



As We May Think

The Legacy of Computing Research and the Power of Human Cognition

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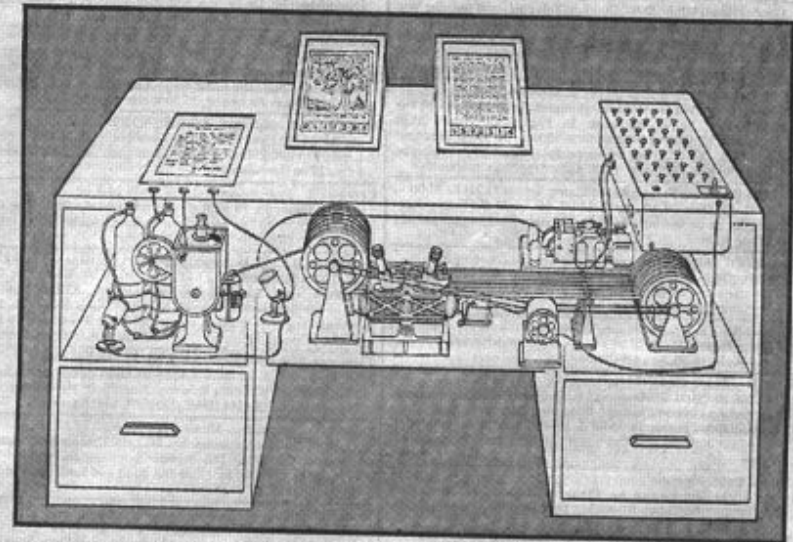
Professor, Interactive Computing

Georgia Institute of Technology

Georgia  **Institute for People**
Tech **and Technology**

Augmenting Human Cognition

Assessment of post WW2
computing capabilities.



MEMEX in the form of a desk would instantly bring files and material on any subject to the operator's fingertips. Slanting translucent viewing screens magnify supermicrofilm filed by code numbers. At left is a mechanism which automatically photographs longhand notes, pictures and letters, then files them in the desk for future reference.

AS WE MAY THINK CONTINUED

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BUILDING "TRAILS" OF THOUGHT ON THE MEMEX—

Wie sich 1945 ein LIFE-Zeichner die erste Hypertextmaschine (Memex) vorstellte

Augmenting Human Cognition

Stanford's Augmentation
Research Center



monday afternoon

december 9

3:45 p.m. / arena

Chairman:

DR. D. C. ENGELBART

*Stanford Research Institute
Menlo Park, California*

a research center for augmenting human intellect

This session is entirely devoted to a presentation by Dr. Engelbart on a computer-based, interactive, multiconsole display system which is being developed at Stanford Research Institute under the sponsorship of ARPA, NASA and RADC. The system is being used as an experimental laboratory for investigating principles by which interactive computer aids can augment intellectual capability. The techniques which are being described will, themselves, be used to augment the presentation.

The session will use an on-line, closed circuit television hook-up to the SRI computing system in Menlo Park. Following the presentation remote terminals to the system, in operation, may be viewed during the remainder of the conference in a special room set aside for that purpose.

Augmenting Human Cognition

Visual tools

XEROX 6085 Workstation

User-Interface Design

To make it easy to compose text and graphics, to do electronic filing, printing, and mailing all at the same workstation, requires a revolutionary user interface design.

Bit-map display - Each of the pixels on the 19" screen is mapped to a bit in memory, thus, arbitrarily complex images can be displayed. The 6085 displays all fonts and graphics as they will be printed. In addition, familiar office objects such as documents, folders, file drawers and in-baskets are portrayed as recognizable images.

The mouse - A unique pointing device that allows the user to quickly select any text, graphic or office object on the display.

See and Point

All functions are visible to the user on the keyboard or on the screen. The user does filing and retrieval by selecting them with the mouse and touching the MOVE, COPY, DELETE or PROPERTIES command keys. Text and graphics are edited with the same keys.

Year	Man 6085	6085
1978	85.2	15.8
1980	41.1	39.9
1982	45	55
1984	30	70
1986	10	90
1988	5	95

Table 1: Percentages of use of methods.

Activity under the old and the new

Figure 1: Data from Table 1 drive

Workstation usage percentages Table 1 and illustrated in Figure 6085 users are likely to do the composition and layout, entire process including printing and di

Text and Graphics

To replace typesetting, the 6085 offers a choice of type fonts and sizes, from 6 point to 36 point:

