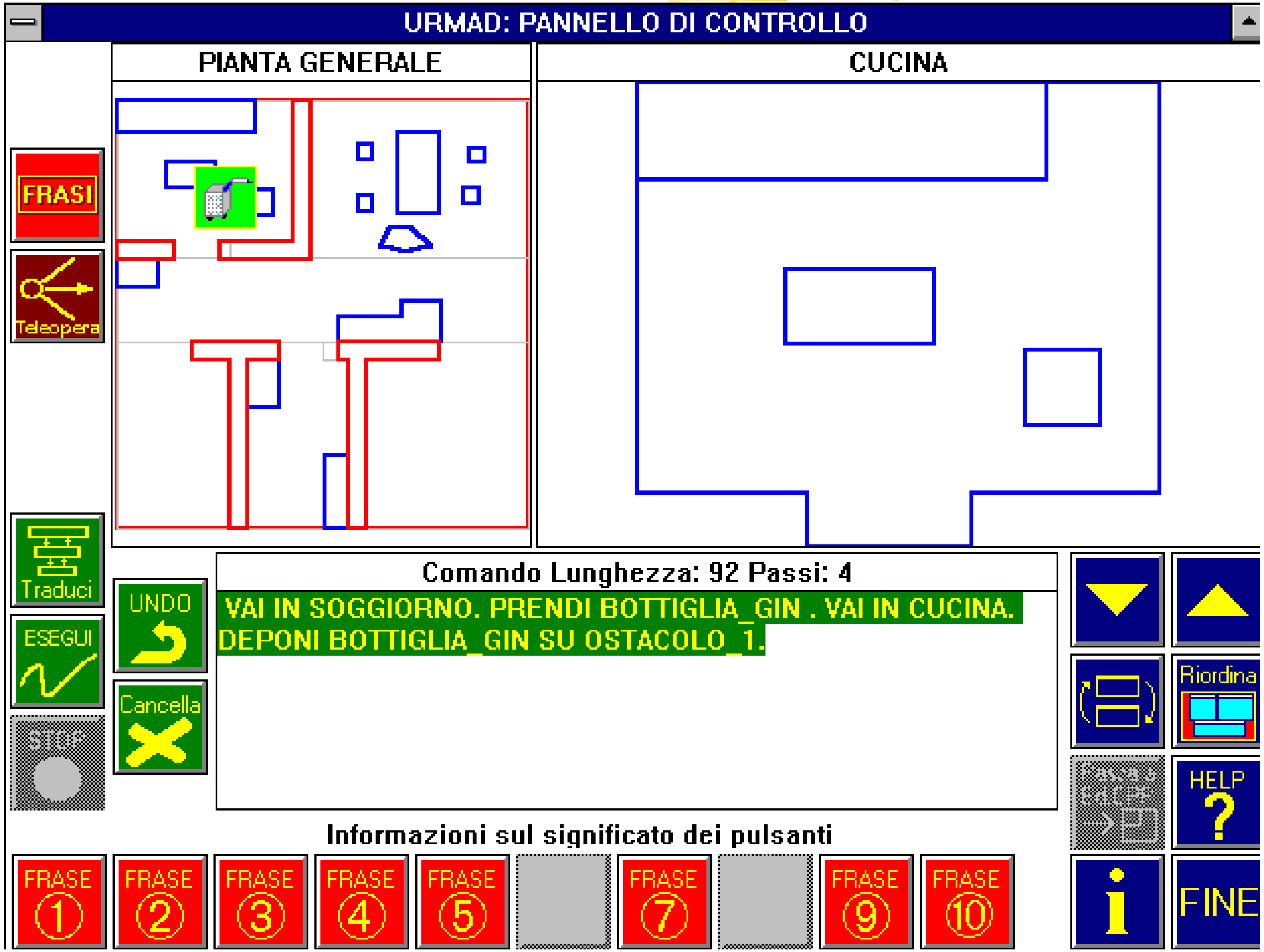
Sistemi robotici mobili: URMAD

CNR-URMAD

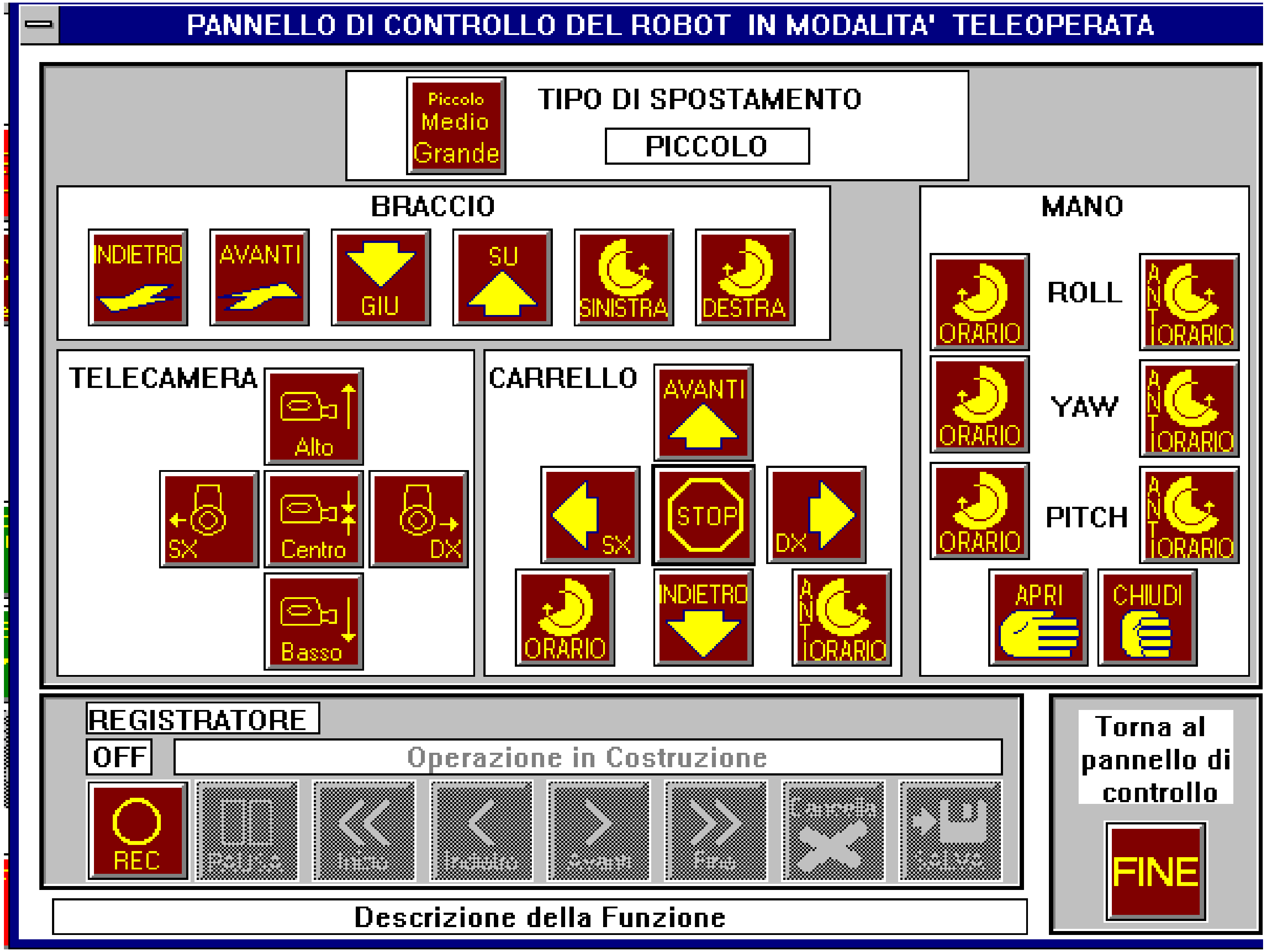
Sistema robotico mobile per l’assistenza personale

Scuola Superiore Sant’Anna, Pisa, 1992-1995

L'interfaccia utente di URMAD: modalità autonoma



L’interfaccia utente di URMAD: modalità tele-operata



Care-o-Bot
IPA, Stuttgart (Germany)

