



ENACTIVE

Enactive Interfaces

The Enactive Network of Excellence Enactive Interfaces

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<http://www.enactivenetwork.org>

Helsinki, November 2006



ENACTIVE NoE



▶ ENACTIVE NETWORK

- A Research Community on Enactive Knowledge;
- Aim of investigating its foundations and the potentialities of Multi Modal Interfaces in this field;
- Exploiting guidelines and application for the development of future interfaces able to connect the Digital Realm and Physical Environments.





Three Kinds of Knowledge



▸ Symbolic knowledge

long abstract sequences of reasoning-text, logic or mathematics;

- A printed or written form of knowledge that makes use of text and vocabulary-signs to represent operations, processes, elements or relations, ...
- Typical forms are: procedural, declarative, episodic
- Typical use: languages

```

File Modifica Cerca Visualizza Opzioni Guida
C:\Programmi\Atmel\WinAUR\sample\Makefile
----- Compiler Options -----
# -g*:      generate debugging information
# -O*:      optimization level
# -f...:    tuning, see GCC manual and avr-libc documentation
# -Wall...: warning level
# -Wa,...:  tell GCC to pass this to the assembler.
# -adhlns...: create assembler listing
CFLAGS = -g$(DEBUG)
CFLAGS += $(CDEFS) $(CINCS)
CFLAGS += -O$(OPT)
CFLAGS += -funsigned-char -funsigned-bitfields -fpack-struct -fshort-enums
CFLAGS += -Wall -Wstrict-prototypes
CFLAGS += -Wa,-adhlns=$(<<:.c=.lst)
CFLAGS += $(patsubst %, -I%, $(EXTRAINC_DIRS))
CFLAGS += $(CSTANDARD)

----- Assembler Options -----
# -Wa,...:  tell GCC to pass this to the assembler.
# -ahlms:  create listing
F1=Guida | Riga:111 Colonna:1

```



▶ Iconic knowledge

- Iconic knowledge is based on images





▶ Enactive Knowledge

- The word 'Enactive' has been attributed to the psychologist Jerome Bruner
- ... The third type of knowledge is enactive. It is inherently tied to actions, and it is the craftperson's way of knowing. It is the most intuitive and so the easiest to learn.

According to Varela's model of "enactive cognition" (Varela et al. 1991), enactive knowledge is primarily "knowledge for action", and conversely, action is always necessary to acquire knowledge



Malcolm McCullough, "Abstracting Craft", MIT Press
Helsinki, **November 2006**



▶ Enactive knowledge



- ENACTIVE knowledge is not positional (knowing that) but rather **embodied (knowing how)**.
- Enactive knowledge is not simply a multi sensory mediated knowledge, since the user is an active part of the learning process
- The knowledge is not only physical but also experiential

- A craftperson needs to touch his/her work.
- This touch can be indirect but it must be physical and continual, and it must provide control of the whole process.





