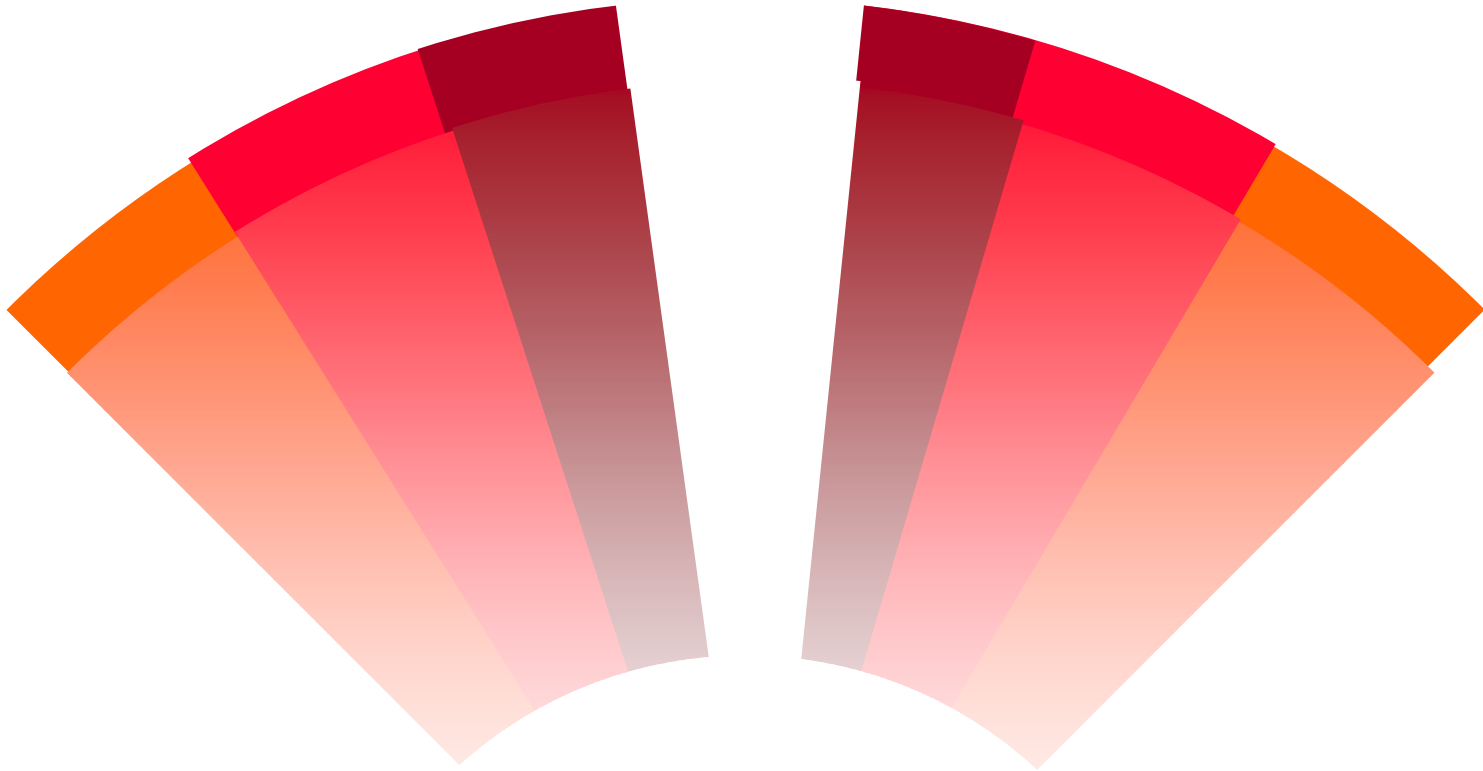


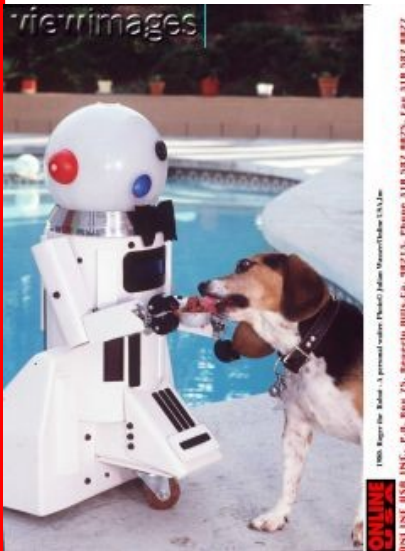
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Brendan Bartlett
Vlad Estivill-Castro
Stuart Seymon

