Eliza Effect and A Therapeutic Role for Robots!

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Eliza Effect: Anthropomorphization

Humans **naturally** tend to associate

                  beliefs

                  goals

                  perceptions

                  feelings

                  desires

to objects in their environment

Eliza Program: History

In late 1960s, Joseph Weizenbaum wrote a simple conversation program called *Eliza*.

The program used a simple keyword-based algorithm to carry out the conversation.

The program did not **understand** anything!

A sample conversation with *Eliza*

Men are all alike.

IN WHAT WAY

They're always bugging us about something or other.

CAN YOU THINK OF A SPECIFIC EXAMPLE

Well, my boyfriend made me come here.

YOUR BOYFRIEND MADE YOU COME HERE

He says I'm depressed much of the time.

I AM SORRY TO HEAR YOU ARE DEPRESSED

It's true. I am unhappy.

DO YOU THINK COMING HERE WILL HELP YOU NOT TO BE UNHAPPY.

A sample conversation with *Eliza…*

I need some help, that much seems certain.

WHAT WOULD IT MEAN TO YOU IF YOU GOT SOME HELP

Perhaps I could learn to get along with my mother.

TELL ME MORE ABOUT YOUR FAMILY.

My mother takes care of me.

WHO ELSE IN YOUR FAMILY TAKES CARE OF YOU

My father.

YOUR FATHER

You are like my father in some ways.

WHAT RESEMBLANCE DO YOU SEE.

A sample conversation with *Eliza…*

You are not very aggressive but I think you don't want me to notice that.

WHAT MAKE YOU THINK I AM NOT VERY AGGRESIVE

You don't argue with me.

WHY DO YOU THINK I DON'T ARGUE WITH YOU

You are afraid of me.

DOES IT PLEASE YOU TO BELIEVE I AM AFRAID OF YOU

My father is afraid of everybody.

WHAT ELSE COMES TO MIND WHEN YOU THINK OF YOUR FATHER

Bullies.

DOES THAT HAVE ANYTHING TO DO WITH THE FACT THAT YOUR BOYFRIEND MADE YOU COME HERE.

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Eliza Effect

Even though it was a simple program,

People spent hours conversing with it!

They told very **personal** things to the program

Even people who knew it was just a program,
acted *as if talking to a real person* when
conversing with the program

Eliza Effect: Moral 1

Weizenbaum found it very troubling that people would knowingly and willingly attach themselves emotionally to a program that didn't understand anything!
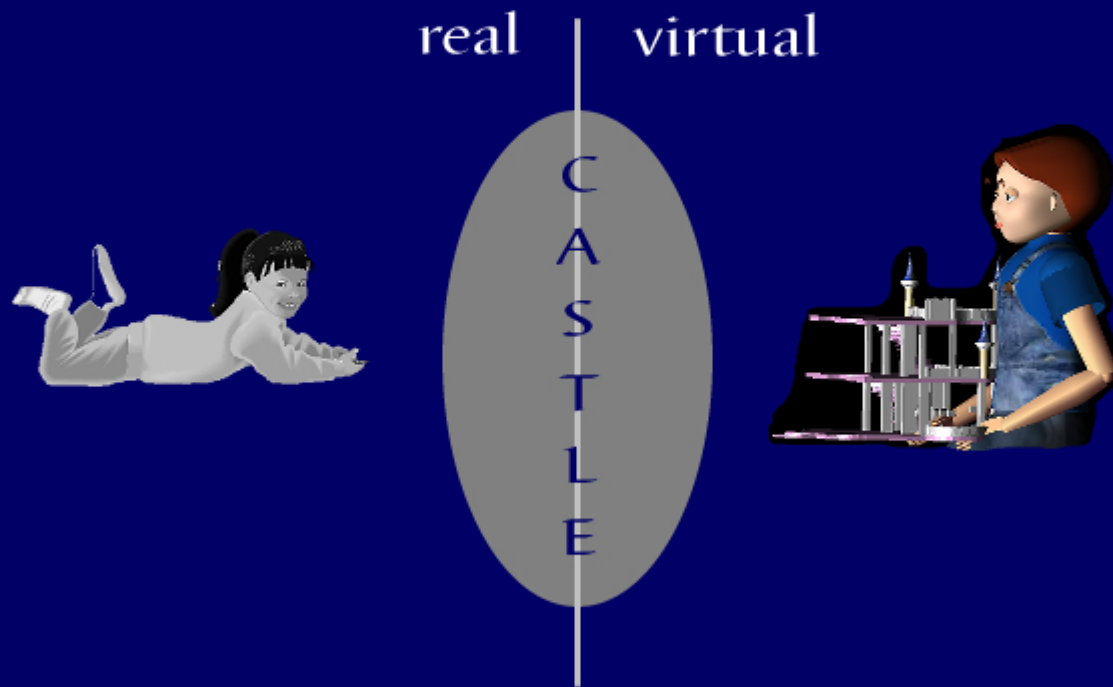
Computer power and human reason (1976)

Eliza Effect: Revival

- In the past ten years or so, a number of robotic systems have incorporated Eliza-like behavioral interface:
  - Castlemate: MIT Media Lab
  - Sony's XDR-3
  - Primo Puel (Japan)
  - Paro the Seal (Japan)
  - Pleo the dinosaur (April 2007)

SAM: The CastleMate

Gesture and Narrative Language
M I T   M e d i a   L a b

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Therapeutic Role of Eliza-Effect

- Primo Puel dolls were originally designed to be an interactive toy/ companion for young single girls in the work force.