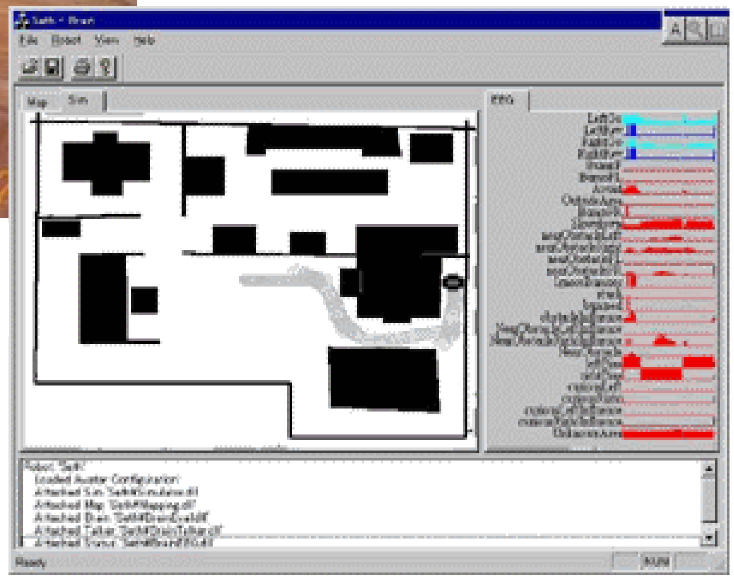
- Household tasks
- Fetch and carry-tasks
- Mobility support
- Communication and social integration
- Monitoring and safety
- Home Management

CareBot by Gecko Systems, (USA)

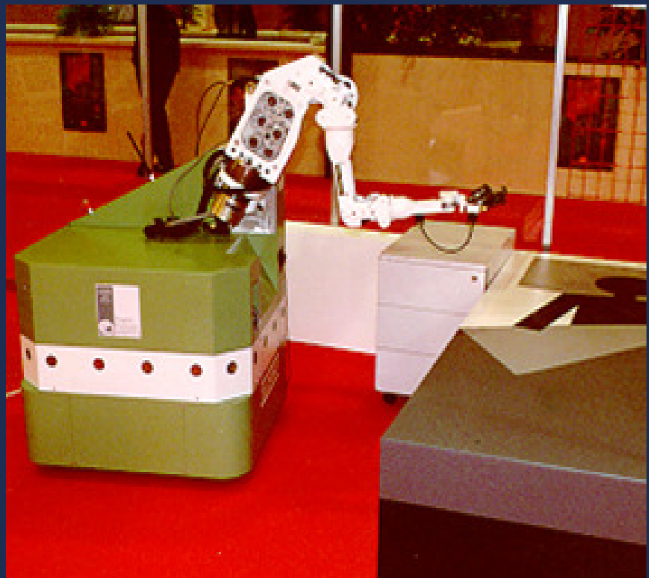
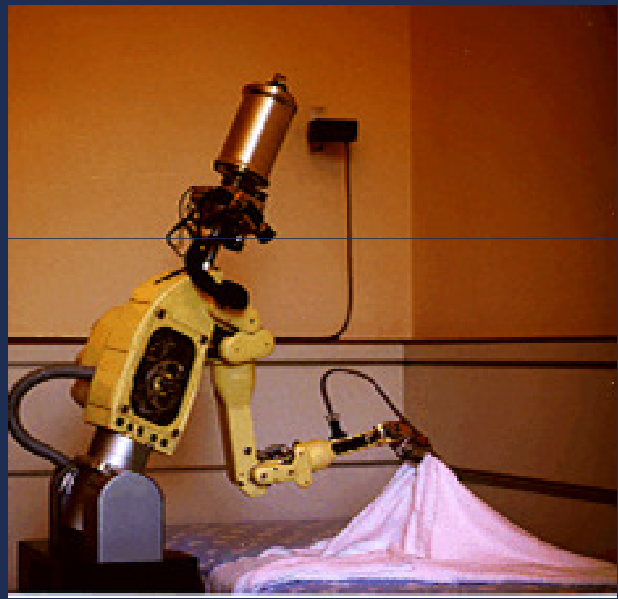
CareBot Serving Refreshments

CareBot Navigating Kitchen

The CareBot tm



Evoluzione del concetto di robot personale

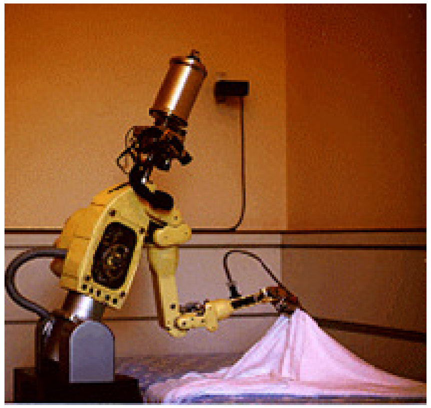
URMAD	**MOVAID**
	
- Massima Autonomia	- Semi-Autonomo
- Centralizzazione delle risorse	- Sistema Distribuito (Docking)
- Pesante e Ingombrante	- Più semplice e compatto

Il robot per l’assistenza ai disabili MOVAID

TIDE-MOVAID: Sistema robotico mobile per l'assistenza domestica

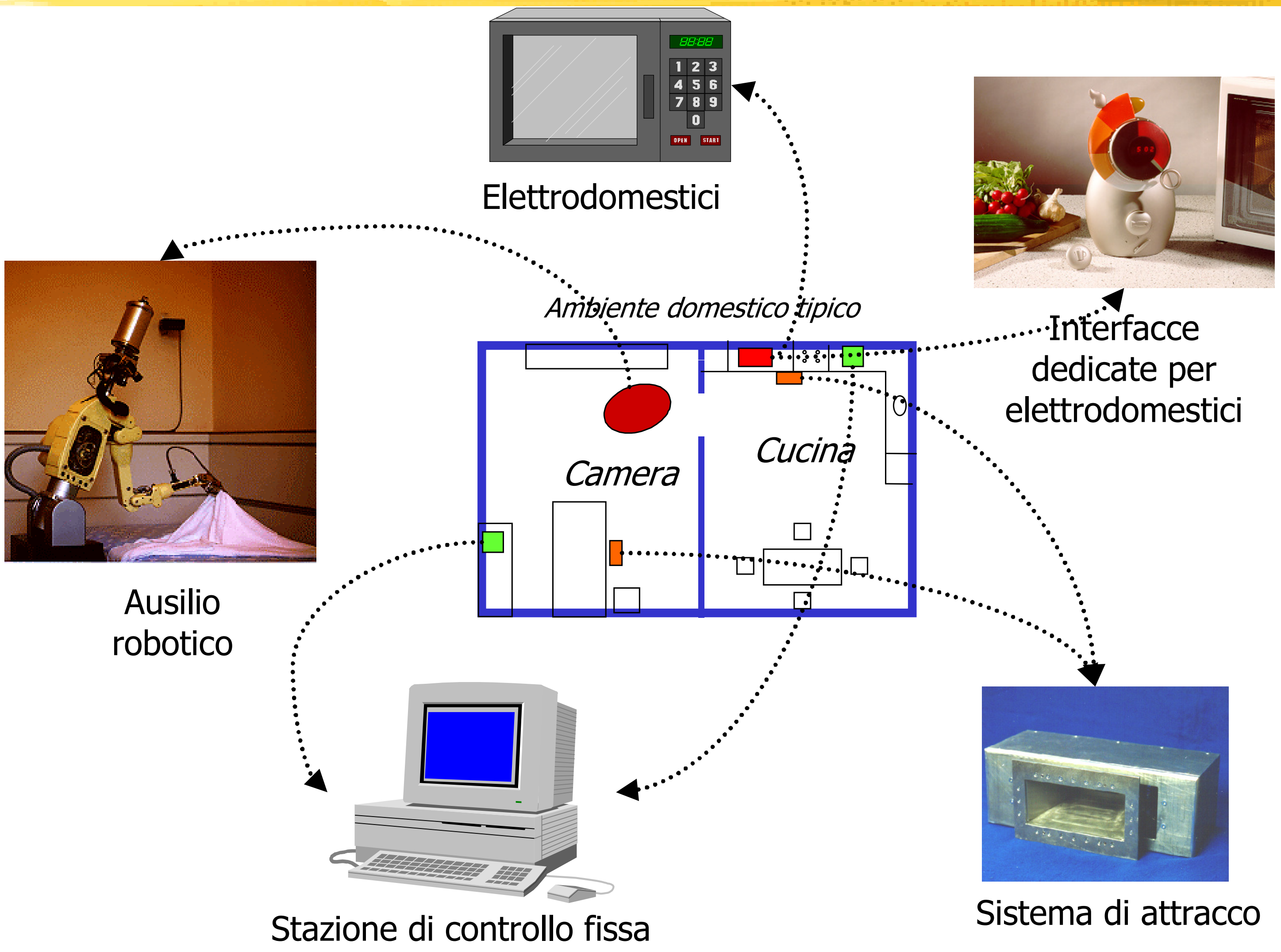
Scuola Superiore Sant'Anna, Pisa, 1994-1997