*Dogs or robots -
Why do children see them as
robotic pets rather than
canine machines?*



Vlad Estivill-Castro

Robots to guide the blind

- Can we effectively use multi-modal interfaces in autonomous mobile robots at least to facilitate human-computer interaction?

WEDNESDAY, JUNE 18, 2003

Visionary plan for robots

ROBOTS that can detect fires and intruders in the home and micro-chipped glasses that can alert the wearer to upcoming objects will soon become tools for the vision impaired if funding is gained for a Griffith University project.

Associate Professor Brendan Bartlett, of the Vision, language and special education school, said the massive project involved the use of specially programmed robots designed to enhance the lives of visually impaired people at all stages of their lives.

With the aim of making robots a familiar and useful object from childhood, a team from Griffith University last week visited Narbethong Special School at Buranda where Johanna Medcalf, 3, was introduced to a modified Sanyo robotic dog nicknamed Miranda.

Johanna's initial caution was quickly overcome as she reached out to investigate the talking, singing, dancing toy.

While the robotic dog (which they plan to turn into a kangaroo called Eye Quee Kangaroo, was designed just to be a toy, the academics carefully observed Johanna's reaction to it.

"The first thing is to see if a young child is capable of changing the battery and turning it on and off to get various outcomes," Dr Bartlett said.

He said while a blind person compensated for the lack of sight by using other senses, it was their tactile sense that was of paramount importance.

"Early days are so important with children," Dr Bartlett said.

"They learn to learn about learning."

"The day they reach out to feel the world is like a breakthrough of literacy."

"What we're looking for here is how long it takes to move from toy to tool — when it becomes something to help build a house (of blocks) with or do sums."

"It takes time and patience."

The university team, including computing and information technology school deputy head, Associate Professor Vladimir Estrivil-Castro, and six PhD students, studied the reactions of four students from the school as part of their project.

— Margaret Socolombe

Hypothesis (1)

- In the not so distant future humans will be surrounded by all sorts of `intelligent machines’
 - Intelligent buildings and Sensitive computing
 - Computing environment intended to assist the user for retrieving, organizing and interpreting available information resources by augmenting and extending the sensory as well as the cognitive capabilities of the user



Hypothesis (2)

- ▶ The sector of the human population that is to benefit the most from `robots around us' are people with disabilities, the elderly and pupils
 - If technology is to reflect an advance society it should make an impact on improving
 - the life of its weak/disadvantaged/untrained members



Hypothesis (3)

- ▶ A convergence is looming on Information and Communication Technologies
 - Mobile phones, PDAs, Wireless/Internet and Intranets through computer watches
 - Wearable computers



Hypothesis (4)

- ▶ There is a shift from “*accessible computing*” to “*user centered design*” in the Human-Computer Interaction community
 - Accessibility
 - Providing accessibility means removing barriers that prevent people with disabilities from participating in substantial life activities
 - UCD
 - Focusing on the product's potential users from the very beginning, and checking at each step of the way with these users to be sure they will like and be comfortable with the final design.

What does robotics provide?

- **Mobility/autonomy**
 - It seems intuitively clear that the problems of mobility, orientation and navigation in robotics are similar to those experienced by people who are blind
 - A walking PDA?
- **Embodiment**
 - Does this really matter to the blind?
 - Does it matter that it looks like a dog?



