ACHI 2010 Panel

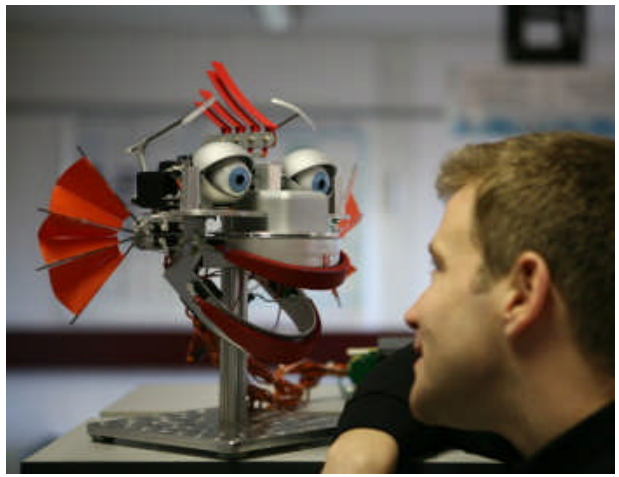
Digital Society Trends:
New Forms of Machine-Human Interactions

Panelists

- Bernd Radig
- Timothy Coles
- Claudia Zapata Del Rio
- Lindsay Grace
- Jose Rouillard

Bernd Radig

- Professor
- Technische Universität München
- Fakultät für Informatik
- + Research Cluster "Cognition for Technical Systems"



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- image sequence understanding
- analysis of facial expressions
- classify the emotional state of humans
- multimodal unstructured dialogue between humans and autonomous robots
- multi joint action - humans and robots

Timothy Coles

- Researcher
- Bangor University, Wales
- + Istituto Italiano di Tecnologia, Genova

- haptics to enhance medical training simulations
- tactile and force feedback
  in combination with augmented reality
- simulation of palpation for a femoral pulse
  in an interventional reality context

Claudia Zapata Del Rio

- Auxiliar Professor
- Pontificia Universidad Católica del Perú
- Computer Engineering School

- improve the quality of the speech synthesis in Spanish using adaptive automatas
- videogames in education
- speech synthesis in Spanish for the mobiles devices

José Rouillard

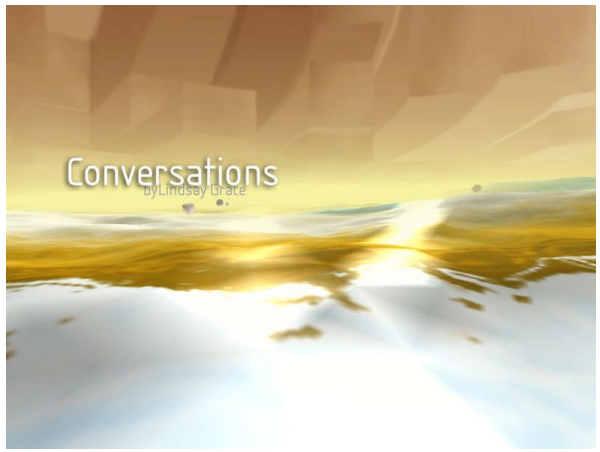
- Associate Professor in Computer Science
- University of Lille, France

- HCI plasticity, multi-modality, multi-channel interfaces
- mobility and pervasive/ubiquitous computing
- adaptation of human-machine interfaces
- multichannel and multimodal interaction

Lindsay Grace

- Armstrong Professor of Fine Arts
- Armstrong Institute for Interactive Media Studies
- + School of Fine Arts
- Miami University

- software designs effect user's problem solving models
- critical gameplay
- game design
- alternative interaction design
- new media art



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Claudia Zapata
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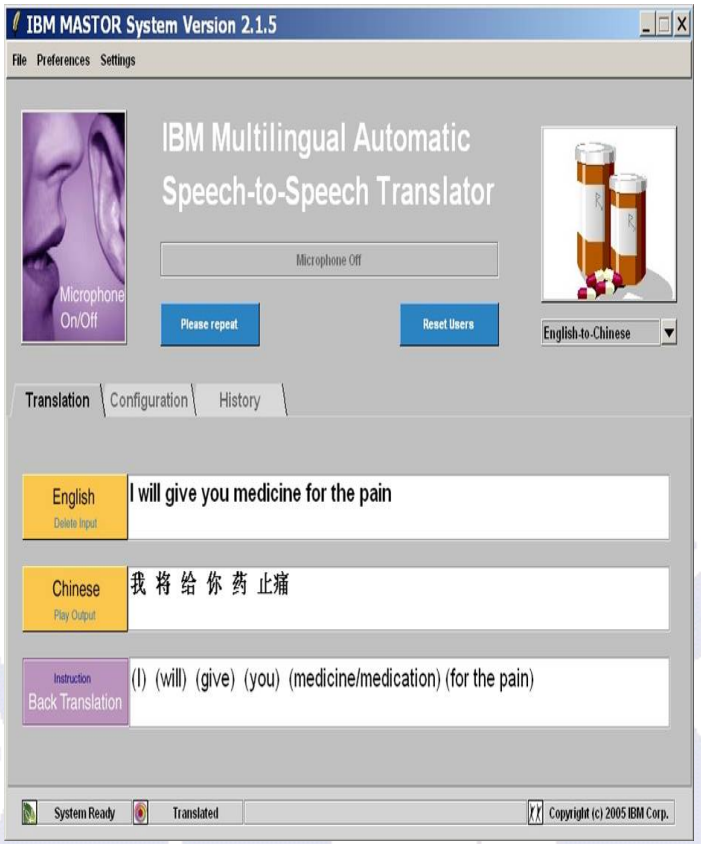
- Speech to speech translation
- Games



- PC recognizes our feelings
- Help blind people

MIT Testing Portable Machine to Help the Blind to See

JANUARY 16, 2009

- Mobile devices

nexus one™

Web meets phone.