I compiti di MOVAID

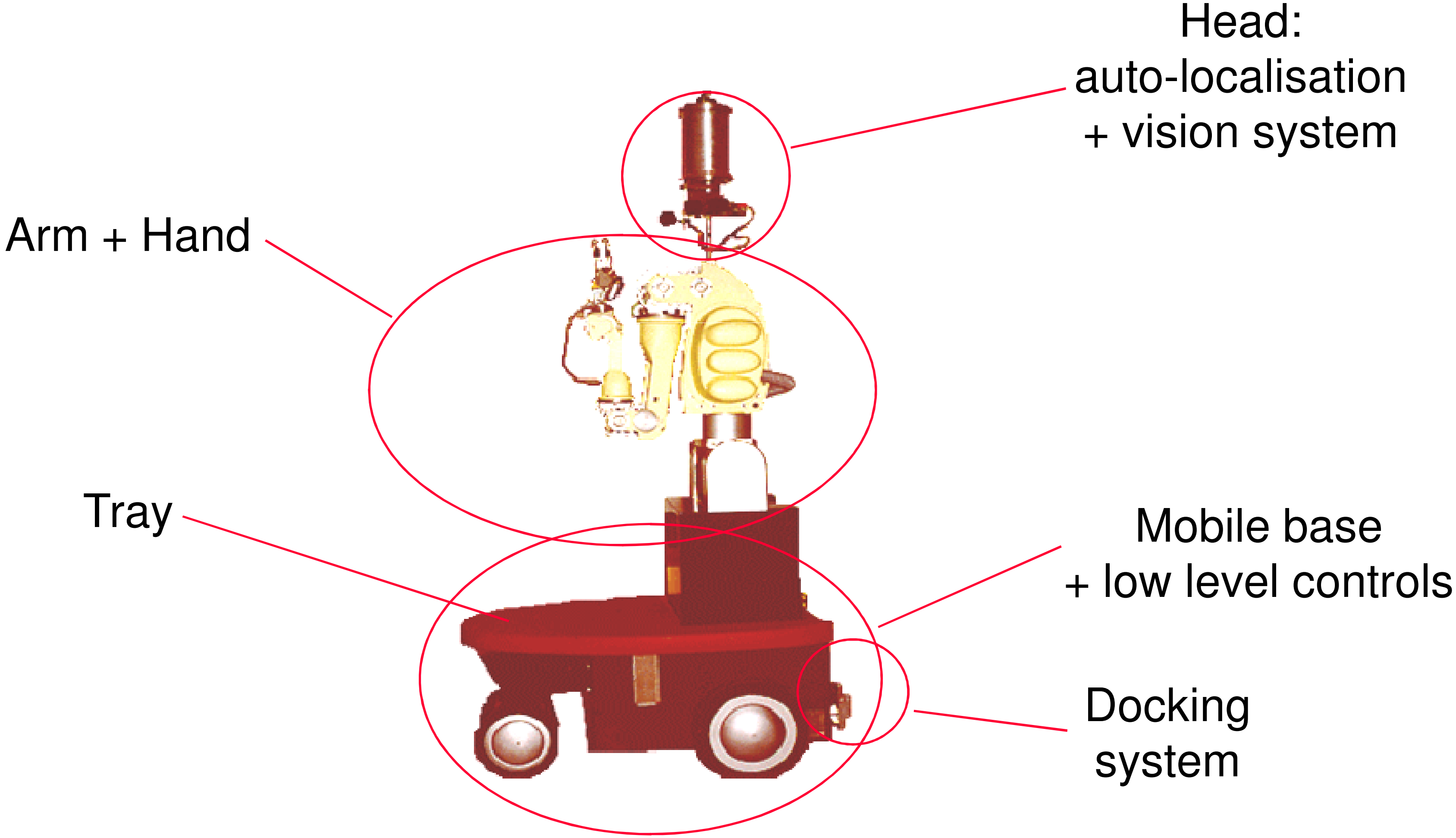


“Centro Auxilia”
Casa Famiglia
O.A.M.I.
v.Bonaini, Livorno
Con il supporto della
Cassa di Risparmi di
Livorno

Il sistema MOVAID: un'unità robotica mobile in grado di 'attraccarsi' a stazioni fisse



MOVAID mobile unit



Il sistema di ‘attracco’ (docking) di MOVAID

Un caso di studio: la progettazione del sistema robotico MOVAID

- Determinare la predisposizione degli utenti verso la robotica
- Personalizzare il livello di autonomia del sistema
- Identificare le funzionalità del sistema
- Disegnare l'aspetto del robot

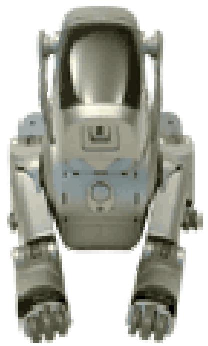
...coinvolgendo 140 utenti potenziali (disabili e loro familiari ed assistenti), in 3 paesi, attraverso questionari ed interviste

Ricerca iconografica

- TRISTEZZA: robot industriali, ‘Metropolis’, cyborg

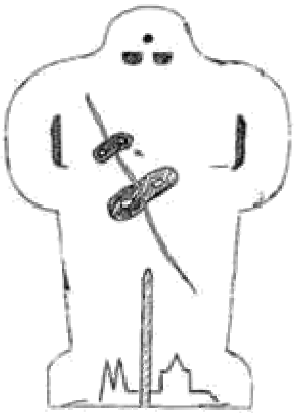


- SORRISO/AMMIRAZIONE: automi, uomo di latta, robot animali


- PAURA: ‘Mazinga’, ‘Alien’