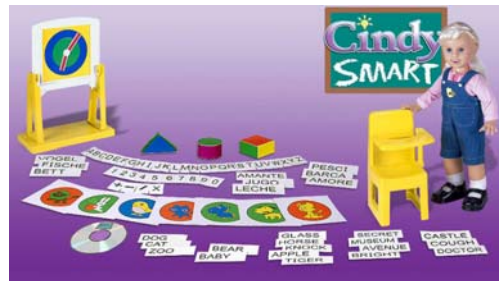
Robotics has penetrated the home market

► Toys

- Lego Mindstorms™



- Cindy Smart™



Robotics has penetrated human environments

Home artifacts

- The EUREKA Robo Vac™
- Electrolux Trilobite™



Guides for visitors in museums and the elderly



What is there for people who are blind

- ▶ The GuideCane (U of Michigan)
 - weighs about 4 kilograms
- ▶ The vOICe (prototype)



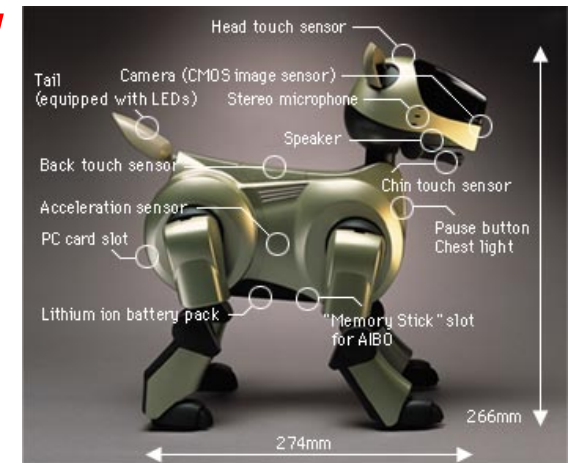
- ▶ The MINIGUIDE™



We have tested if “off the shelf” technology is usable by people who are blind [ACRA-03]

SONY Aibo

- Relative inexpensive to other ICT-tools for people with disabilities
 - **JAWS 3.5 for Windows**
Henter Joyce,
a division of Freedom Scientific
(800) 444-4443
www.freedomscientific.com
 - Full version for Windows 95/98: \$795 USD
Full version for Windows NT 4.0 or Windows 2000 Professional: \$1,195 USD



Evaluate children's attitudes to characteristics that define ROBOT

- ▶ Mobility
- ▶ Battery powered (autonomous)
- ▶ Programmable

INSTRUMENT Vs INDIVIDUAL

Acceptability as a companion/vehicle for interface with computers

Methods

- Presentations to children
 - initially 14 presentations
 - average 17 children per presentation
 - several videotaped/transcribed
- Confirmation questionnaire