Your voicemail, transcribed

Why Medical Training Simulation?

- Pressure to reform conventional medical practices
  - Experience through error
  - Errors can cause discomfort, prolonged recovery and even death
- Safe practice
  - Visual
  - Haptic
- Virtual Training Simulation offers
  - Patient Variability (Habitus and Anatomy)
  - Assessment
  - Affordability through reusability

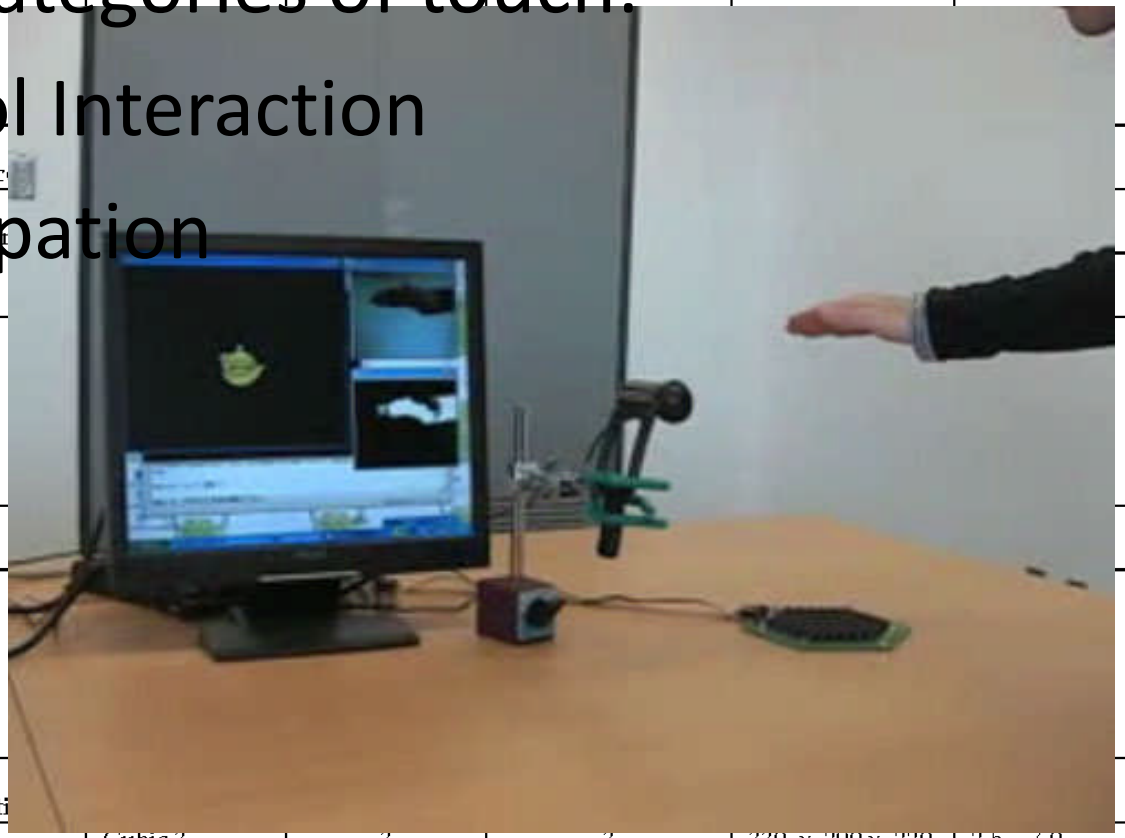
Visualisation

- Three categories in training simulations
  - Mannequin Based
  - Mannequin Visualisation with Virtual Force
  - **Virtual**

Touch – Force Feedback

Company	Devices	Degrees of Freedom	Degrees of Force Feedback	Workspace	Max Force / Torque	Stiffness	Price
SensAble Technologies www.sensable.com	Omni	6	3	160 x 120 x 70	3.3 / 0	1.02 1.7 3.5 3.5 1	2 11 18 24 – 51 53 – 70
Force Dimensions www.forcedimension.c						14.5 15	14 – 24 22 – 40
Novint http://home.novint.com						NA	0.2
Immersion Corp www.immersion.com						NA NA	45
Haption www.haption.com						2.5 2 2.5 NA NA	30 25 85 120 80 *
Mimic www.mimic.ws						5.5	10
Quanser www.quanser.com						2 10 3 3 10	35 60 – 70 20 25 50
Moog FCS Robotics www.fcs-cs.com/roboti						10	43
MPB Technologies www.mpb-technologies.ca	Cubic 3 Freedom 6S F7S	3 6 7	3 6 7	330 x 290 x 220 170 x 220 x 330 170 x 220 x 330	2.5 / 0 2.5 / 150 2.5 / 150	NA 2 2	NA 25 29