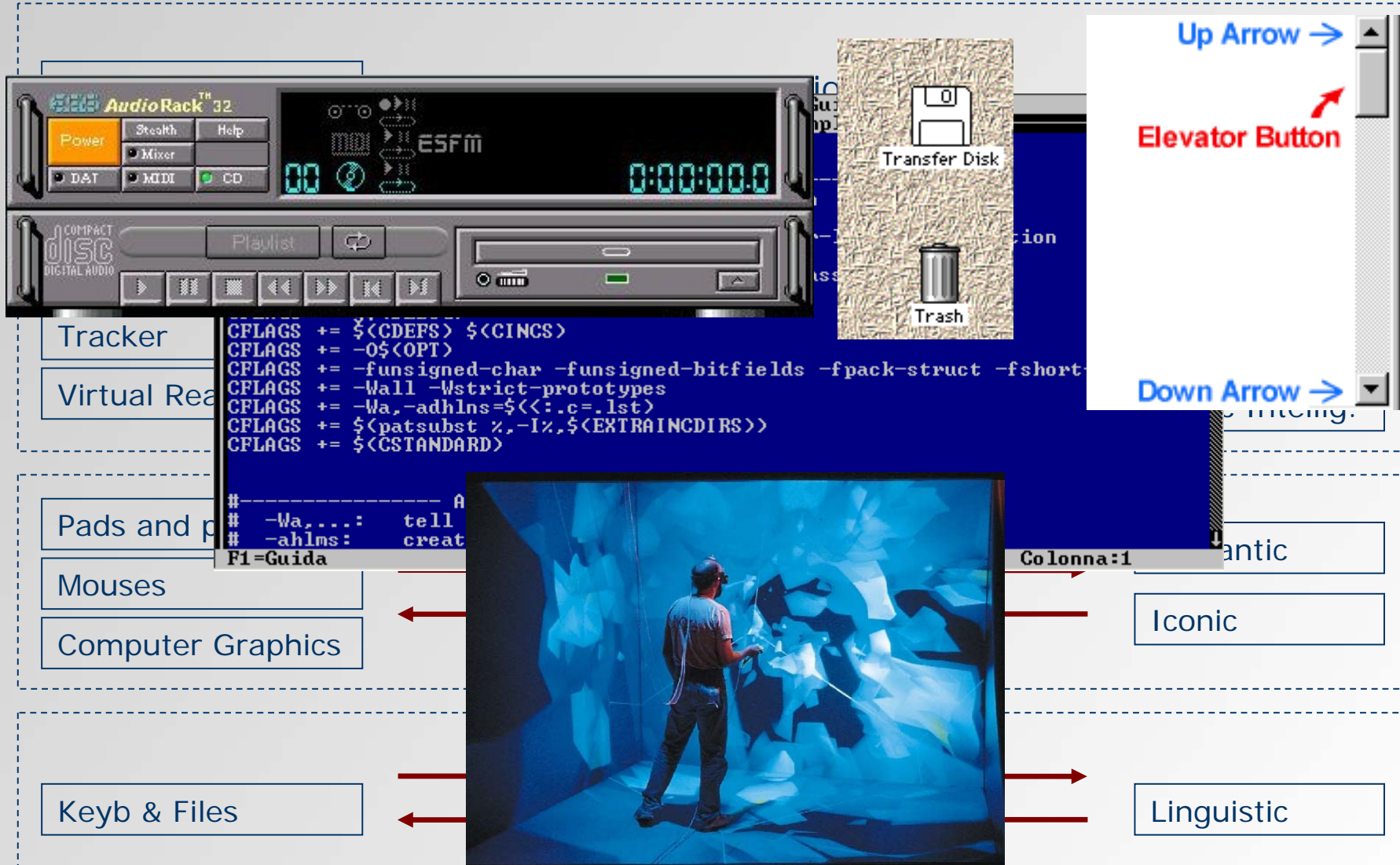
▶ ENACTIVE Knowledge

- Enactive knowledge is constructed on motor skills, such as manipulating objects, riding a bicycle, etc.
- Enactive representations are acquired by doing
Elena Pasquinelli, 2004
- Enactive knowledge is not far from our everyday life.
 - SPORT
 - MUSIC
 - ART
 - WORK
 - DANCING
 - CRAFTING
 - PLAYING