Contents of the presentation

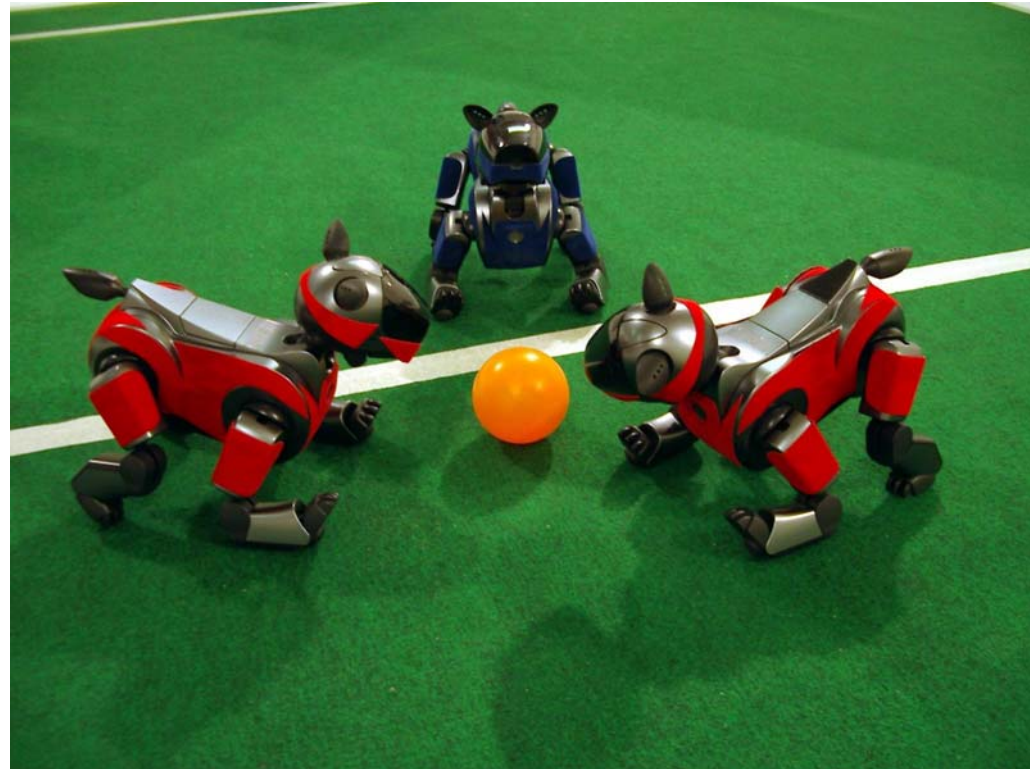
- ▶ Illustration of an AIBO
- ▶ Illustration of other `toys' (instruments) that emphasize a property of a robot
- ▶ A series of challenges on the standing with respect to the nature of Aibo
- ▶ Occasionally,
 - Some questionnaires or other validation

Robots for the Blind



Items presented

- Video
 - - establish the language



Items presented

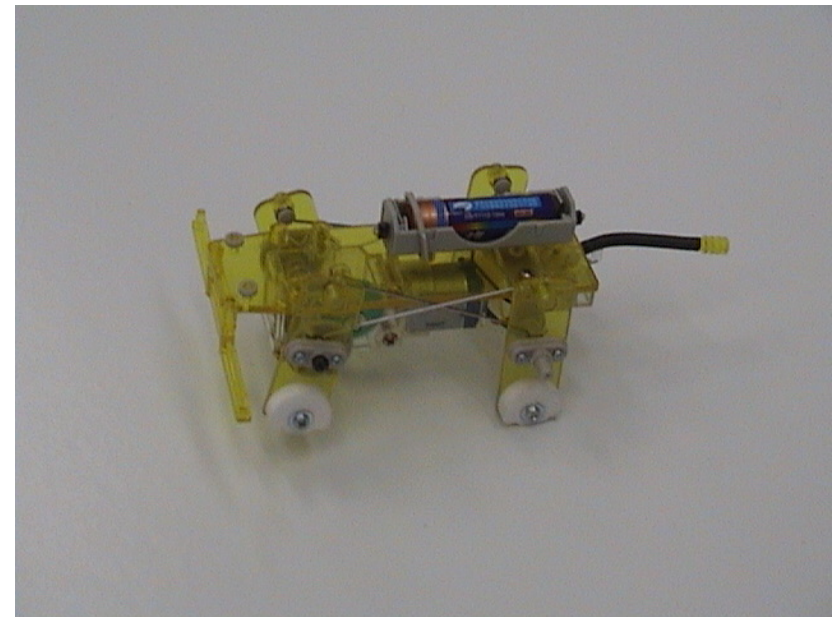
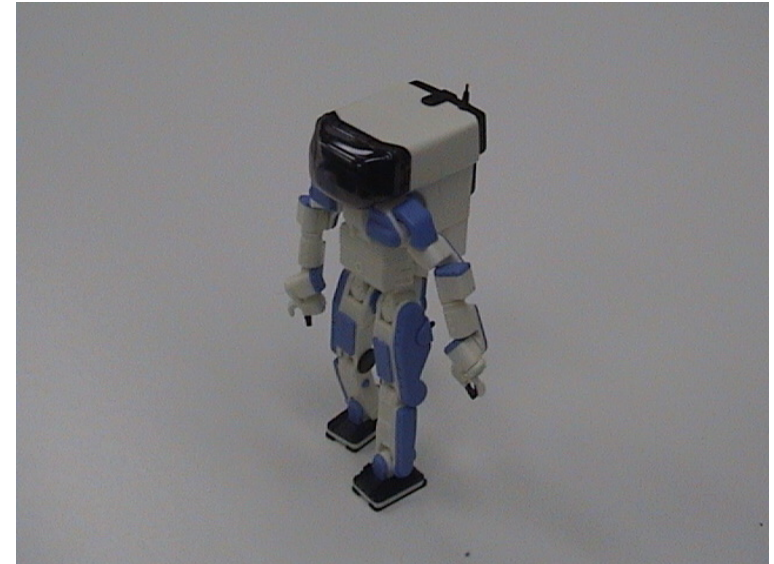
- Miranda (our AIBO)
 - - playful behaviors (demo mode)
 - - other routines (speaking/singing/dancing)