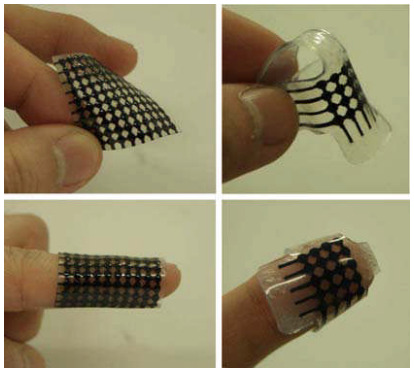
- Two categories of touch:
  - Tool Interaction
  - Palpation



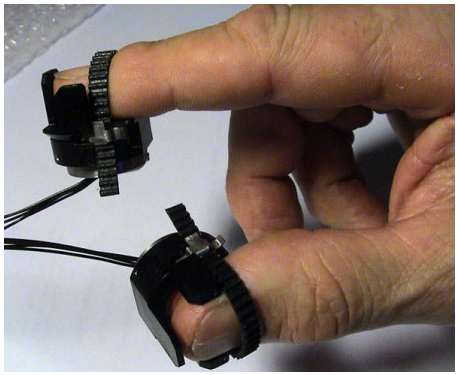
University of Tokyo

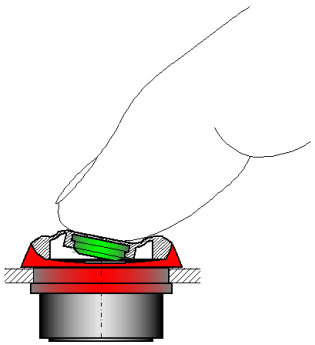
Touch – Tactile Feedback

- Force feedback insufficient
- Direct palpation requires stimulation of the fingertips
- Problem – Must be compact for use with force feedback



Sungkyunkwan University, Suwon





CompuTouch AS (Asker, Norway)

Next five years

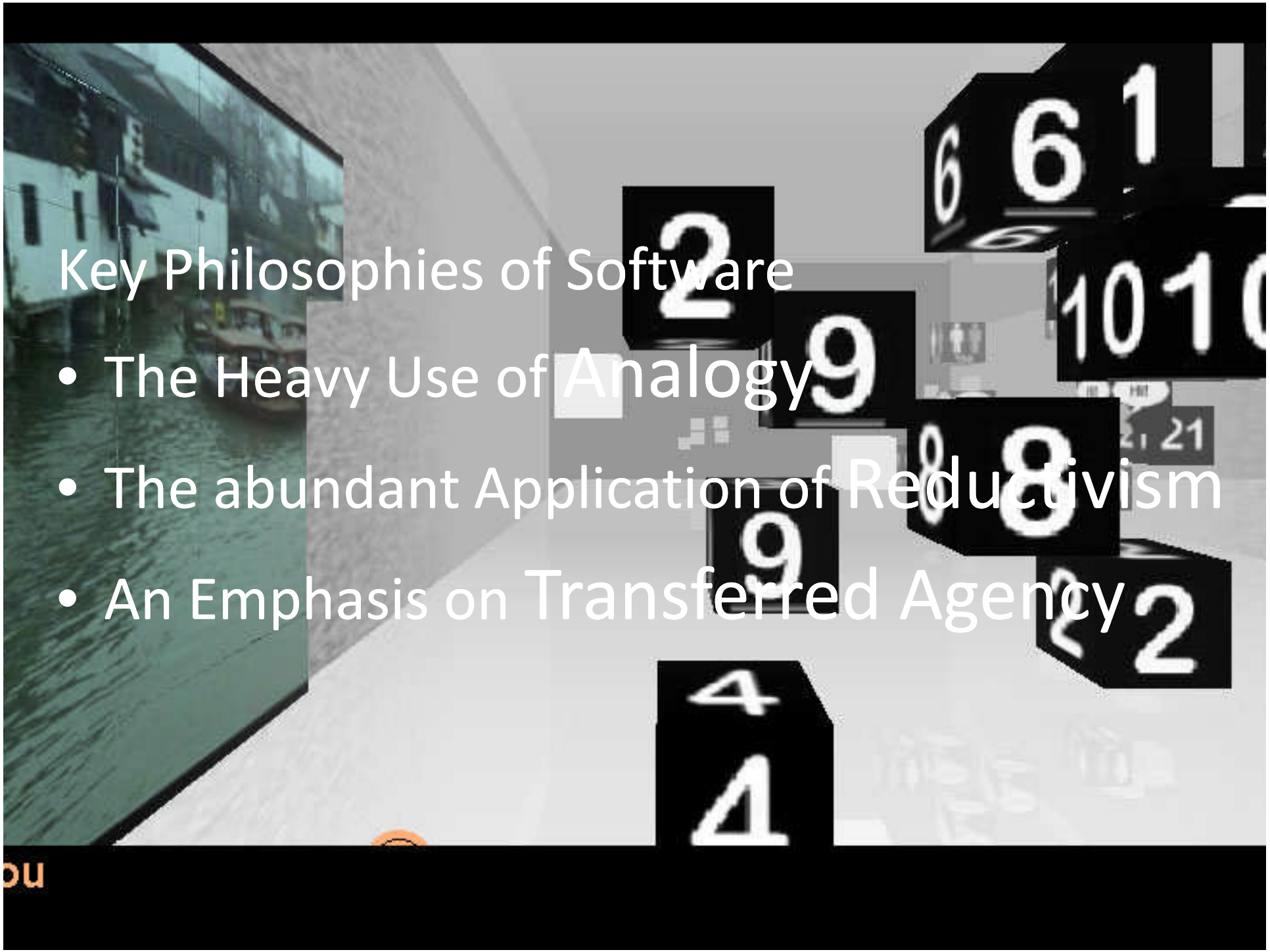
- Low cost is the key – but don’t sacrifice fidelity
- Combination two commercial devices for increased degrees of force feedback
- Simple modification of commercial end effectors
- New compact tactile devices.
- Augmented reality visualisation