 - ... and much more



▶ Enactive interfaces: addressing the Paradigm Shift





▶ Enactive Systems

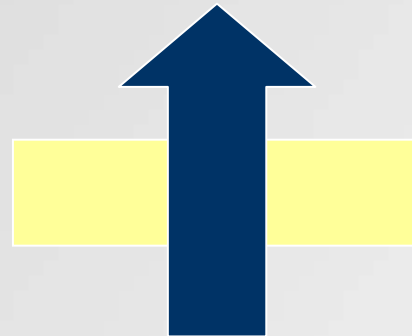
Haptic Interfaces

Audio Interfaces

Visual Interfaces

ENACTIVE Interfaces

Manual/body language
and physical
interaction

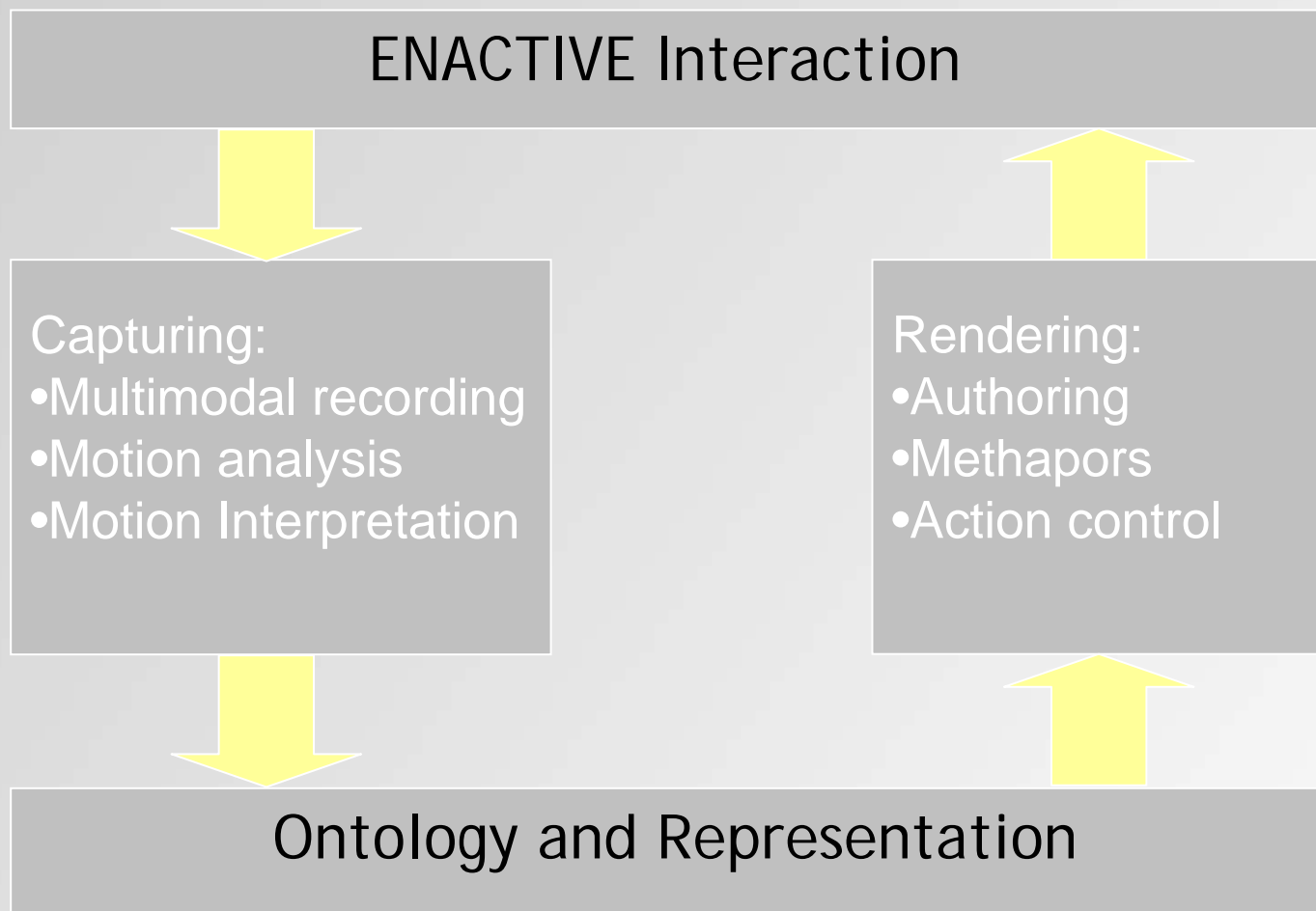


Learning and
Training

Virtual Environment



▶ Logical Components



>>> PARTNERS OVERVIEW

- 25 Partners
 - Experimental Psychology
 - Cognitive Sciences
 - Technology (Robotics, Computer Science, Virtual Environments)
 - Interaction Design

PERCRO Laboratory Computer Sciences and Artistic Creation Laboratory Biomedical Physics Group Centro de Estudios e Investigaciones Tecnicas de Guipuzcoa Centre for Research in Sport Sciences Department of Design Sciences COSTECH Department of Psychology Institute of Robotics and Mechatronics, DLR Expertise center for Digital Media Sound Processing and Control Laboratory Human Factors Research Laboratory Foundation LBEIN Max Planck Gesellschaft Zur Foerderung der Wissenschaften E.V. MIRALab VRlab Department of Information Engineering SONY Computer Science Laboratory Department of Communications, Computer and Systems Science Institut Jean Nicod Association pour la Création et la Recherche sur les Outils d'Expression Université Pierre Mendès Laboratoire de Psychologie Expérimentale

>>> INTEGRATION ACTIVITIES AND RESEARCH DIRECTIONS OVERVIEW



■ Research Activities

- RD1.1 Technologies for Haptic Interfaces
- RD1.2 Technologies for haptic-auditory-vision-interfaces
- RD1.3 Multisensory Information Transfer
- RD1.4 Hardware and software Trends and standards
- RD2.1 Psychophysics of Multisensory-Motor Interactions
- RD2.2 Kinaesthetic Model of the User
- RD2.3 Enforcing Believability of Computational Models
- RD3.1 Special users and Uses
- RD3.2 Enactive Human Computer Interfaces for Teaching and Learning Manual Tasks
- RD3.3 Creativity, Art and Enaction

1st ENACTIVE Workshop

Web: <http://www.enactivenetwork.org/EnactiveWorkshop/>

Participants: 72 people

Presented papers: 24



The 1° Enactive workshop was organized by the network.
The event took place on March 21° and 22° 2005 in Pisa at Scuola Superiore Sant'Anna

The workshop dealt with the presentation of the research on enactive interfaces and Enactive knowledge carried out during the first year of the network. The program included: cognitive aspects of human perception, basic technologies of haptic interfaces, integration of visual-audio and haptic sensory information, applications of Enactive Interfaces.