Items presented

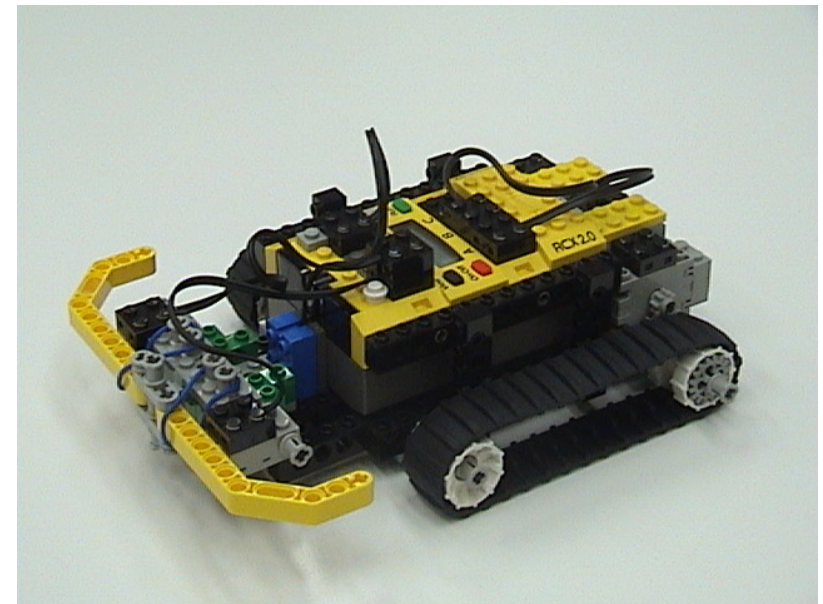
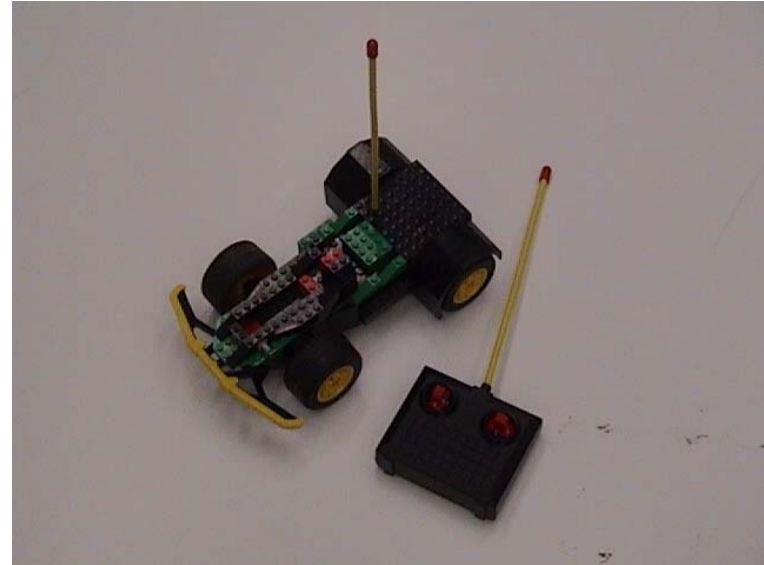
- ▶ Model of Humanoid
 - Does nothing