Critiquing Software Interactions

Exposing the invisible effects of software

on the problem solving processes

- Software Studies: 2009
  - Lev Manovic at UCSD
- Software Philosophy: 2009
  - An analysis of the underlying themes and philosophies integrated into software
  - Diagnosing how the design of existing systems effects the design of new systems
  - Expose the qualities of software interactions, software interoperability, and programming conventions that may effect the problem solving process


Key Philosophies of Software
• The Heavy Use of Analogy
• The abundant Application of Reductivism
• An Emphasis on Transferred Agency

- Critical Gameplay:
  - Software Philosophy for **Game Design** and production
  - Begins with application of **Critical Design**
    - Diagnose key questions in how games are played
    - Create games that illustrate alternate ways to play
    - Exhibited in Europe (Greece), South America (Brazil) and North American (various) in 2009-2010


Critical Gameplay:
game mechanics
effect the way we
problem solve,
socialize, or even view the world?

Critical Gameplay

- When we shoot do we learn to destroy obstacles instead of working around them?


Does the binary
enemies and adversaries
teach us to ignore the
gray in the everyday?

Critical Gameplay

Are we forgetting how to play with each other, because playing against each other is more common?

Iterative Design and Development

- Investigating these practices yields a fundamental evaluation of the design process
  - IDEO Design Thinking
  - Iterative design
  - Collective, multidisciplinary practitioners
    - Global Game Jam

- Can we invert gameplay mechanics to better Harness Human Computation in games
- Can iterative processes like Design thinking and prototype thinking yield better HCI?

Tomorrow's user interfaces: smart environment versus smart people

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PANEL ACHI
ACHI 2010 - St Maarten

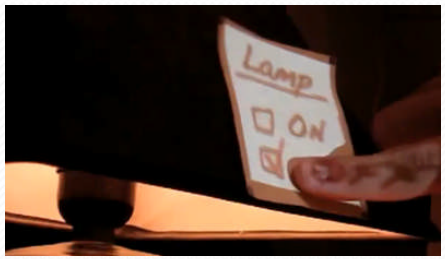
Overview

1) Introduction
2) About NUI
3) About context
4) About semantic
5) About seamlessness
6) About singularity

1. Introduction

What about Future User Interfaces ?

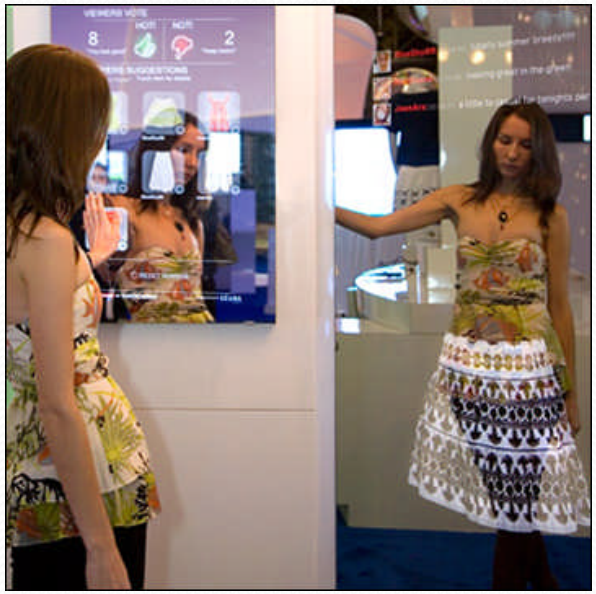
The past	CLI : Command Line Interface
Now	GUI : Graphical User Interface
Near future	NUI : Natural User Interface
Future	OUI : Organic User Interface



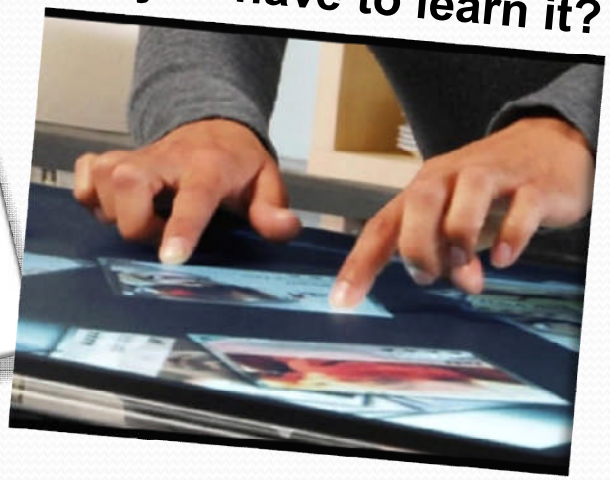
Source : Human Media Lab

2. About NUI

What is really natural in Natural User Interfaces?