Two plenary speakers by Stephen Brewster (Multimodal Interaction Group, University of Glasgow) and Dale Lawrence (University of Colorado).

2nd International ENACTIVE Conference

Web: <http://www.enactive2005.org>

Participants: 140

Presented Papers: 55



ENACTIVE 2nd annual conference was organized by PERCRO and DIST. The conference took place in Genova Italy, on November 17th and 18th 2005. ENACTIVE 2005 addressed a wide scientific community, gathering together leading scientists from the domains of technology, psychology, human factors, cognitive sciences, HCI, interaction design and engineering, and is aimed at creating a truly multidisciplinary research community on the new generation of human-computer.

The conference program included two plenary talks, 55 paper presentation, posters sessions and hands-on demos.

World Haptics Conference (WHC)

Web: <http://www.worldhaptics.com/>

Participants: 378 people, 15 expositors and 35 hands-on demos

Presented papers: 67 papers and 143 posters



Eurohaptics Conference and Symposium On Haptic Interfaces For Virtual Environment And Teleoperator Systems has been jointly for the first time. WHC took place in Pisa at CNR on March 18th -20th 2005. The event was organized by PERCRO and supported by the ENACTIVE Network. The conference addressed all the aspects related to haptic interaction - from the basic scientific underpinnings, to the technological developments, to the different realizations and applications.



2 DAYS AGO

ENACTIVE / 06

3rd International Conference on Enactive Interfaces

Enaction & Complexity

Montpellier – France, November 20-21, 2006



Strategies at 3rd Year of NoE

Focusing on representative research scenarios that may find relevant Mass and Interest to continue research after the termination of financial contribution

Creating Applications and relationships to foster results among industrial and social environment

Enhancing Web services, Clustering Technologies,
Platforms and Guidelines
into a Common Virtual Laboratory