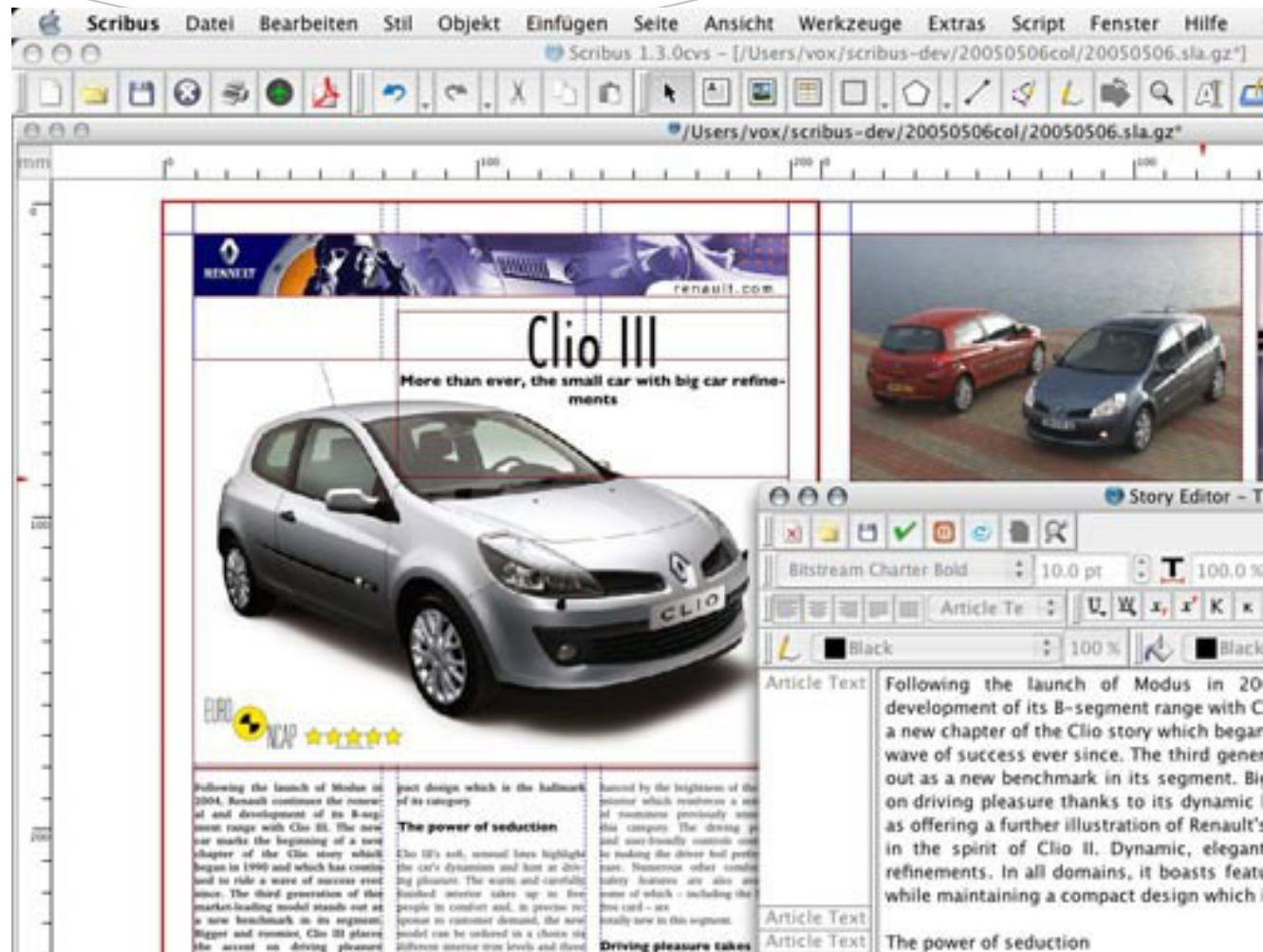
Here is a sentence of 14 point text.
Here is a sentence of 12 point text.
18-point text.
24-point text.

DOS & Lotus data:

NAME	EXTENSION	SIZE	DATE
COMMAND	COM	22677	15-8
ANSI	SYS	2556	18-8
ASSIGN	COM	864	28-8
ATTRIB	EXE	15091	14-8
BACKUP	COM	17024	28-4
CHKDSK	COM	9435	24-8
CHMOD	COM	6528	27-4
COMP	COM	3018	10-8
DEBUG	EXE	15364	15-8

Augmenting Human Cognition

Desktop publishing



Augmenting Human Cognition

WWW publishing

The screenshot shows the homepage of DoSomething.org. At the top, there's a navigation bar with icons for help, chat, phone, and email, a search bar, and links for 'Log in' and 'Connect'. Below this is a blue banner with the text 'MEMBERS ONLY FIND YOUR CAUSE START SOMETHING AWESOME-THINGS'. The main content area features a large photo of a diverse group of young adults standing behind several large brown paper bags filled with food items like rice, pasta, and canned goods. Below the photo is a purple banner that reads 'Food for the people!' and 'Collect and donate food to help the homeless.' To the right of this banner is a yellow arrow pointing left with the text 'Do This'. On the left side of the page, there's a sidebar with the 'DO SOMETHING .ORG' logo, a 'Become a Member' section with a Facebook connect button and a registration form (First Name, Last Name, Cell Number or E-mail, Over 13? mm dd yyyy, SUBMIT), and a 'Why become a member?' section. Below the sidebar are three columns: 'Twitter Feed' with recent activity from users like Matt Collman and Kevin DiBiase; 'Make an Impact' with filters for 'What Cause?' (Education...), 'Who With?' (Friends...), 'Where?' (School...), and 'How Long?' (1 Minute...), plus a 'SUBMIT' button; and 'News & Stuff' with three article teasers: 'Free ways to quit smoking', 'Facts about famine', and 'Prevent melting'.