Is it always intuitive and natural ?
Do you have to learn it?



If you have to write a long letter, what is the more "natural" for you:
Pen and paper or keyboard and mouse?

3. About context

"Context is key" [Coutaz, Crowley, Dobson, Garlan 2005], Communications of the ACM, Vol. 48, Issue 3, 2005, Special issue: The disappearing computer, pp: 49 - 53

natural adaptation dynamicity

Design time intuitive heterogeneity fusion **Runtime**

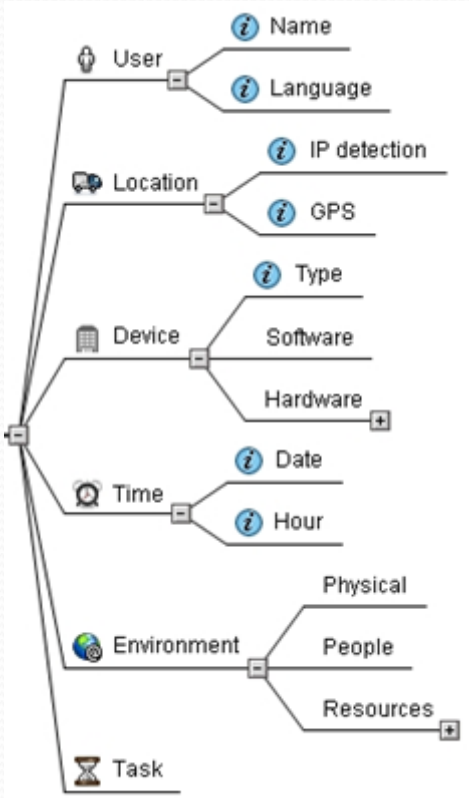
network mobility multiplicity fission

How to discover a context?
And how to use it?

How to model efficiently the context :
global context, local context, relevant context ?

- What is relevant in the context?
- What granularity of the context ?
- Depending on the task, user, moment ...

How to detect and manage « unexpected » situation?

