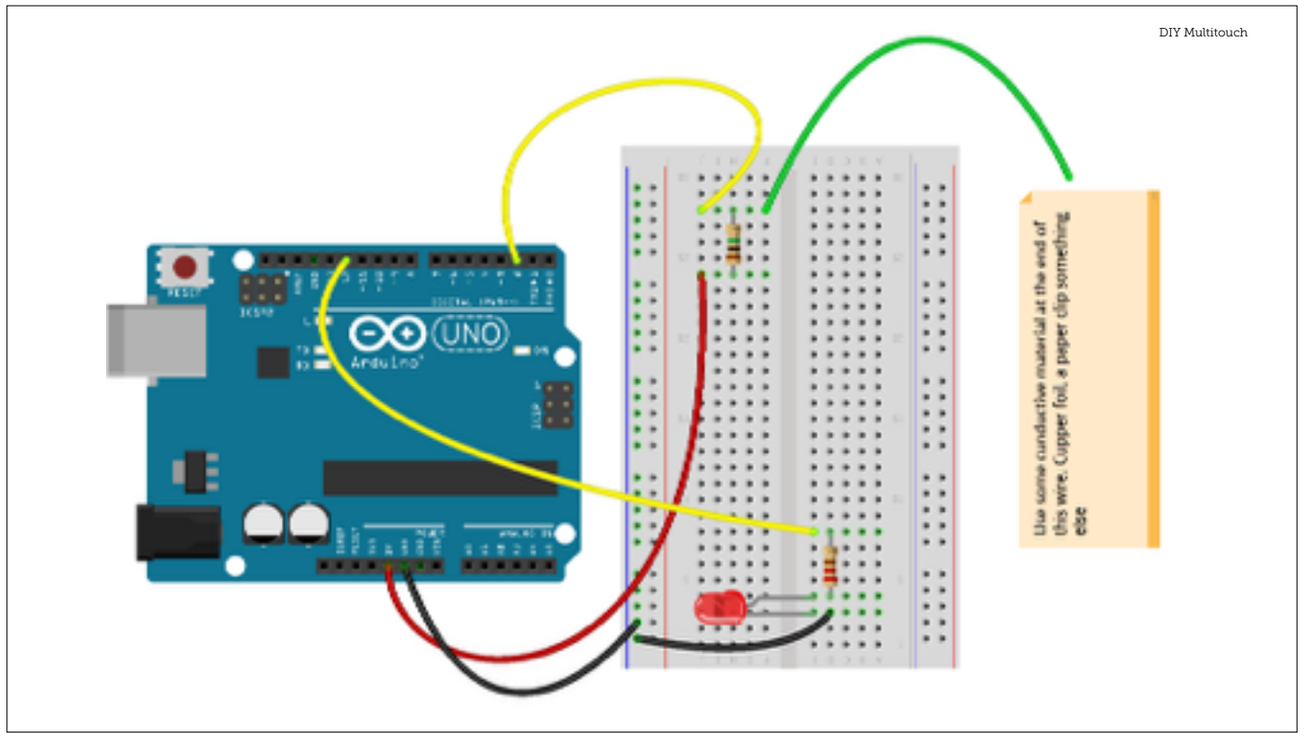
reacTIVision app



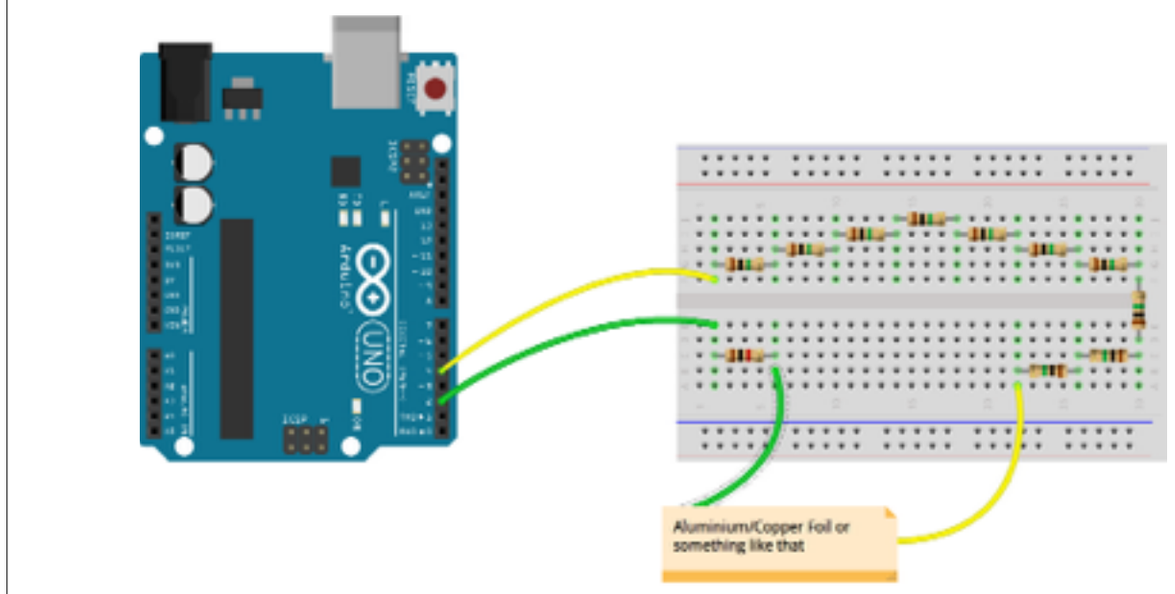
Fabian



Knock acoustic

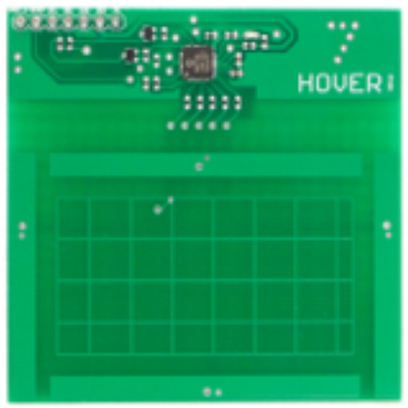


Capacitive Digital



Capacitive Analog

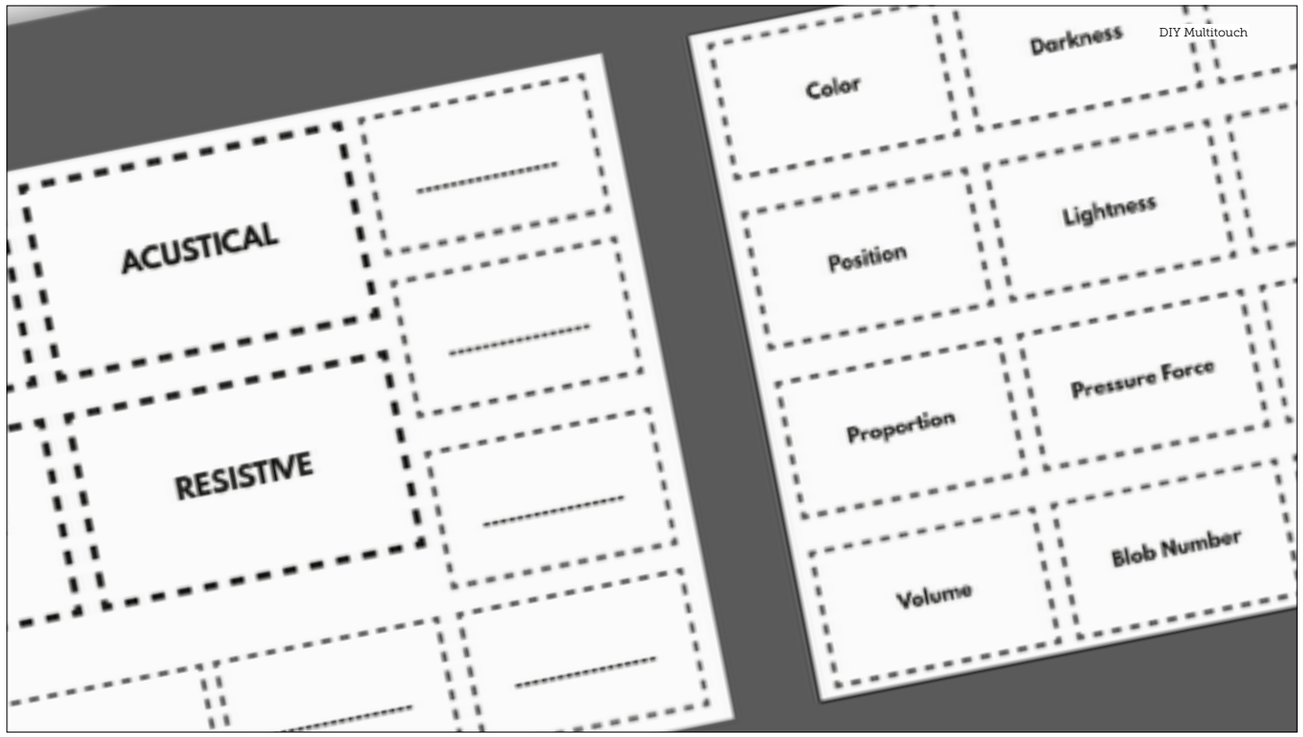
https://www.olimex.com/Products/Duino/AVR/OLIMEXINO-85S/open-source-hardware



http://www.hoverlabs.co/#hover

Dank an Phillip Pfingstag

IDEA GENERATOR


ACUSTICAL
RESISTIVE
Color
Darkness
Position
Lightness
Proportion
Pressure Force
Volume
Blob Number
DIY Multitouch

GROUPS

EXERCISE

Connect || Think || Present

Aufgabe zu morgen