Augmenting Human Cognition

Knowledge Communities

WIKIPEDIA

English

The Free Encyclopedia

3 543 000+ articles

日本語

フリー百科事典

730 000+ 記事

Deutsch

Die freie Enzyklopädie

1 181 000+ Artikel

Français

L'encyclopédie libre

1 061 000+ articles

Italiano

L'enciclopedia libera

768 000+ voci



Español

La enciclopedia libre

710 000+ artículos

Русский

Свободная энциклопедия

654 000+ статей

Português

A enciclopédia livre

669 000+ artigos

Polski

Wolna encyklopedia

769 000+ haseł

Nederlands

De vrije encyclopedie

668 000+ artikelen

Augmenting Human Cognition

North Korea Uncovered



Human Computer Interaction

Apple's iPad



Integrated Circuit

GPS



Zoomable

Touchscreen

Multi-touch

Deconstructing the iPad

Touchscreens



NASA and Library of Congress funding in late '80s/early '90s

- For information access
- To avoid mice in space



Jobs visits UMD 1988

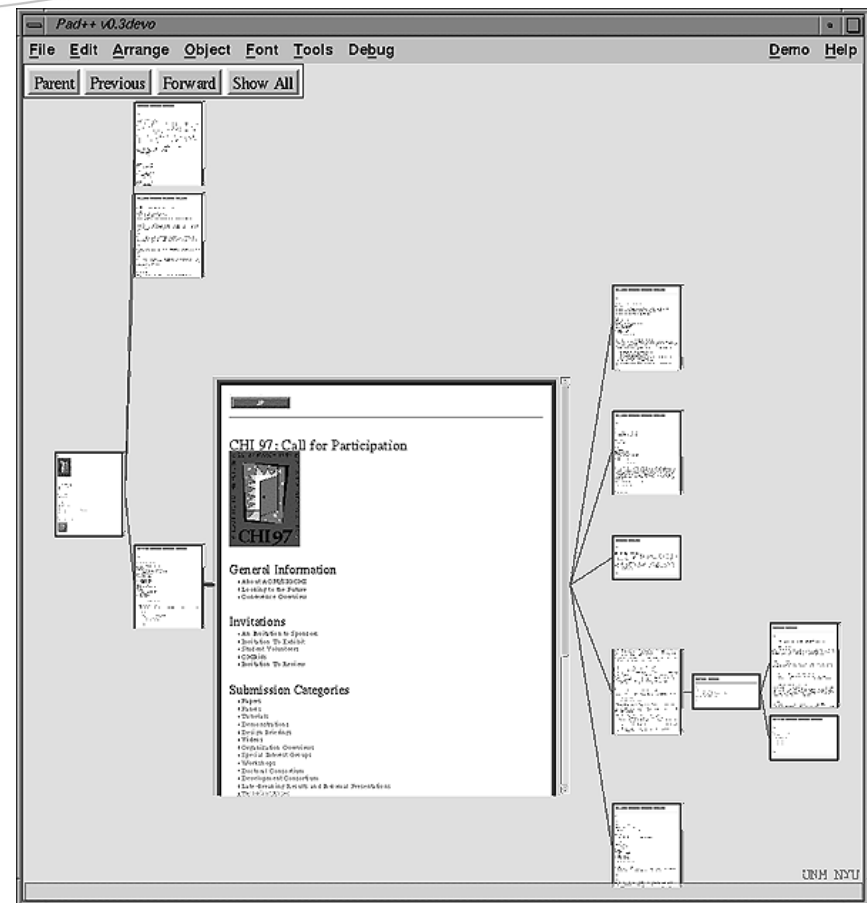
Deconstructing the iPad

Zoomable User Interfaces

**DARPA funding in
mid '90s**

Command Post
of the Future

New desktop &
document management



Deconstructing the iPad

Multi-touch Gestures

Long History:

1972 PLATO – Univ. Illinois

Army-Navy-Airforce =>

NSF funding

1985 Sensor Frame – CMU

NASA SBIR

1998 Fingerworks – U. Delaware

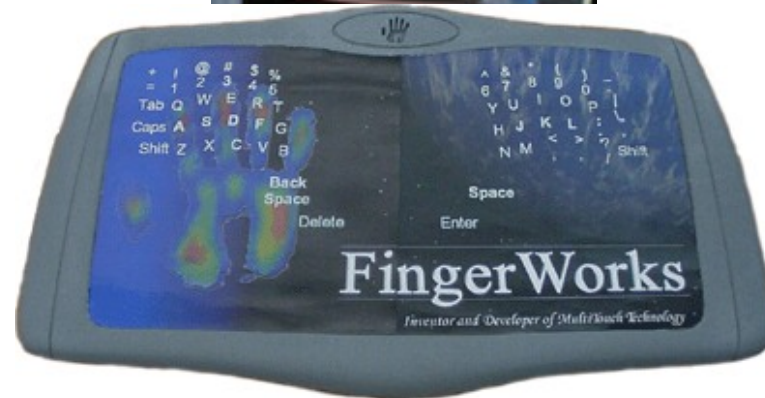
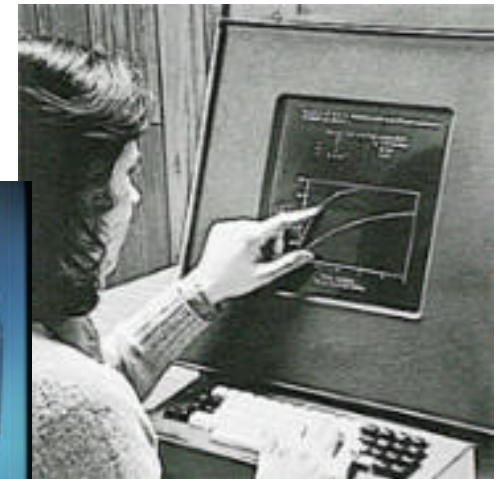
NSF Grad Fellowship –