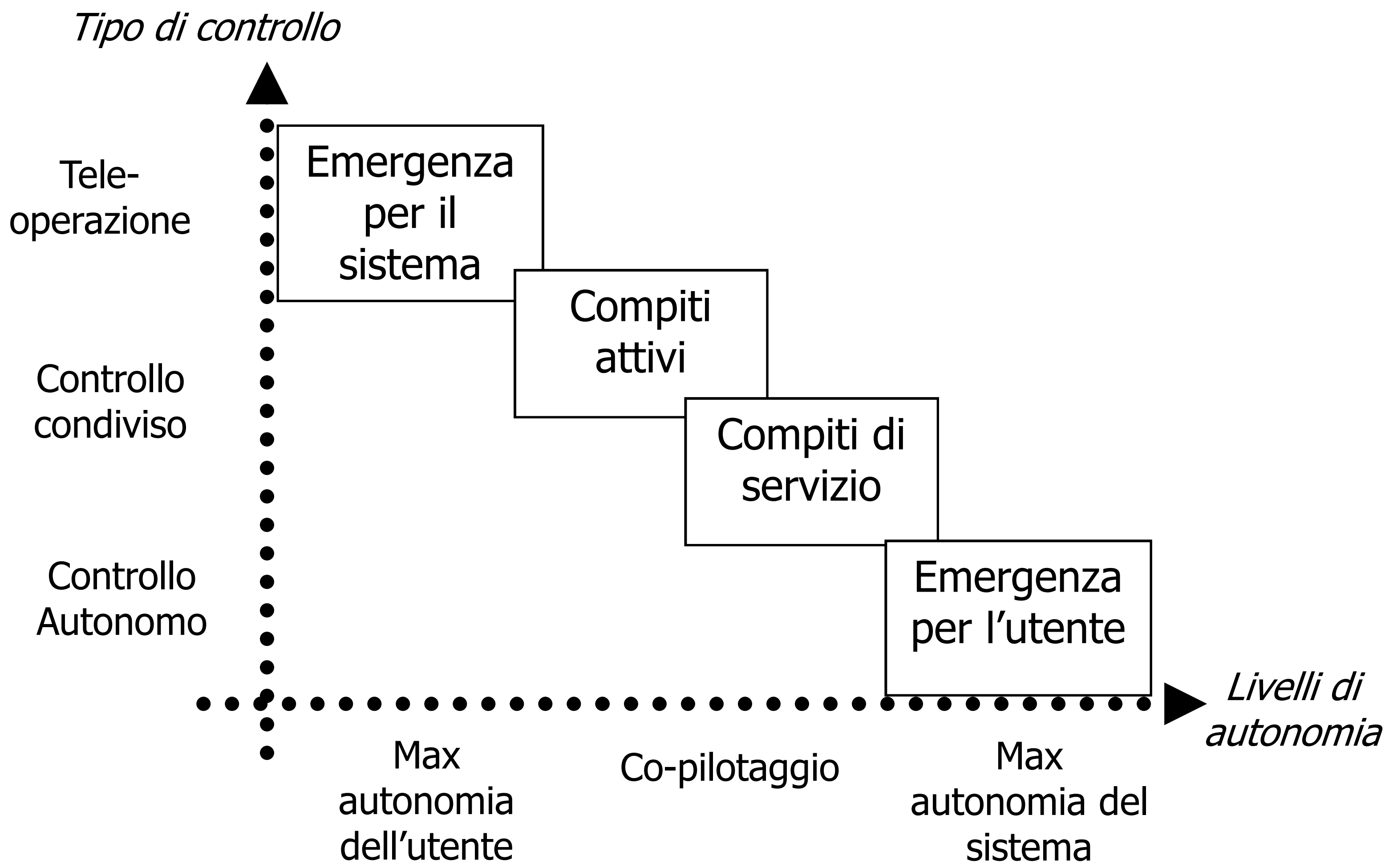
- GOLEM



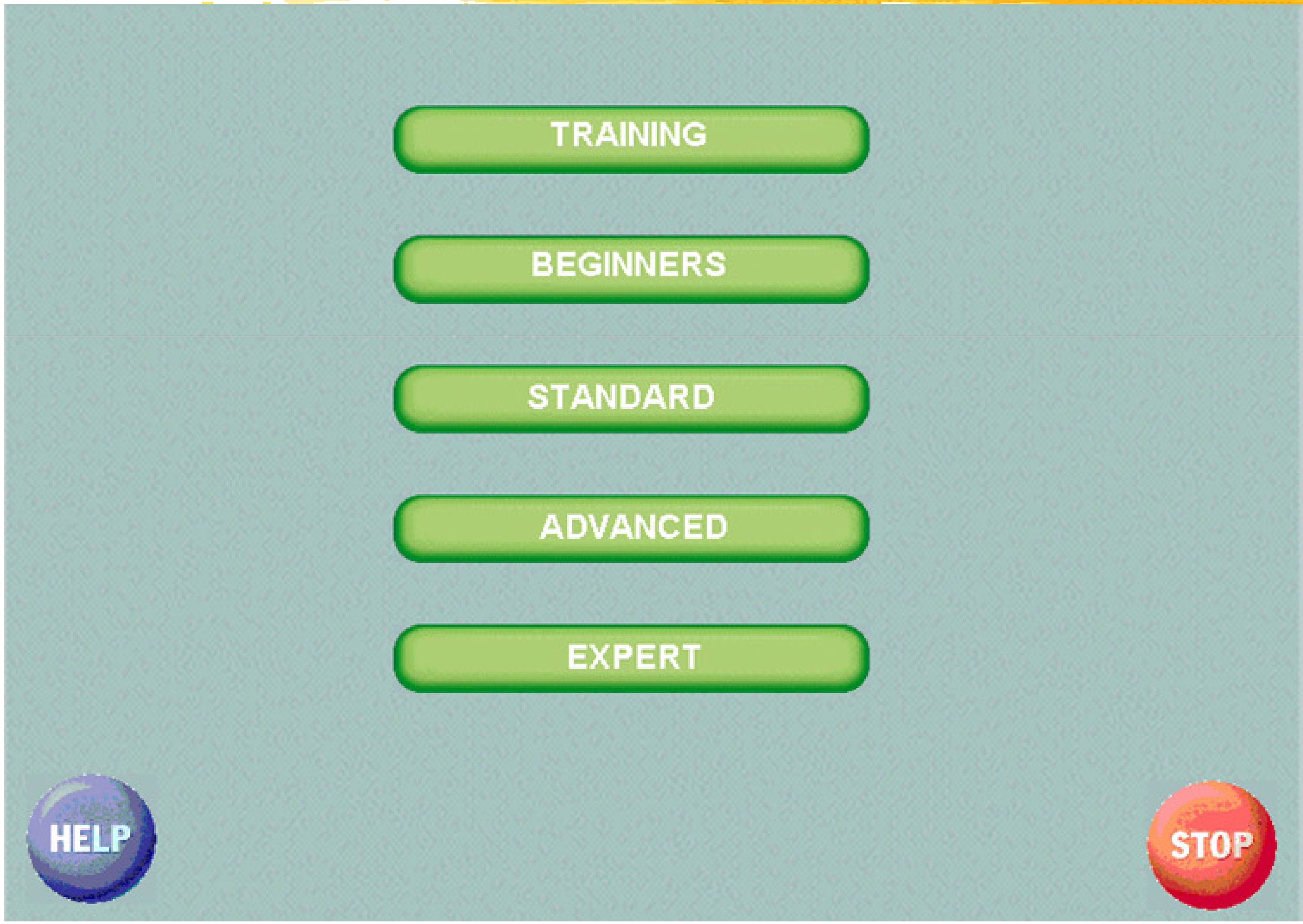

Desirable characteristics of a personal robot according to users analysis

- the robot should look clearly **artificial**, never biomorphic nor anthropomorphic;
- a careful balance should be kept between the technical look and some **'softer'** elements suggesting a feeling of humanism and friendliness;
- 'caricature' elements (pet-robot, puppet) should be generally avoided, as they could create a sense of unreliability (should I be helped by a toy?);
- the robot should 'sleep' in a reassuring position and, when waking up, it should warn and start with a gentle movement;
- the robot should never move in the darkness, or should warn with a light before moving;
- the arm should possibly offer objects from a lower position, avoiding coming toward the user with a 'threatening' attitude.