ENACTIVE

Haptic & Tactile
for Manipulation

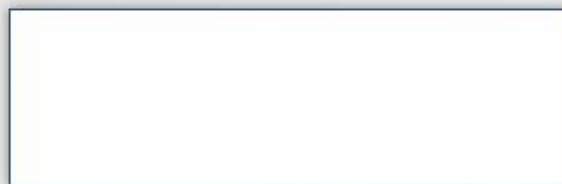
Whole Body Mot.
& reaching in VE

Navigation
Exploration
Recognition

Coordination
Cooperation
Collaboration

Creativity

ENACTIVE Emblematic Scenarios



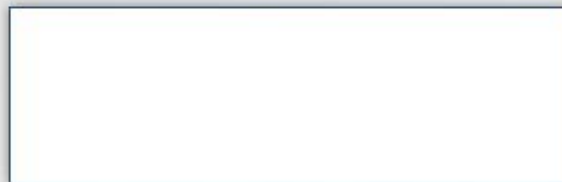


INDUSTRY &
TRAINING

SPECIAL
USERS

ARTS

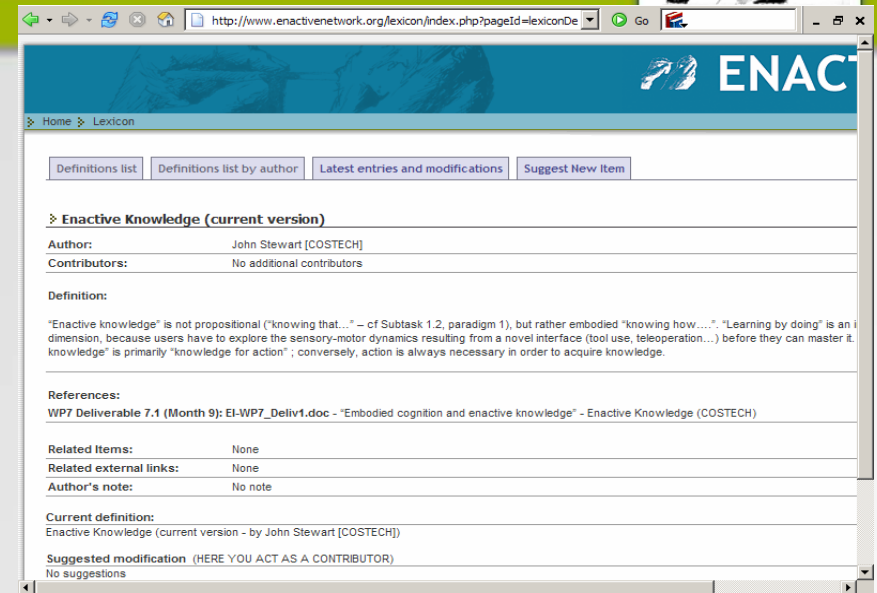
ENACTIVE Reference Applications





Other VL resources

- Documents
- Know-how
- Libraries and Tools
- HW-SW Databases
- WEB Services for networking
- Development Environments
- Interactive experiments
- Virtual Seminars
- Streamed workshops



Home > Lexicon

Definitions list | Definitions list by author | Latest entries and modifications | Suggest New Item

Enactive Knowledge (current version)

Author: John Stewart [COSTECH]
Contributors: No additional contributors

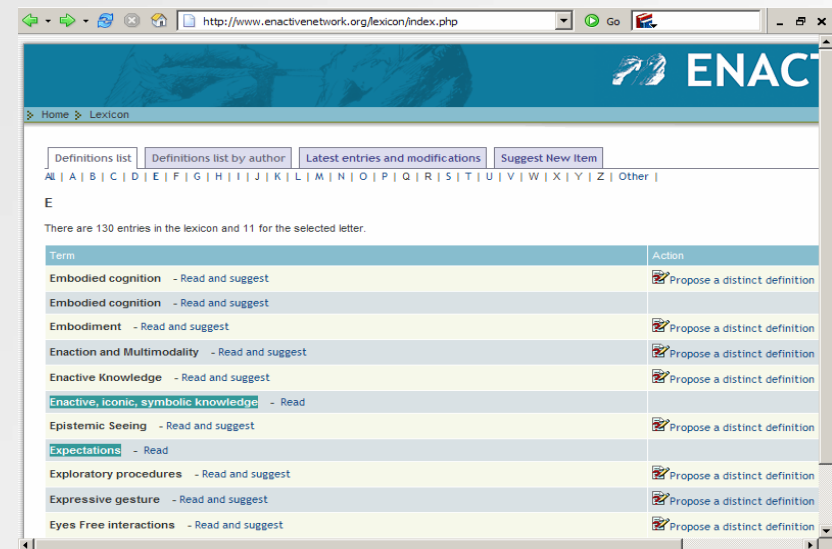
Definition:
"Enactive knowledge" is not propositional ("knowing that..." - cf Subtask 1.2, paradigm 1), but rather embodied "knowing how...". "Learning by doing" is an dimension, because users have to explore the sensory-motor dynamics resulting from a novel interface (tool use, teleoperation...) before they can master it. "knowledge" is primarily "knowledge for action"; conversely, action is always necessary in order to acquire knowledge.

References:
WP7 Deliverable 7.1 (Month 9): EI-WP7_Deliv1.doc - "Embodied cognition and enactive knowledge" - Enactive Knowledge (COSTECH)

Related Items: None
Related external links: None
Author's note: No note

Current definition:
Enactive Knowledge (current version - by John Stewart [COSTECH])

Suggested modification (HERE YOU ACT AS A CONTRIBUTOR)
No suggestions



Home > Lexicon

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A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | Other |

E

There are 130 entries in the lexicon and 11 for the selected letter.

Term	Action
Embodied cognition - Read and suggest	Propose a distinct definition
Embodied cognition - Read and suggest	Propose a distinct definition
Embodiment - Read and suggest	Propose a distinct definition
Enaction and Multimodality - Read and suggest	Propose a distinct definition
Enactive Knowledge - Read and suggest	Propose a distinct definition
Enactive, iconic, symbolic knowledge - Read	Propose a distinct definition
Epistemic Seeing - Read and suggest	Propose a distinct definition
Expectations - Read	
Exploratory procedures - Read and suggest	Propose a distinct definition
Expressive gesture - Read and suggest	Propose a distinct definition
Eyes Free interactions - Read and suggest	Propose a distinct definition



Thank you for your attention

www.enactivenetwork.org

Info and Demo at 5G