Wayne Westerman

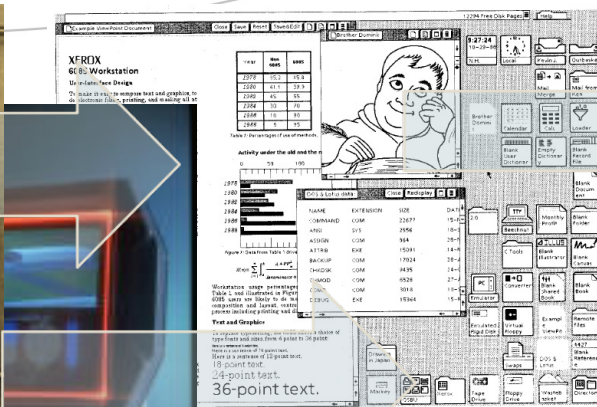
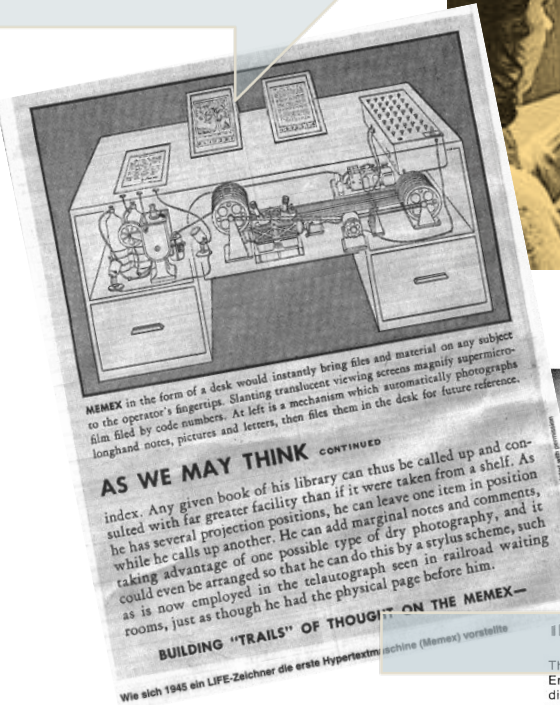
NSF Research Grant –

John Elias

=> **2005 Bought by Apple**



The Legacy is clear...



WIKIPEDIA

Google

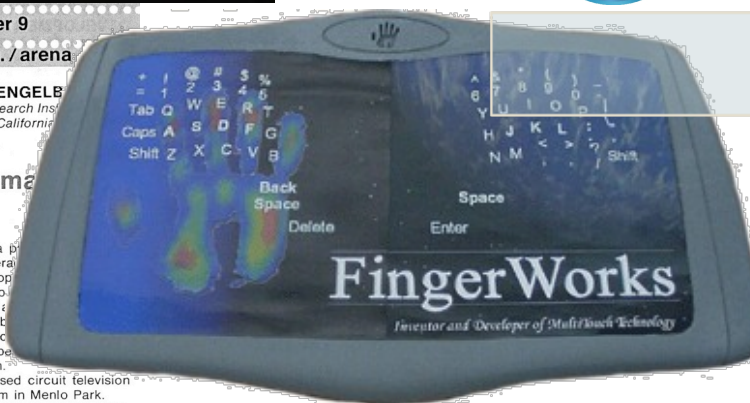


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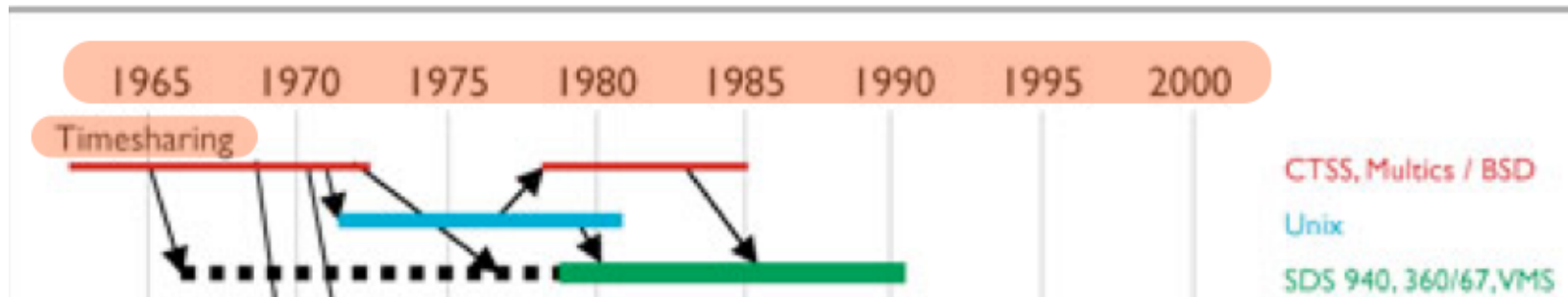
research center
augmenting human
intellect

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The Legacy is clear...