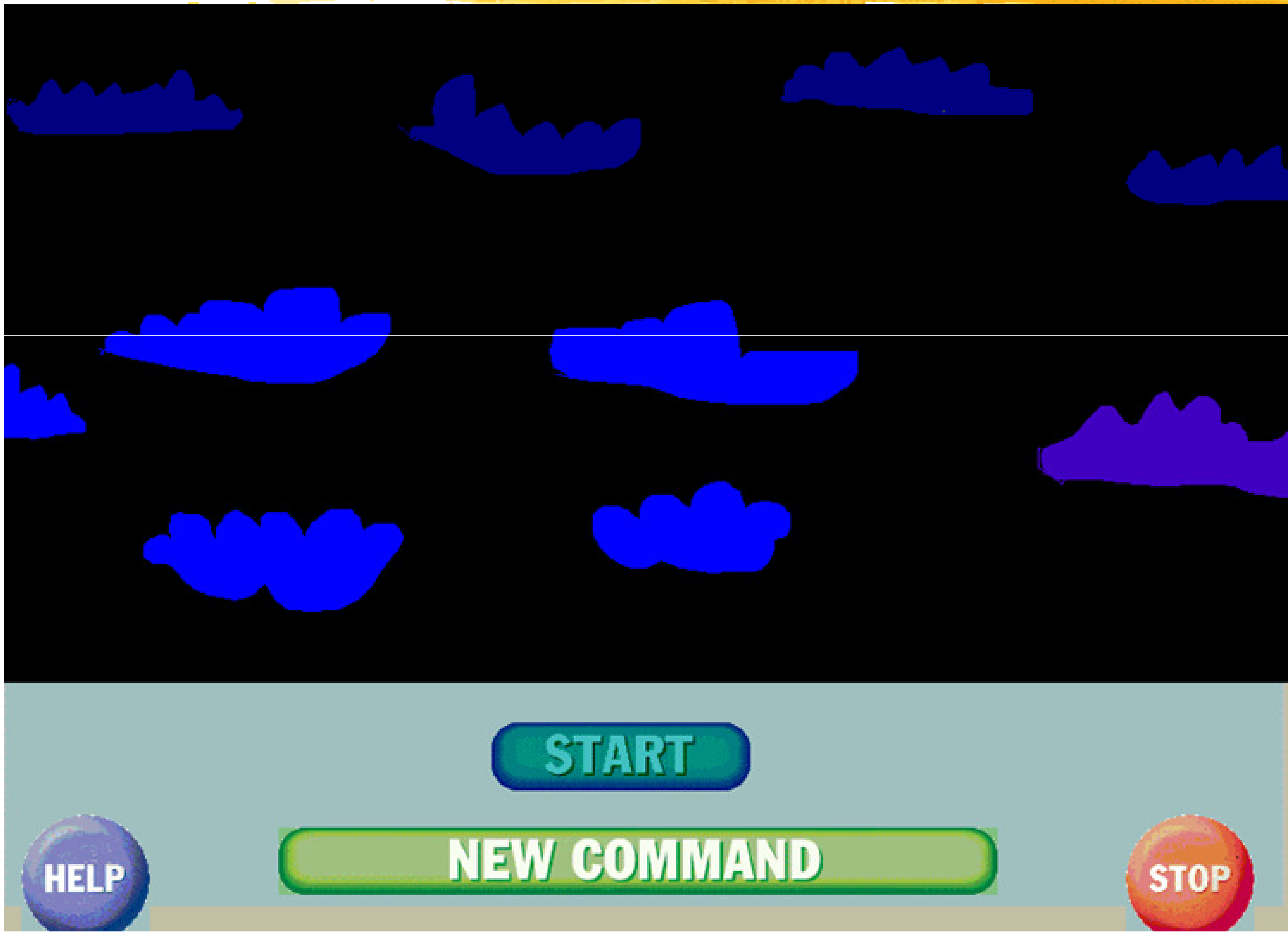
Modularità nell'autonomia



L’interfaccia utente di MOVAID

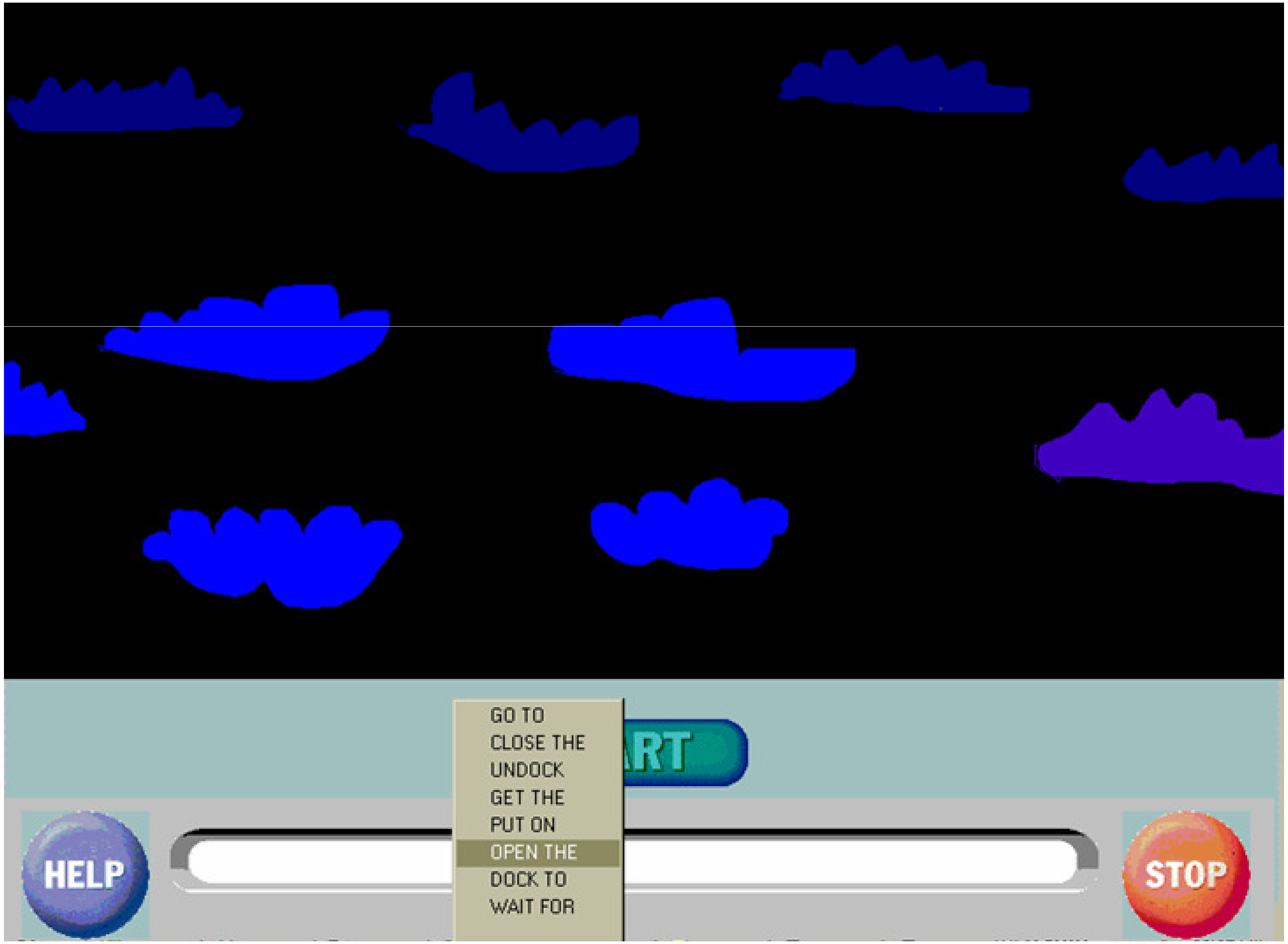


L'interfaccia utente di MOVAID



L’interfaccia utente di MOVAID

L'interfaccia utente di MOVAID



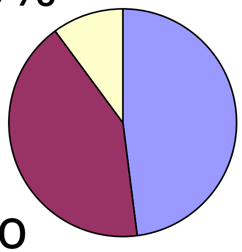
L’interfaccia utente di MOVAID

Co-operazione nell'esecuzione dei compiti

Validazione del sistema MOVAID

Prima di MOVAID

Immagini l'assistenza di un Robot?

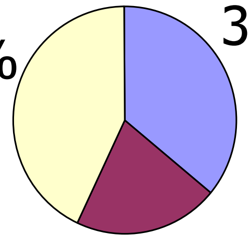


Prove Sperimentali

64 utenti coinvolti in prove e dimostrazioni in 3 diversi paesi Europei

Dopo MOVAID

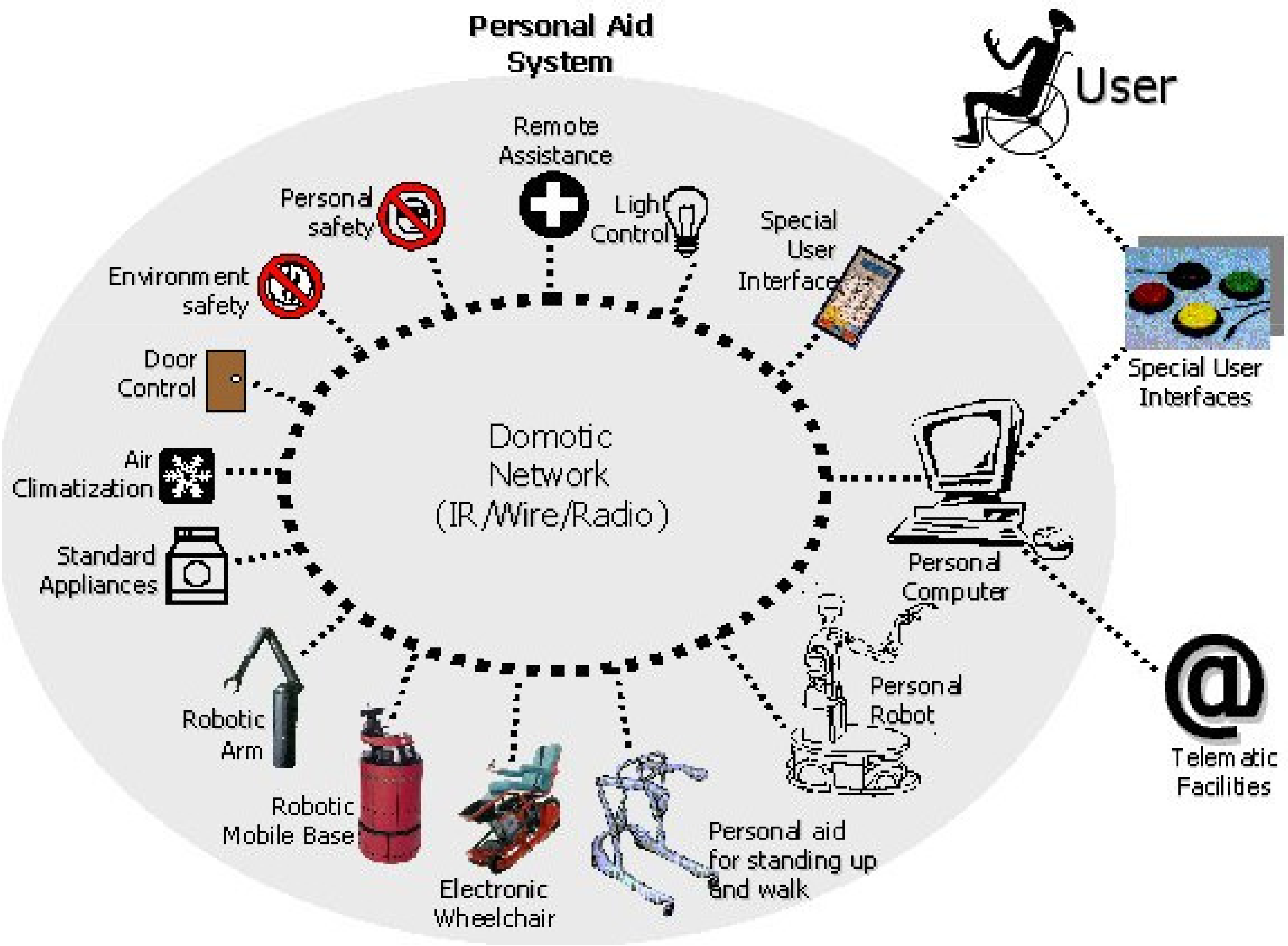
Vorresti avere un Robot come Assistente?