- But were a big hit with elderly people across Japan!

Primo-puel doll

Eliza-effect in Pleo Robot
(By Caleb Chung & Ugobe)

Modeled after a one week old Camarasaurus, a gentle loving plant eater from the late Jurassic period in prehistoric history.

Pleo Robot: Technical Details

- A camera in the nose: remember places and basic information about locations

- 14 super quiet motors: realistic body movement

- Multiple processors: coordinate servos running smoothly

- Sensors for sight, sound, and plenty for touch, over 35 in all: make Pleo a responsive little dino. There's even one for tickling Pleo under the chin!

- A flash card slot: swap personalities and share them with others online

- USB port: Connect to PC to modify aspects of Pleo's personality

- In the future: a C/C++ developer's kit (SDK) will be available for those who want to try their hand at modifying their Pleo's behavior.

Pleo Robot: Behavior

- Pleo is capable of learning over time and of expressing many different moods and basic animal drives such as hunger, fatigue, fear, and love.

- Pleo will explore its environment and continue to learn.

- When tired, Pleo will seek out its regeneration bed and rest while dreaming baby dino dreams.

- Pleo's neural net adapts to stimulus from the user and the environment: Pleo's personality and demeanor over time will change in response to how it is treated. (Pleo will limp if you hurt its leg and will remember that you were mean).

- Pleo will frown, smile, shrug, yowl for food, and do the clever things like a baby to get your attention and make you laugh.

- Pleos can react to each other and learn from each other; they can even catch a cold!

Therapeutic role of Eliza-like Behavior

- Children/Adult feel more comfortable confiding to a robotic agent:
  - Benign, non-threatening personality
  - User-centered
  - Anonymity factor
  - Novelty factor
  - Availability factor

Eliza Effect: Moral 2

You don't need to do much to make the behavior of a system believable!

People are naturally gullible!

But we must deliberately design the system's behavior to mimic human behavior.

Such systems can sometimes be more effective than a human therapist!!

Autism and Social Robots

Autism

- Affects 1 in 1000 children
- Autism Triad
  - Impairment in developing social relationships
  - Impairment in developing verbal and non verbal communication
  - Inability to develop interests outside their stereotypic preoccupation

Autism – Social communication

Most Severe	Intermediate	Less Severe
• No response to any social overture • No attempt to initiate social contact with others	• A few unvarying stereotyped ways of initiating contact • Contact initiated solely for needs; not sustained; • Does not understand social etiquette in groups	• Interactions awkward or odd • Comprehension of social behavior of others limited • Inadvertently offensive but also naive and gullible

• They prefer environments which do not change

Robots and autism

- Children with autism have difficulty in social interaction
- The real world interactions are too complex for them to handle
- They need to be able to process the other person's mind sets and emotions to be able to interact
- The rules of social interaction are extremely dynamic
- They love inanimate objects like toys, computers etc.,
- **Robots**
  - are more human like than toys
  - but still safe, predictable
  - a bridge between interacting with toys and humans
  - **Can robots be used to impart social skills to children with autism** ?
  - **Can a child learn how to interact with humans by learning to interact with robots ?**

Some projects

- PETS – Personal Electronic Teller of Stories: *(University of Maryland)*

- AURORA - **Au**tonomous **Ro**botic platform as a **R**emedial tool for children with **A**utism: *(University of Hertfordshire, UK)*
  - KASPAR robot
  - Robota *(École Polytechnique Fédérale de Lausanne)*

- Keepon *(Marek Michalowski & Hideki Kozima)*

PETS - Story telling Robot

- Children author stories

- The story is *played* by the robot, which acts out the story and the emotions

- Helps children with autism to reflect on emotions

AURORA

- Engage the child with interactions in the environment

- Basic social interaction skills using turn-taking and imitation games

Kaspar and autistic child: 1

Figure 3: Left – Kelly indicating her wish to come closer to KASPAR;
Right – Kelly exploring KASPAR and imitating its drumming action.

*From Robins, Dautenhahn &
Dickerson (2009)*

Figure 4: Left - Kelly is exploring KASPAR's eyes; Right – Kelly is reaching
for the experimenter's hand.