Red Line - research in universities

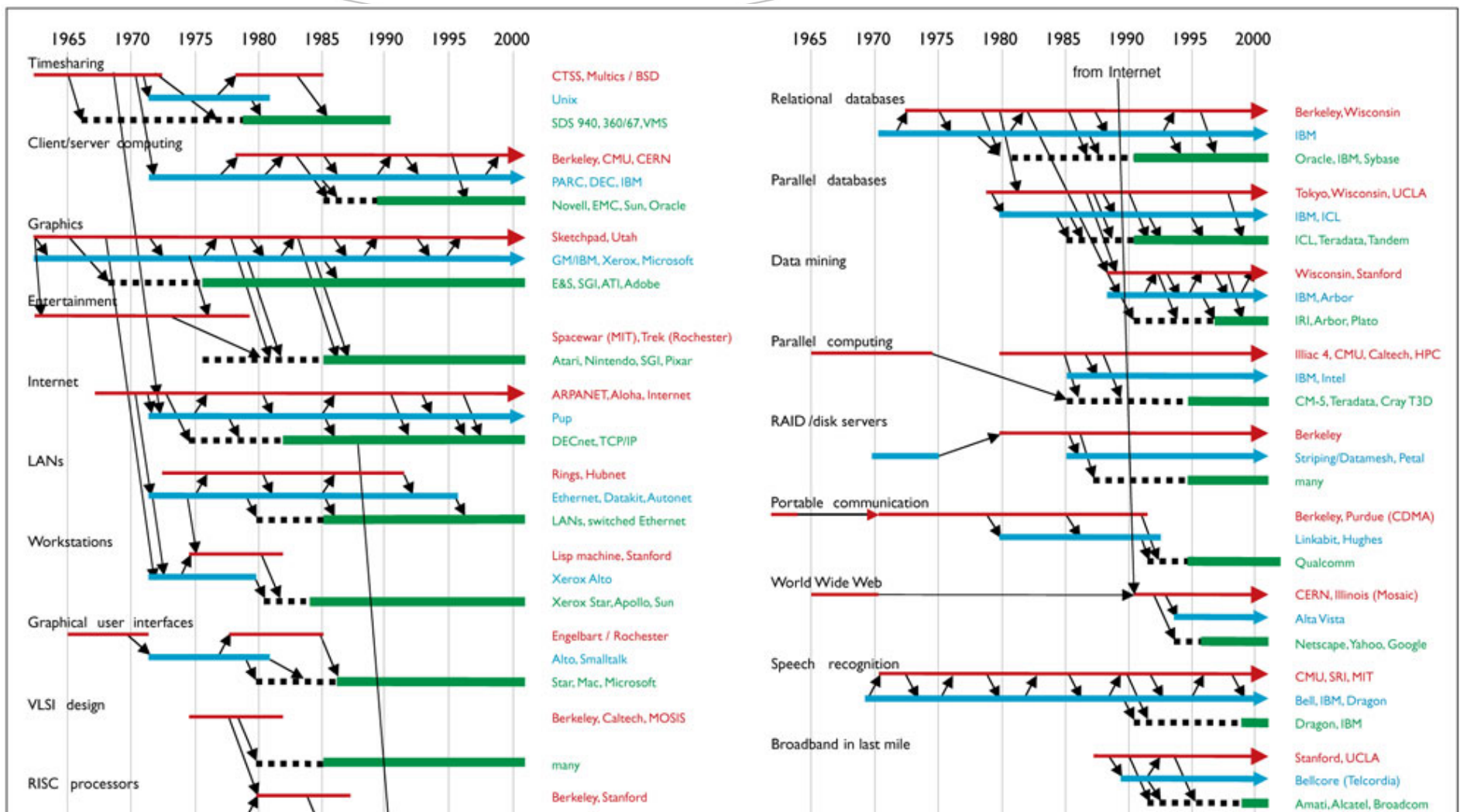
Blue Line - research in industry

Dotted Black Line - first product

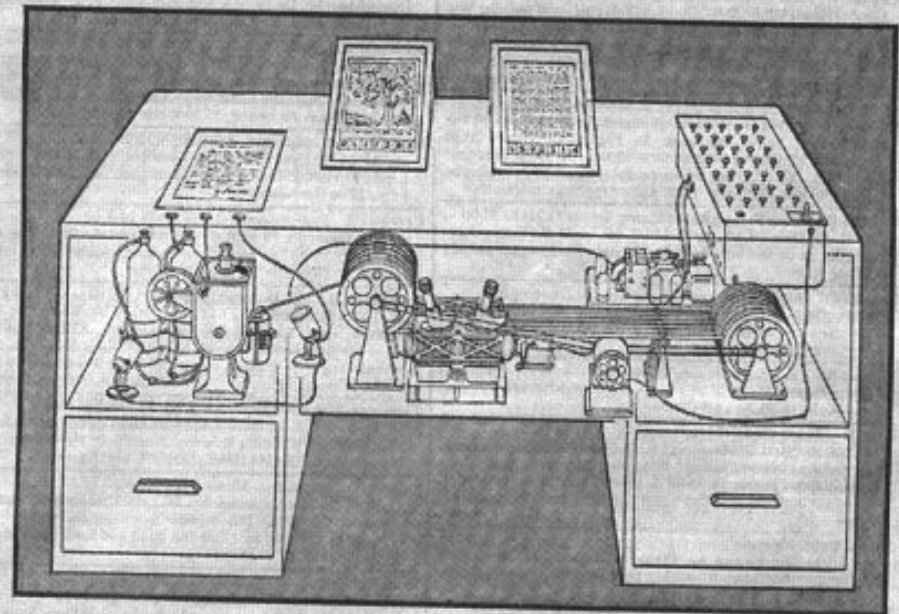
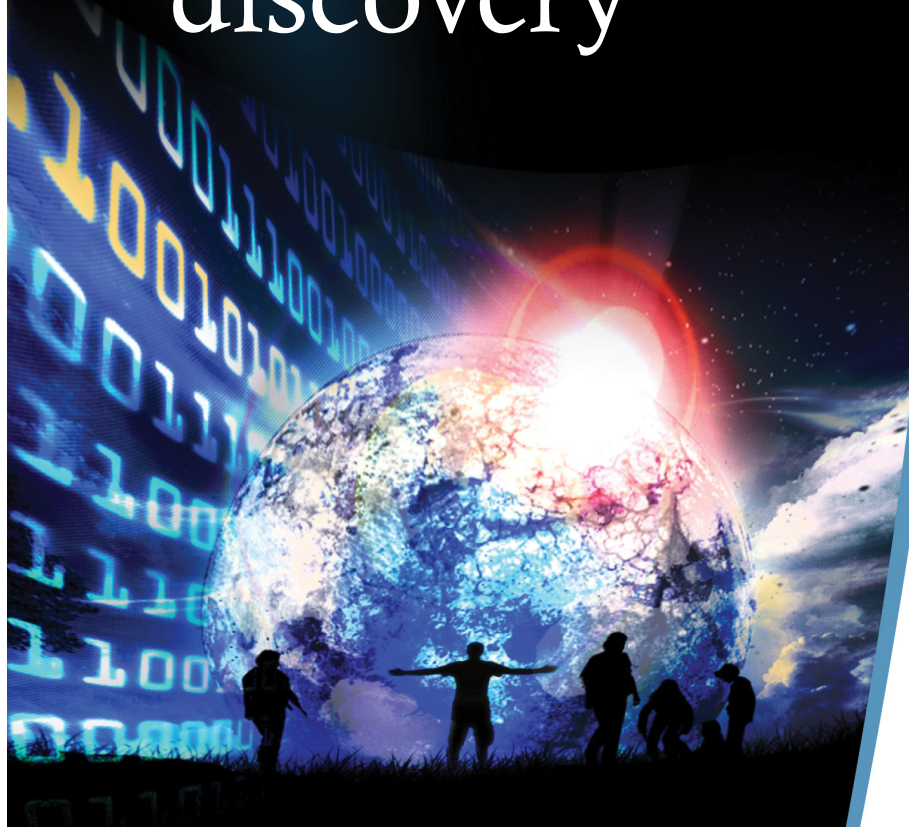
Solid Green Line - billion dollar sector

Arrows - flow of people and ideas

The Legacy is clear...



On the horizon... the era of discovery



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BUILDING "TRAILS" OF THOUGHT ON THE MEMEX—

Wie sich 1945 ein LIFE-Zeichner die erste Hypertextmaschine (Memex) vorstellte

Discovering the keys to disease treatment

The screenshot shows the homepage of the 'patientslikeme' website. At the top, the logo 'patientslikeme' is displayed with the tagline 'Patients helping patients live better every day.' Below the logo is a navigation bar with icons for 'Patients', 'Treatments', 'Symptoms', and 'Research', along with a search bar and 'Help | Crisis' links. The main content area features three columns: 'Learn' with a 'Catechesis' section, 'Find' with a 'Patient' profile, and 'Share' with a 'alking 101' profile. To the right of these columns are three call-to-action buttons: 'Share Your Experience »', 'Find Patients Like You »', and 'Learn From Others »', each with a small icon and a brief description. Below these buttons is a yellow 'Join Now (It's free!)' button and a 'Log in' link for existing members. A horizontal strip of member photos is shown below the call-to-action buttons. At the bottom, there are two sections: 'Our Current Communities' listing various neurological and neuroendocrine conditions, and 'Highlights' featuring a 'New!' badge for the 'Fibromyalgia Community' with a 'Learn more...' link and a row of human icons.

patientslikeme™ Patients helping patients live better every day.

Patients | Treatments | Symptoms | Research

Search this site Search Help | Crisis

Learn Find Share

Catechesis

Patient

alking 101

Share Your Experience »

Find Patients Like You »

Learn From Others »

Join Now (It's free!)