Domotica

A. Sensori antintrusione intelligenti
B. Sensori di luce
C. Distributore di cibo per animali
D. Sensore di presenza auto
E. Sensore di presenza posta
F. Telecamere
G. Sistema di sicurezza
H. Impianto citofonico
I. Sensori ad infrarosso per sicurezza
J. Luci intelligenti
K. Home theater system
L. Annaffiatori intelligenti
M. Controllo computerizzato
N. Movimentazione tende
P. Sensori per il monitoraggio ambientale
R. HVAC
S. Interfacce al sistema
T. Sistema telefonico intelligente
V. Porta automatica per ingresso animali
W. Protezione per sovratensioni
X. Filtri per il segnale

Nuovo concetto di sistema modulare integrato



Task-specific Robots

Handy 1 Rehab Robotics

MySpoon

Cye Robot ProRobotics

Roomba iRobots

✓ **Pros:**

- Natural evolution of today’s appliances
- Less invasive
- Lower cost to benefit
- More commercially viable
- Shorter development cycle

✓ **Cons:**

- Need many devices to meet total need
- Less natural in human environment

Scuola Superiore Sant’Anna
di Studi Universitari e di Perfezionamento

ARTS Lab

Handy1: un robot per mangiare

By RehabRobotics, UK, 1997

Research trends for Assistive Robotics

- Two main paths for assistive robotics:
  - Long-Term: general purpose robotic servants, which MAY have human-like, humanoid appearance BUT IN ANY CASE SHALL BE capable of operating without heavy environmental adaptations, and of interacting at cognitive level
  - Medium/Short-Term: the robotic appliance. The concept of a novel generation of task-specific appliances taking full advantage of enabling micromechatronics and ICT technology, and of human-centred design

Quali implicazioni?

'It will be impossible to build humanoid robots that have human level interactions without them having souls…'
'BUT, we (engineers) will not have to try to give them souls. They will just have them'.

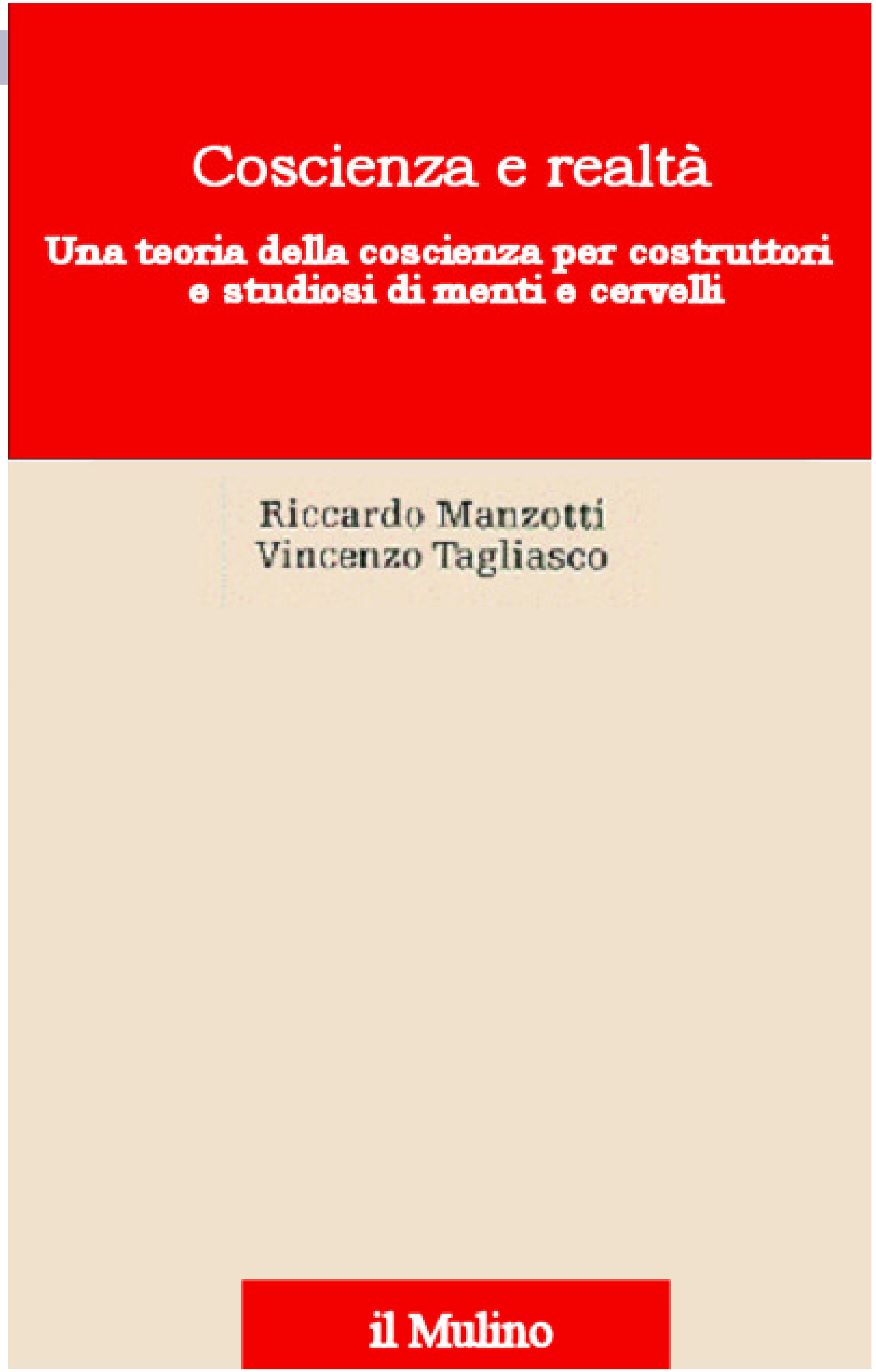
Can Humanoids Be Spiritual?
(R. Brooks, 1998)

Sarà impossibile costruire robot umanoidi con lo stesso livello di interazione degli esseri umani, senza che essi abbiano un'anima. MA noi (ingegneri) non dovremo cercare di dargliene una. Semplicemente l'avranno"

Verso un nuovo paradigma

“e’ necessaria una nuova teoria della coscienza che possa essere implementata su un robot umanoide dotato di capacità sensoriali e motorie”

Vincenzo Tagliasco, 2001



ARTS Lab

scuola superiore **Sant'Anna** di studi universitari e di perfezionamento

WASEDA UNIV. HRI

Italy-Japan 2001 Workshop

HUMANOIDS

A Techno-Ontological Approach

November 21st, 2001, Waseda University, Tokyo

日本におけるイタリア 2001 ITALIA IN GIAPPONE

Supported by the Italian Embassy in Tokyo, by the Italian Ministry of Education, University and Research and by the Italian Ministry of Foreign Affairs

MAISON DE LA CULTURE DU JAPON A PARIS

"Robots : entre technologie et culture"

Are robots accepted in the same way in Japan and in Europe?

Paolo Dario

Professor, Scuola Superiore Sant'Anna, Pisa, Italy
President, IEEE Robotics and Automation Society

December 13, 2003, Maison de la Culture du Japon a Paris

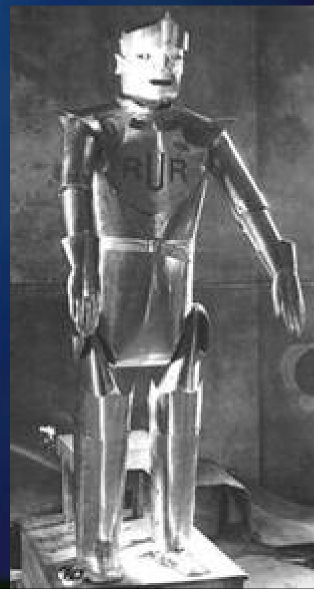
Popular myths in Europe:
- "goodness" is associated to being human
- robots are a threat for Humankind

Pinocchio becomes a human boy when he becomes "good"