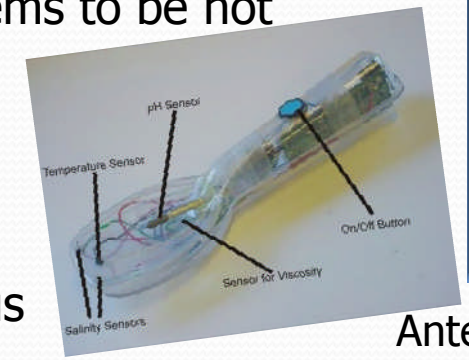


4. About semantic

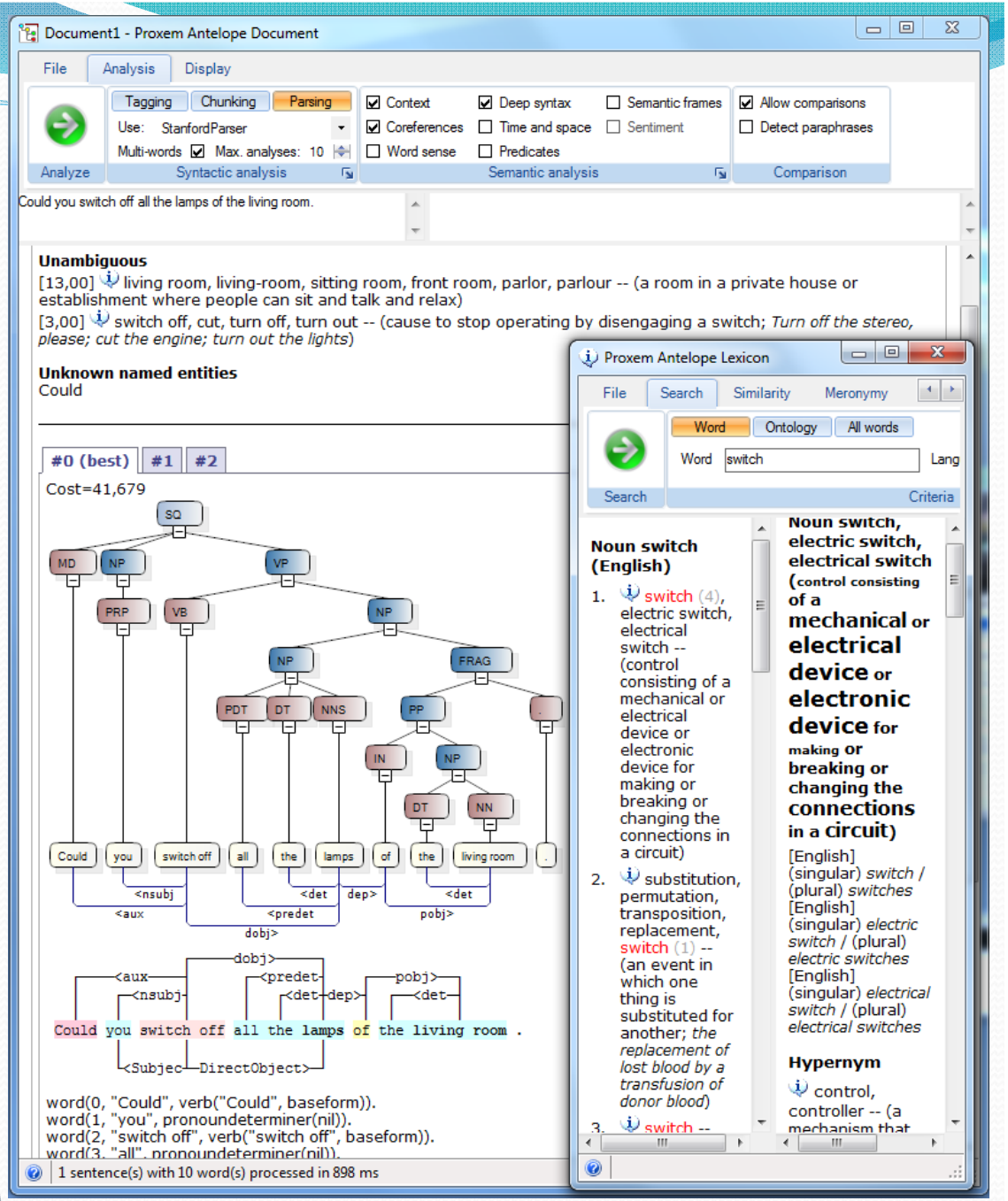
Semantic is key for context managing

Expertise: fuel warning is here

Cultural: it seems to be hot



Factual:
it's 42° celcius



Antelope Natural Language Processing framework from Proxem

5. About seamlessness

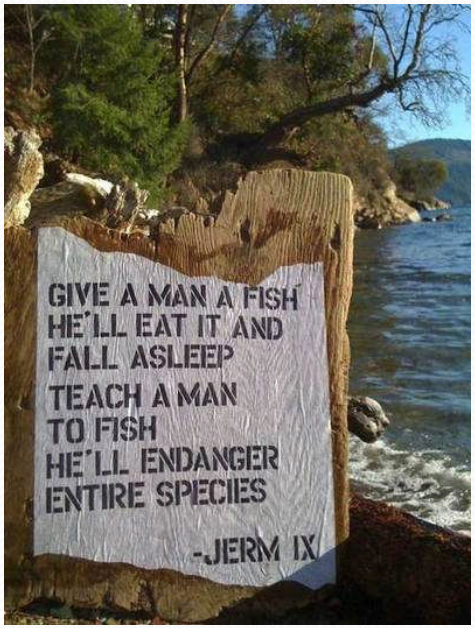
What do we want: Smart people or smart environment?

"*Contrary to many visions of future home environments in the literature, we advocate an approach that uses* ***technology to teach*** *as opposed to using* ***technology primarily for automated control.