Already a member? Log in

Click on member photos for more details

Our Current Communities

Neurological Conditions

- MS (Multiple Sclerosis)
- Parkinson's Disease
- ALS (Amyotrophic Lateral Sclerosis) / MND (Motor Neuron Disease)
- PLS (Primary Lateral Sclerosis)
- PMA (Progressive Muscular Atrophy)
- PSP (Progressive Supranuclear Palsy)

Neuroendocrine Conditions

- Fibromyalgia (New!)
- Mood Conditions
- Depression
- Anxiety
- Bipolar
- OCD (Obsessive-Compulsive Disorder)

Highlights

Fibromyalgia Community

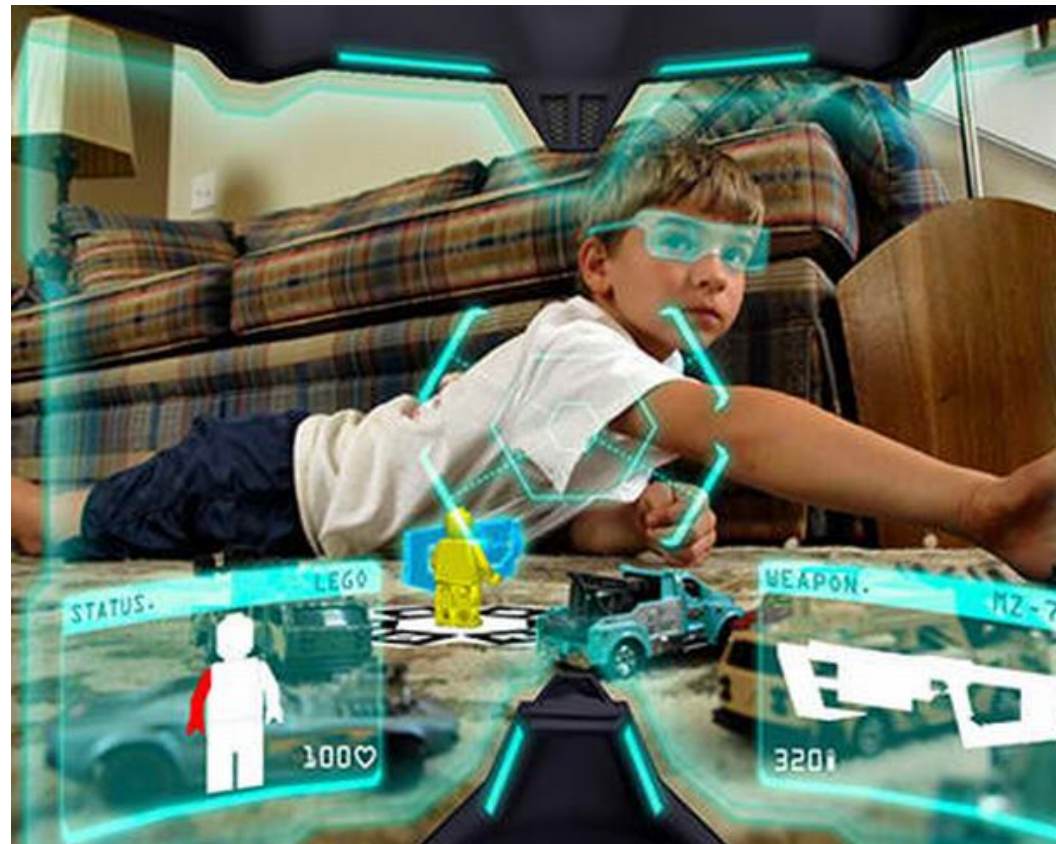
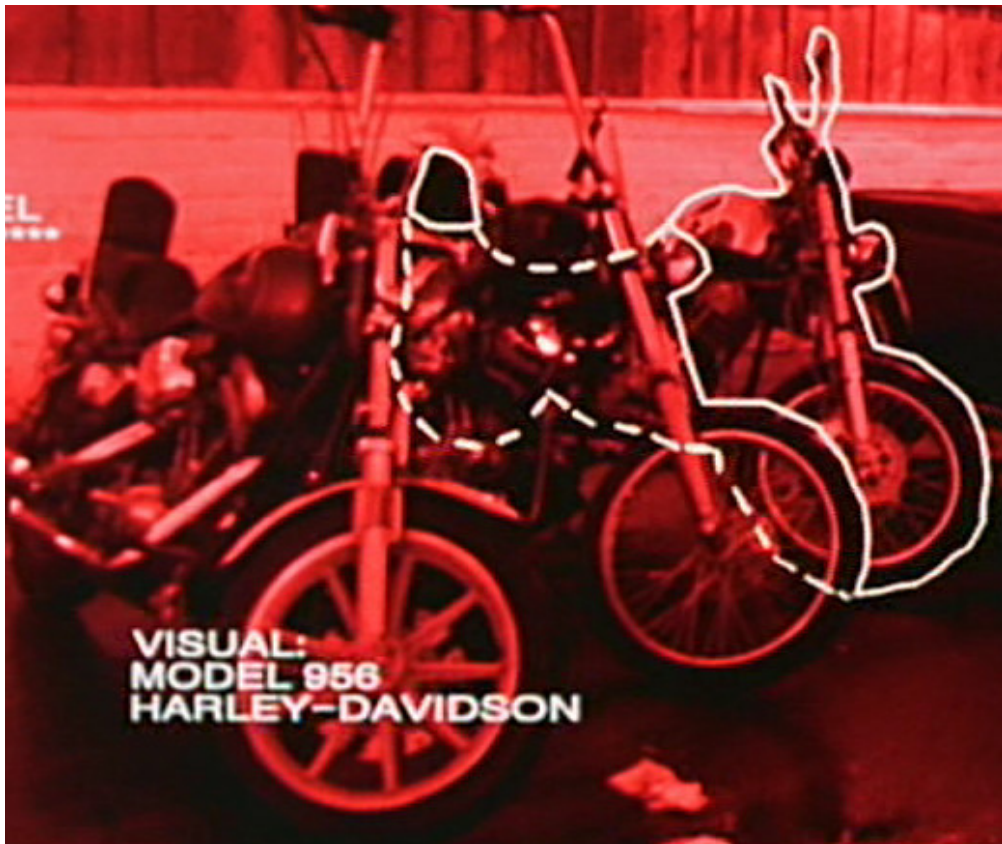
Introducing our new community for Fibromyalgia patients like you.