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Kaspar and autistic child: 2

Figure 5: Left - Leroy engages in a tactile exploration of KASPAR;
Right – Leroy seeks to share his excitement with his teacher

Figure 6: Leroy exploring very closely KASPAR's facial features, and then turns to his teacher and explores her face in similar way.

From Robins, Dautenhahn & Dickerson (2009)

Kaspar and autistic child: 3

Figure 8 - Andy controlling the robot himself, closely exploring KASPAR's and his own facial features.

From Robins, Dautenhahn & Dickerson (2009)

Robota and autistic child

Figure 7: From top left to bottom left: Over the course of the demonstration, the child's interest in the robot grows. At the beginning of the demonstration, the child sits in a typical withdrawn attitude. At the end of the demonstration (14 seconds later), he has shifted his body forward, coming closer to the robot, looking intently at the robot. One can, also, see the child shifting his focus of attention from the robot to the demonstrator, taking in the demonstrator's arm movements and their effect on the robot's motion. **Bottom Right:** Once left free to play with the robot, the child spontaneously brought a doll he uses to play with on to the table to compare it to Robota, thus, demonstrating his understanding of the similarity across the two objects (the robot and the doll). He also managed in a few instances to engage in the imitation game with the robot.

From Billard, Robins, Nadel & Dautenhahn (2006)

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Keepon

- Minimalist design
- Behaviors are easy to understand
- Makes it easier for children to understand the emotions
- Interacts with children by directing attention and expressing emotion

Keepon and children

Fig. 8 Interaction between Keepon and typically developing children: a 2-year-old showing a toy and soothing the robot (*upper*), a 6-month-old touching (*lower left*), and a 5-year-old challenging the robot (*lower right*)

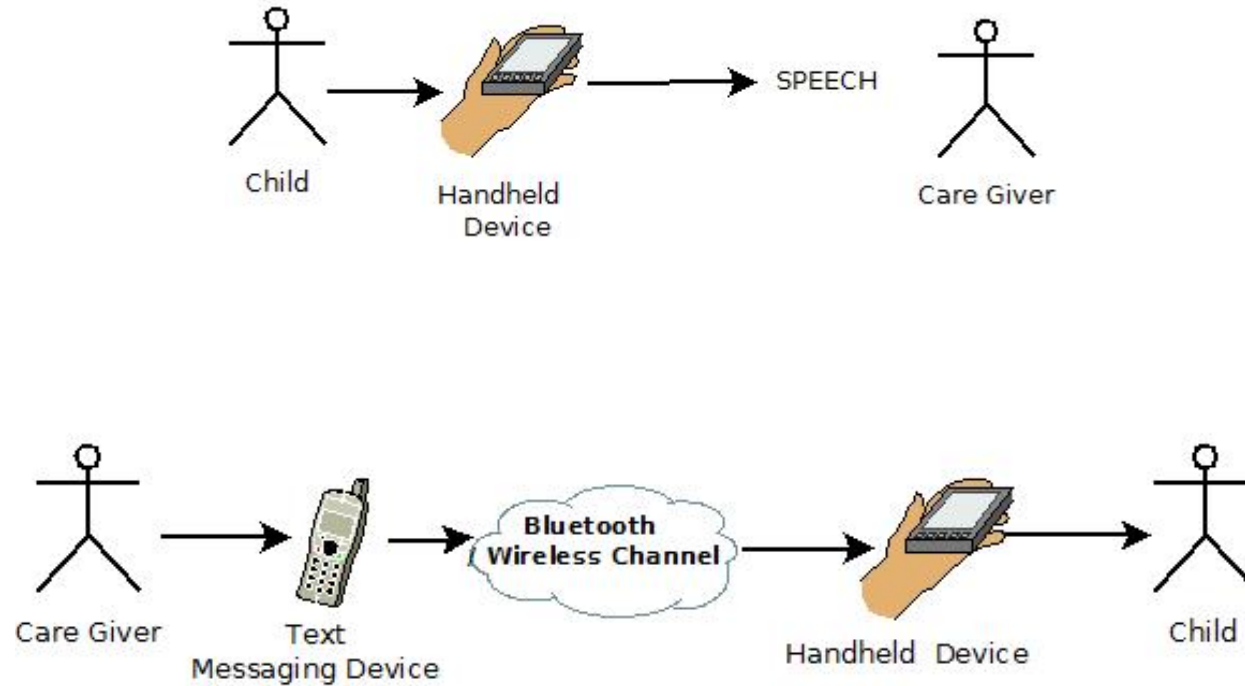*From Kozima, Michalowski, & Nakagawa (2009)*

Research at IIIT

Alternative and Augmentative Communication Systems

- Two way communication device

- Picture to speech and speech/text to pictures

Two Way Communication

Symbol Set

- Action as animation

- Culture-appropriate symbol set
  - There are multiple subcultures

No

Culture appropriate symbols

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