***" [Stephen S. Intille, The Goal: Smart People, Not Smart Homes, *International Conference on Smart Homes and Health Telematics*, IOS Press, 2006]

What is best: to give relevant information to the user or to act for him/her?

Sometimes, it can be useful to show the seams to the end-user.

Give a man a fish, he'll eat for day. Teach a man to fish, he'll eat for a lifetime. Lao Tzu.



5. About singularity

"A robot that can plug itself in would be totally unstoppable "

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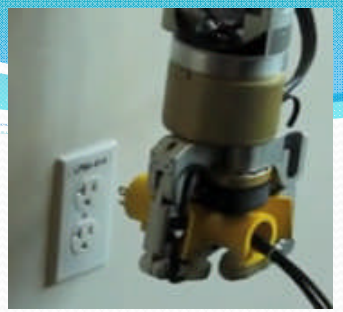
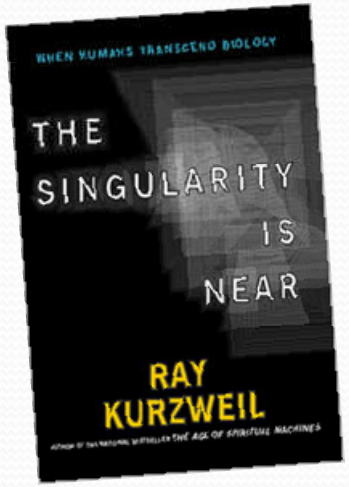
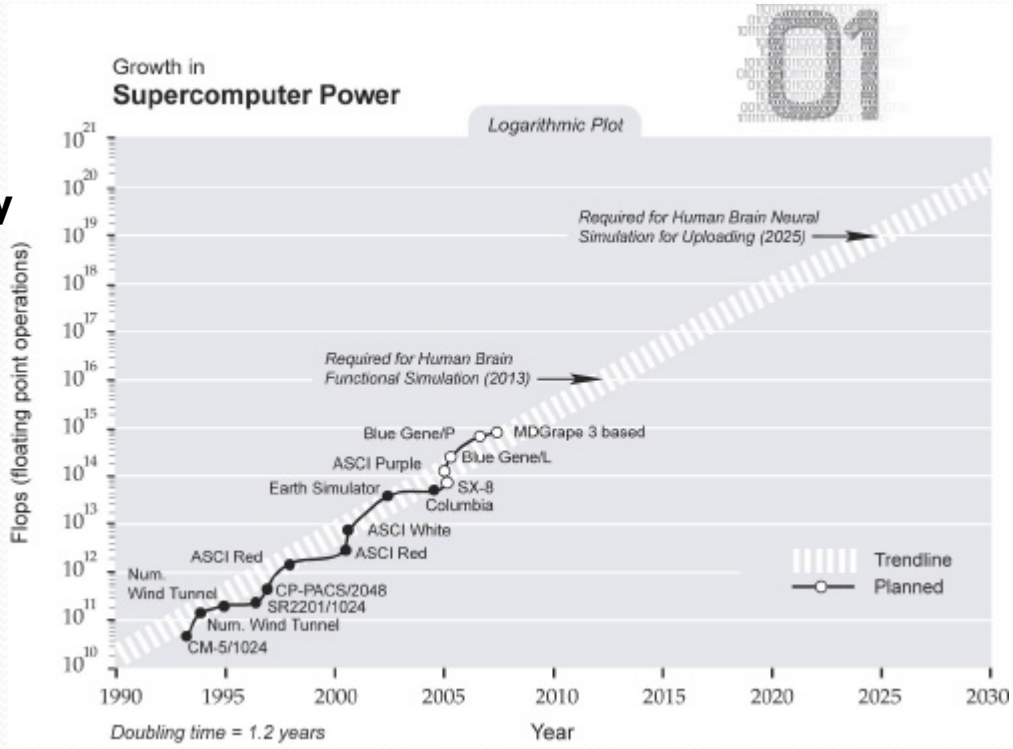