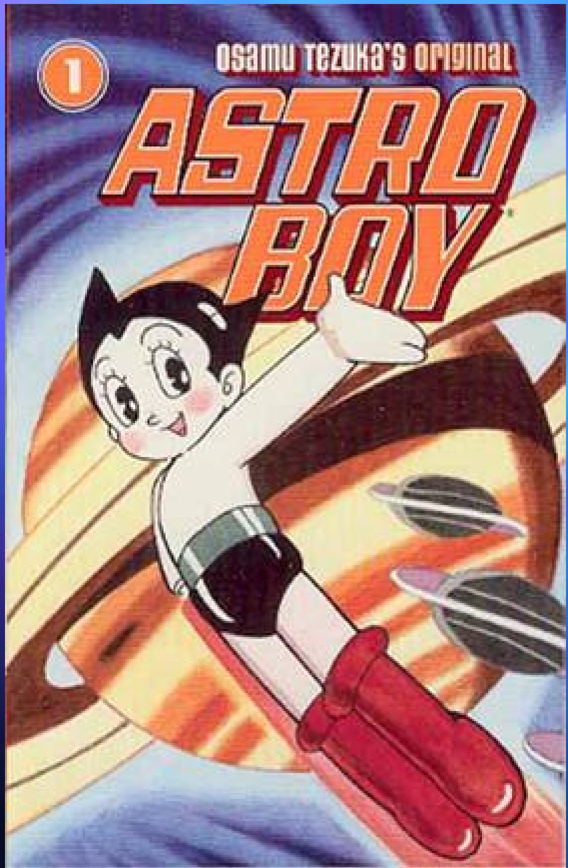
Frankestein: a monster with human body but no soul

A robot from the 1921 play "**R.U.R.**": Robots are used as workers but they rebel to humans

Superheroes: <u>Humans</u> with superpowers



Popular myths in Japan: "good" robots in the help of humankind



Astro Boy / Atom Man: a "good" robot boy

A space robot protecting the Humankind against aliens

Doraemon: a boy's cat robot, friend and helper

L'ingegnere e il ricercatore del futuro assumono un nuovo ruolo e nuove responsabilità etiche

José Maria Galvan "Sulla Tecnoetica", IEEE Robotics and Automation Magazine, Dicembre 2003

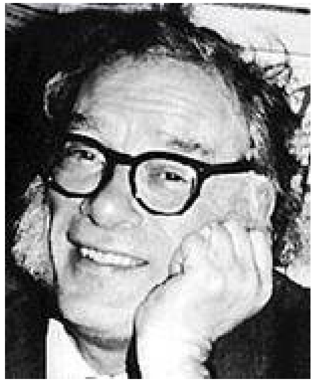
Obiettivo della Tecnoetica

Superare il paradosso fra la dipendenza tecnologica dell'uomo di oggi e la percezione diffusa che la tecnologia sia "antiumana"

La questione che si pone è quella di un nuovo rapporto fra uomo e macchina

(Josè Maria Galvan, Sant'Anna News, gennaio 2002)

Temi di riflessione etica (1/2)



- Autonomia dei robot: quale grado di autonomia dovrebbe essere fornito ai robot, dato che azioni incontrollate dei robot possono essere dannose agli esseri umani?
  - robotica per l'assistenza personale
  - robotica per applicazioni militari
- Le leggi di Asimov costituiscono una linea guida utile per vincolare l'autonomia dei robot?
- È realistica la possibilità di esseri artificiali auto-replicantesi?
- Stato ontologico dei "cyborg" e delle entità artificiali:
  - Chi è la macchina e chi è l'uomo?
  - Possiamo permettere che esseri umani vengano riprogrammati?
  - Possono esistere dissidenti in un mondo di replicanti?

Temi di riflessione etica (2/2)

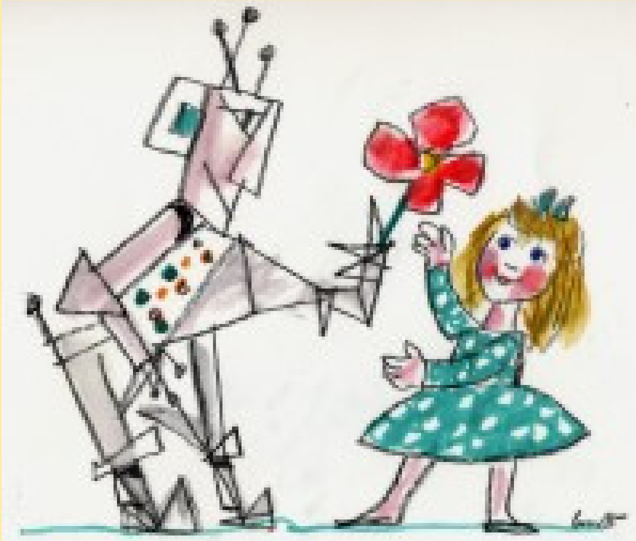
- Robotica per l’assistenza e per la riabilitazione
  - Possono i robot sostituire gli esseri umani in compiti in cui sono importanti i fattori emozionali ed empatici?
- Accrescimento delle facoltà sensomotorie
  - La possibilità di “potenziare” gli esseri umani può essere causa di discriminazioni e nuove forme di schiavitù?
  - Che impatto può avere sulla società l’allungamento della vita lavorativa?
- Chi si potrà permettere, in senso economico, di recuperare capacità sensomotorie mediante artefatti neuro-robotici?

First International Symposium on

ROBOETHICS

The ethics, social, humanitarian and ecological aspects of Robotics

30^{th} - 31^{th} January, 2004
Villa Nobel, Sanremo, Italy



The ROBOETHICS Symposium aims to open a debate, among scientists and scholars of Sciences and Humanities, with the participation of people of goodwill, about the ethical basis which should inspire the design and development of robots.
The Symposium is an opportunity to encounter scientists and scholars committed to discuss new and sensitive problems that humankind is glimpsing at the horizon.
Philosophers, jurists, sociologists, anthropologist and moralists, together with robotic scientists, are called to contribute to lay the fundations of the Ethics in the design, development and employment of the Intelligent Machines, the Roboethics.
For this reasons the Distinguished Speakers will report their experience in a general way, with a special focus on the social and ethical problems they are identifying in their fields.

Program Commitee:

Paolo DARIO
José M. GALVÁN
Fiorella OPERTO
Jovan PATRNOGIC
Gianmarco VERUGGIO

Organiser:

Scuola di Robotica

Co-Organisers:

ARTS-Lab, Scuola Superiore Sant'Anna, Pisa, Italy
International Institute of Humanitarian Law
School of Theology, Pontifical University of the Holy Cross, Rome, Italy

Bio-Robotics: New Ethical Challenges for the Robotics Researcher

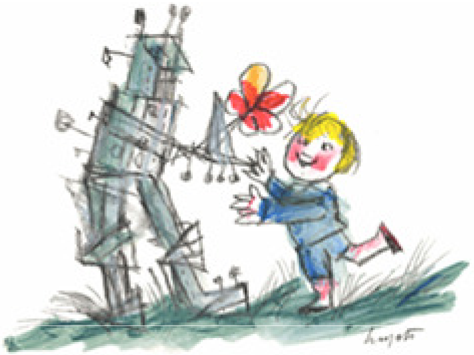
Bruxelles, March 16, 2004

Paolo Dario

Scuola Superiore Sant'Anna, Pisa, Italy

EURON ROBOETHICS ATELIER Genova 27 February-3 March, 2006

EURON Atelier on Roboethics 2006



EURON ATELIER ON ROBOETHICS

27 FEBRUARY: PALAZZO DORIA SPINOLA
28 - 3 MARCH: SALA LIGNEA, BIBLIOTECA BERIO
GENOVA

SCHOOL OF ROBOTICS

EURON
EUROPEAN ROBOTICS RESEARCH NETWORK

The Research Atelier on Roboethics is an EURON Project aimed to develop the concept of an Ethics applied to Robotics. The Atelier will last one working week, in February 2006. It will be attended by about 30 participants (Senior Scientists and PhD Students) coming from different fields of research, both from Sciences and Humanities. The result will be a ***Roboethics Roadmap Book***.

In January 2004, Scuola di Robotica organized the First International Symposium on Roboethics. The success and the important follow-ups of that event encouraged the partners of this proposal to design a more continuous and systematic approach: the Roboethics Atelier inside **EURON**.

The Roboethics Atelier will apply, in the Robotics field, the EC directives on the subject of Ethics. Actually, the Action Plan "*Science and Society*" specifies some of the principles which should govern researches in science and technology. In this context, the Atelier will analyze the effects of Robotics, from those principles, in the applications fields where the potential problems are more important and evident.

ETHICBOTS Project

- Home
- Goals and motivations
- Consortium
- Documents
- Events
- Media information
- Contacts
- Links

News

University of Hertfordshire, Hatfield, United Kingdom, 6-8 September 2006
15th IEEE International Symposium on Robot and Human Interactive Communication

IEEE RO-MAN 06 provides a forum for an interdisciplinary exchange for researchers dedicated to advancing knowledge in the field of human-robot interaction and communication.