- ▶ Battery powered 4-legged and tail toy
 - Batteries



Items presented

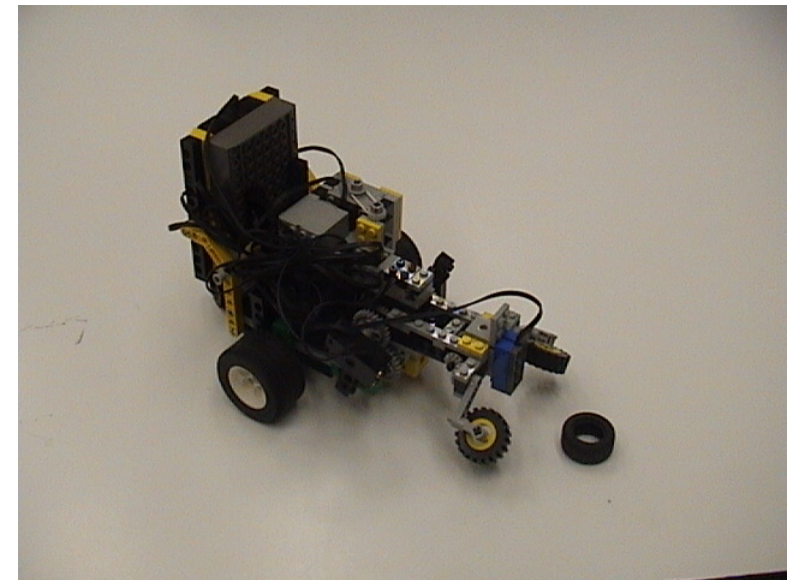
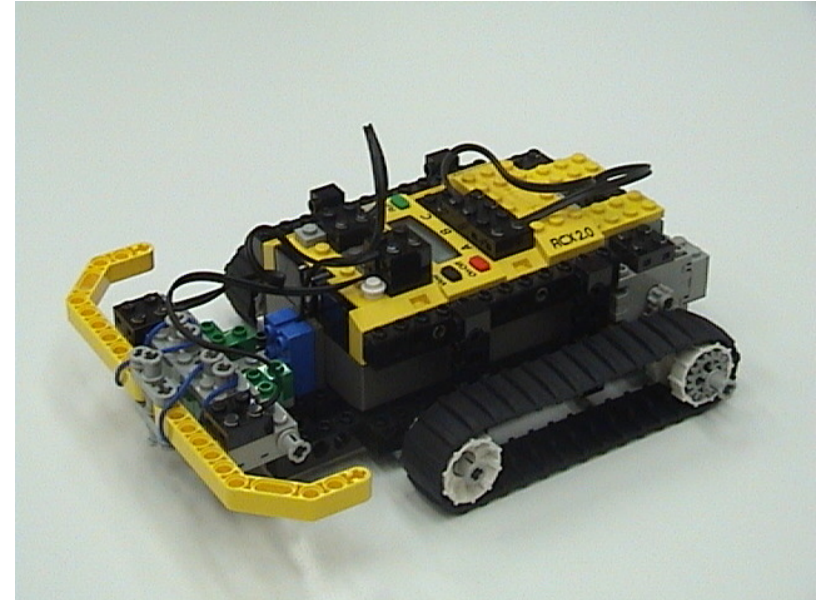
- ▶ Remote control
- ▶ Autonomous control