Intel's research robot, named Marvin, has just learned how to plug "himself" into a standard wall outlet.



I set the date for the **Singularity** — representing a profound and disruptive transformation in human capability — as 2045.
The nonbiological intelligence created in that year will be one billion times more powerful than all human intelligence today.
Raymond Kurzweil, 2005.



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Thank you for your attention

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NUI

Singularity **Context**

Seamlessness **Semantic**

Thanks to Jean-Claude Tarby for resources

1. Introduction

Future UI ?

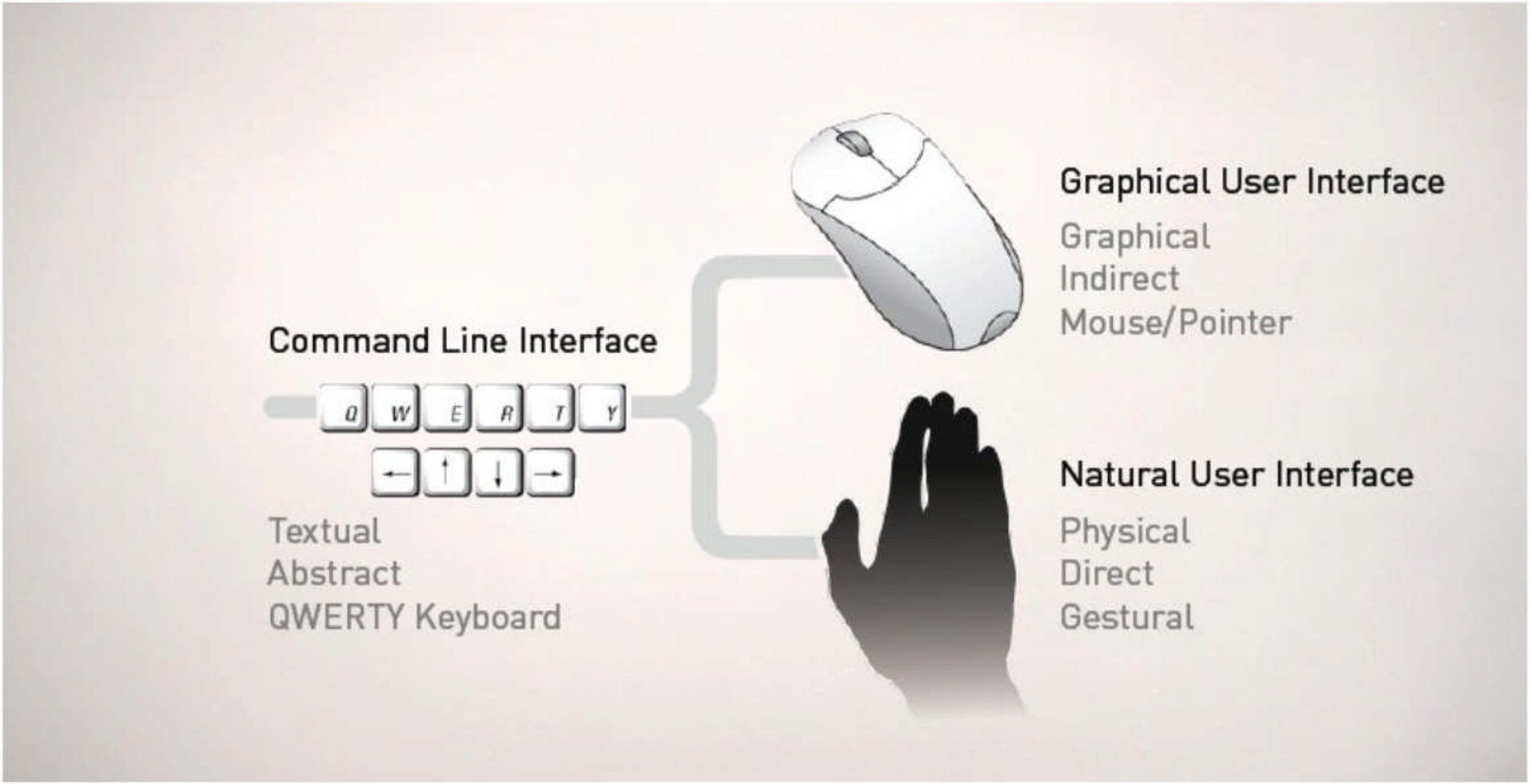
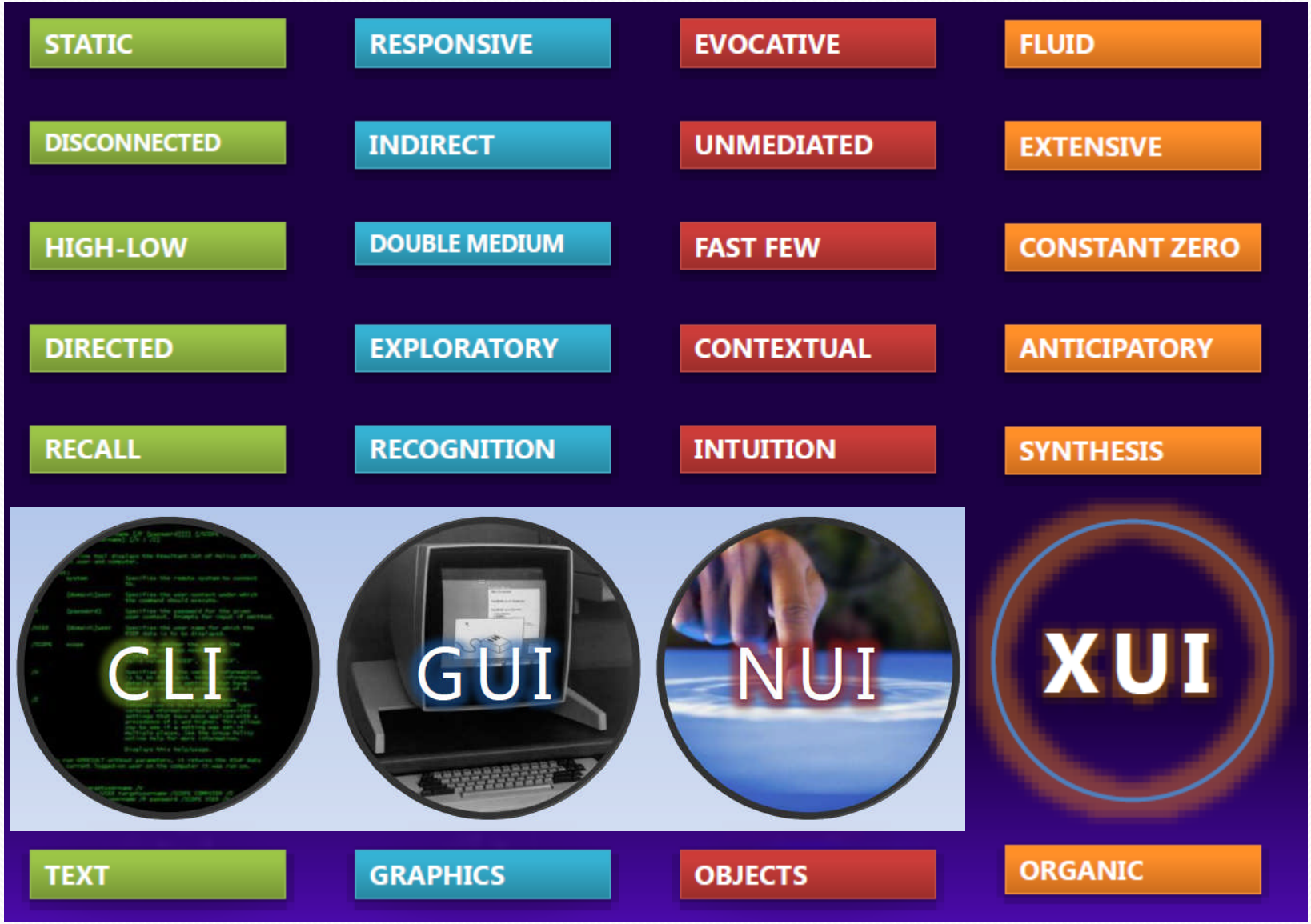


Diagram : Stimulant.io

1. Introduction

New trends



Source : August de los Reyes

Bernd Radig

- dialogue between humans and autonomous robots
- natural => multimodal: speech, vision, haptics, etc.

more important: natural =>

- autonomous systems has to know about
    - context, situation, history
    - understand the current task
    - how to acquire knowledge about objects, activities, ...
- has to understand human feedback
    - e.g. confirmative answers, gestures, smiling etc.
    - has to synthesize gestures, emotional expressions, ...

Bernd Radig

- dialogue between human and autonomous system
  - designed for 24/7 experiments
  - evaluated with "normal" persons
  - includes teaching and operation phases
  - has to learn from different sources
    - observation of human activities, task solving
    - acquisition of information e.g. from the internet

      e.g. recipe how to cook spaghetti, tools, functions...

Bernd Radig


Cognition for Technical Systems
Multi Joint Action - MuJoA
Emotion mirror
Emotion display EDDIE mirrors facial expressions