Go to the website

Napoli, Italy, April 20-22
Workshop

ETHICBOTS project home page

ETHICBOTS project
Emerging Technoethics of Human Interaction with Communication, Bionic, and robOTic systems
Coordination Action
FP6 - Science and Society
Start date: November 1st, 2005
Duration: 2 years

News

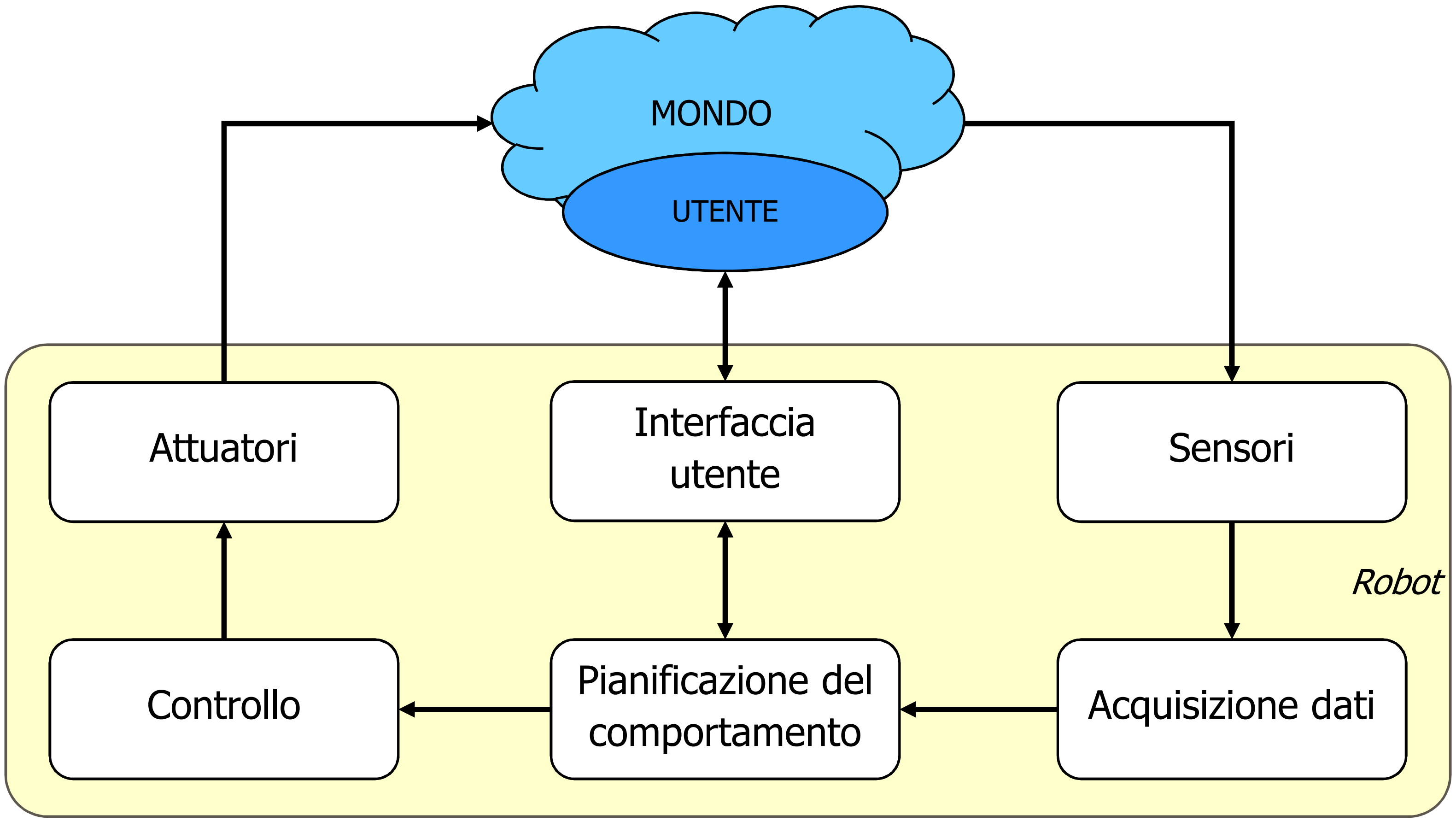
- Workshop on ***Ethics of Human Interaction with Robotic, Bionic, and AI Systems - Concepts and Policies***, Naples, 17-18 October, 2006
- Some kick-off meeting presentations have been uploaded on the kick-off agenda page

Project overview

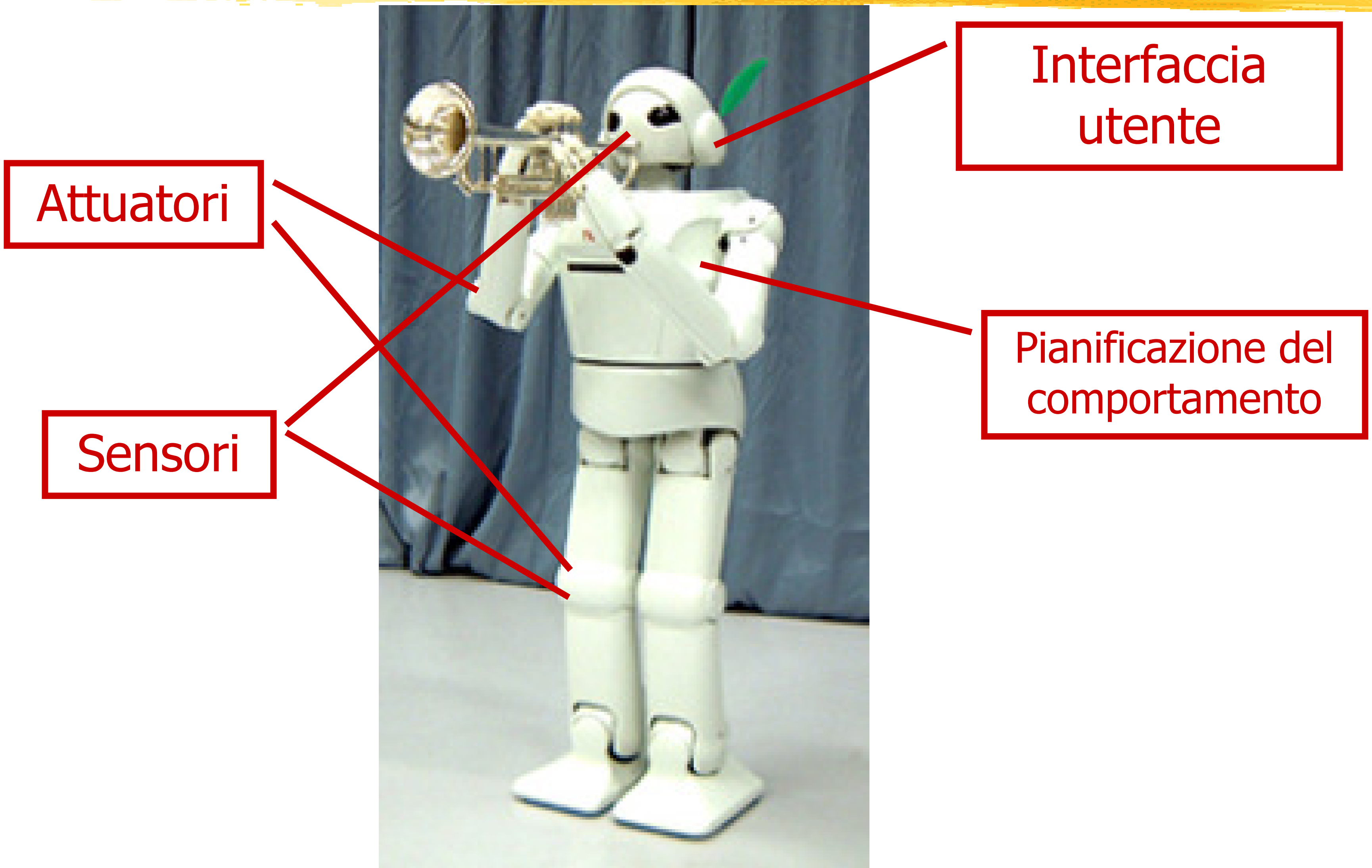
ETHICBOTS will promote and coordinate a multidisciplinary group of researchers into artificial intelligence, robotics, anthropology, moral philosophy, philosophy of science, psychology, and cognitive science, with the common purpose of identifying and analyzing techno-ethical issues concerning the integration of human beings and artificial (software/hardware) entities.

Three kinds of integration will be analized:
(a) Human-softbot integration, as achieved by AI research on information and communication technologies;
(b) Human-robot, non-invasive integration, as achieved by robotic research on autonomous systems inhabiting human environments;
(c) Physical, invasive integration, as achieved by bionic research.

Schema tipico di un sistema robotico



Componenti fondamentali di un sistema robotico



Componenti fondamentali di un sistema robotico

Schema tipico di un sistema robotico