Learn more...

Discovering the keys to disease treatment



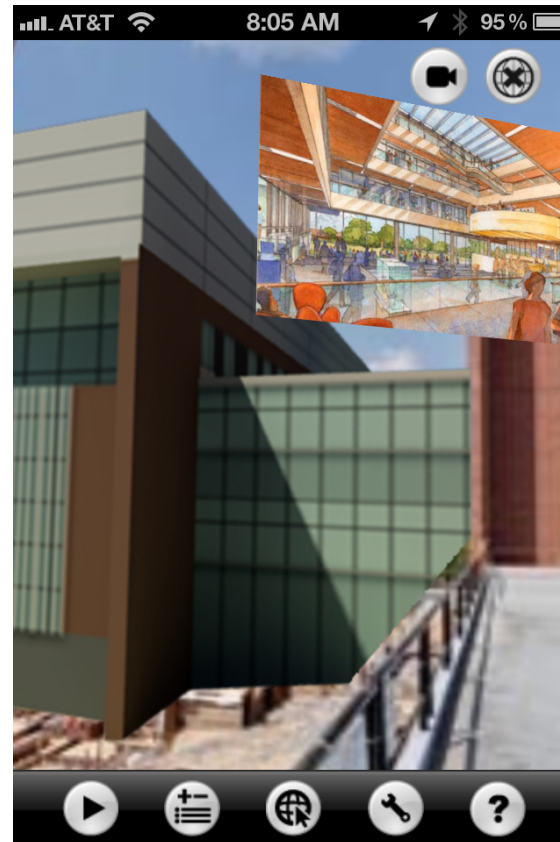
Mixed reality interaction for discovery



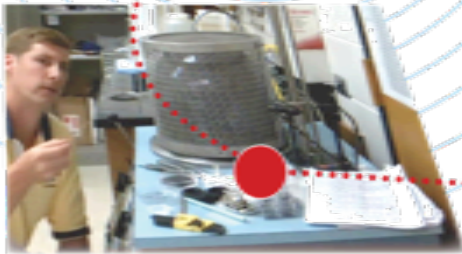
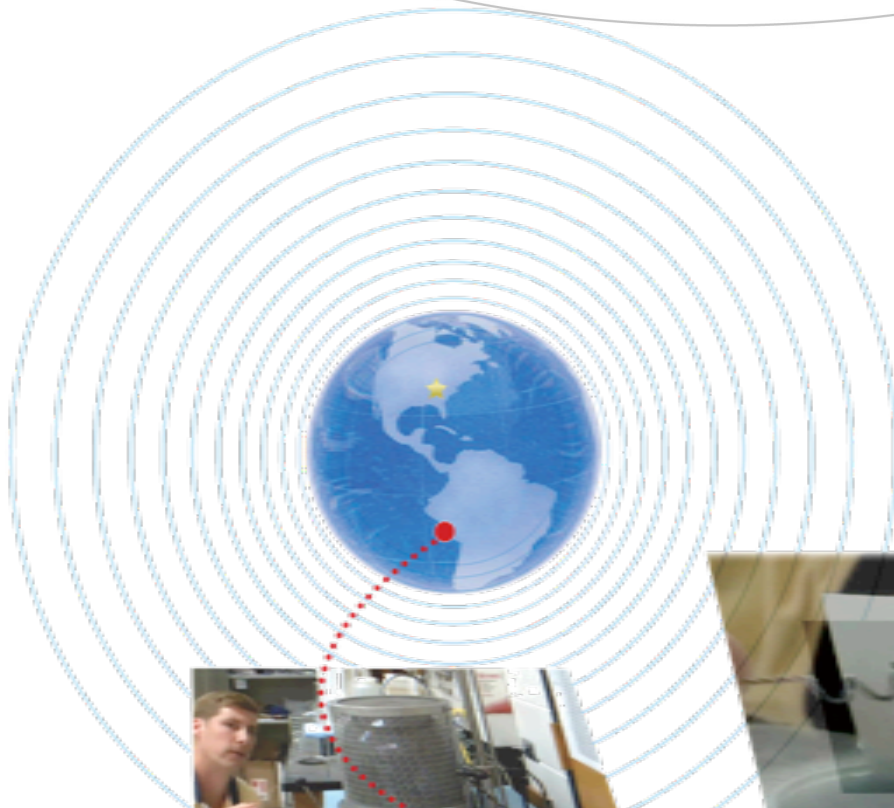
Mixed reality interaction for discovery



Mixed reality interaction for discovery



Learning as discovery



Investing in the era of discovery



**New technologies for data
acquisition**

**New techniques for data
analytics**

**New interaction and
visualization paradigms**

**New methods for
collaboration and
knowledge creation**

**New strategies for
education**



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