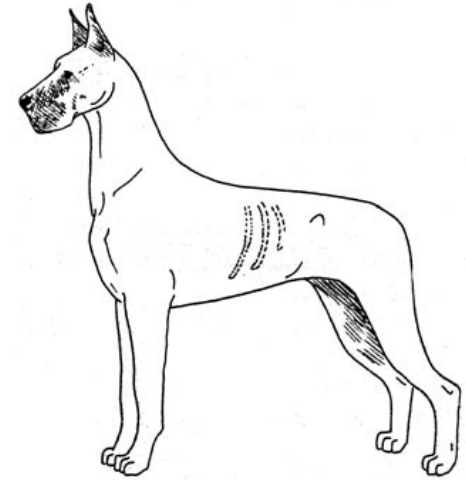
Items presented

- ▶ A robot with sensors
 - Some interaction

- ▶ A robot that clearly modifies its environment



Observations



- Children were reluctant to see the Aibo more as a `machine' (robots) than as a `dog' (living).
- Attribute biological status
 - Aibo may have babies
 - Aibo may get energy by eating

Observations



- Attribute personality
 - Aibo may have feelings
- Attribute some moral standing
 - Aibo may need to be punished if `it' does something wrong

Observations

- ▶ Aibo does meet the criteria for being a robot (consensus)
- ▶ Younger groups eventually went onto define it as `robotic dog’
 - robotic dog (noun is dog)
 - rather than
 - dog-looking robot (noun is robot)

Informal observations

▶ The parents

- frustrated at the child's apparent lack of understanding that the ROBOT is a MACHINE

▶ The older children

- use explanations based on 'spiritual nature of humans'
 - "robots do not have soul"

▶ The teachers

- proactively attempting to use the current beliefs (in the curricula)
 - repeating the definition of living organism

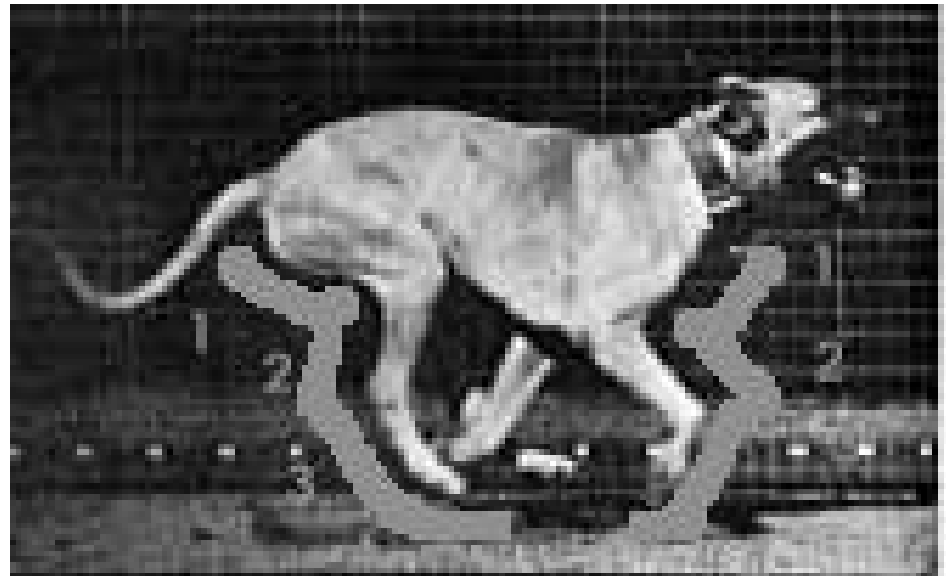
What will parents and teachers think in 100 years?

Look and feel goes a long way on what the user expect



“Dogs don’t sign”- a 6 year old child who is blind. The user of a robot is dissatisfied with the mismatch with the expectations.

An illustration



Conclusions

- Robots, as Human-Computer Interfaces,
 - generate a series of attitudes in those around them
 - and corresponding expectations of behavior
 - interaction/response
 - even strong emotional attachment to artificial system
 - a series of challenges to our belief systems
 - what standing (biological, moral and social)
 - what roles (educational, companionship/entertainment, assistant)

**Focus on the robot
FOR THE HUMAN
who will use it**

Summary

- ▶ Robotics is to enter and overlap with the `sensitive computing /wearable computer/ intelligent PDA’
- ▶ We should focus on people with disabilities
 - In educational settings
 - Future work – how can the programmable capability allow educational development?

ROBOT
sUBSTITUTE
BIND

THANK YOU

