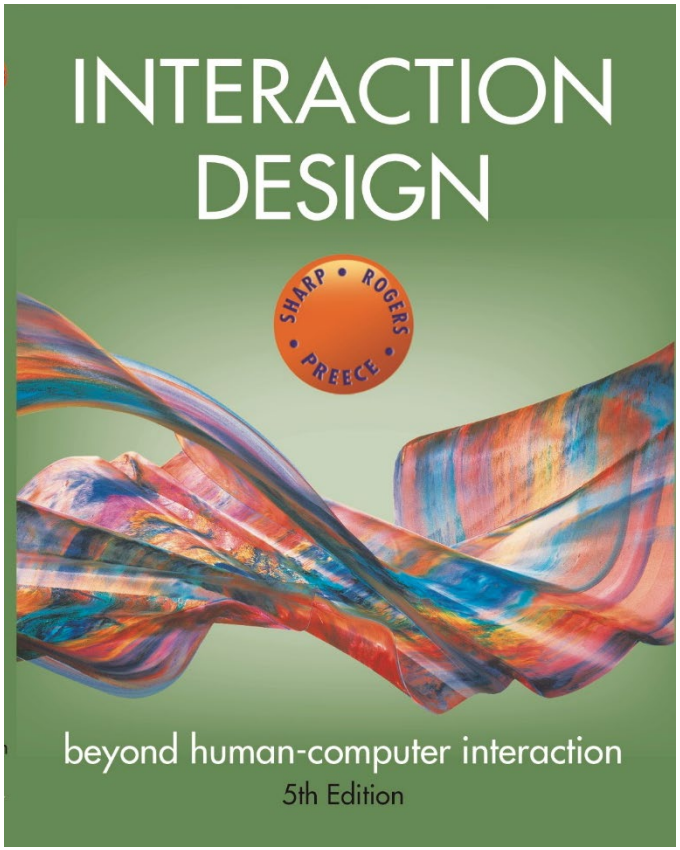


Chapter 6

EMOTIONAL INTERACTION

Overview

- Emotions and the user experience
- Expressive and emotional design
  - How the ‘appearance’ of an interface can affect users
- Affective computing and emotional AI
- Persuasive technologies and behavioral change
- Anthropomorphism
  - The pros and cons

Emotions and the user experience

- HCI has traditionally been about designing efficient and effective systems
- Now more about how to design interactive systems that make people respond in certain ways
  - For example, to be happy, to be trusting, to learn, or to be motivated
- Emotional interaction is concerned with how we feel and react when interacting with technologies
- Affective computing is improving with better recognition software and machine learning algorithms

Emotional interaction

- What makes us happy, sad, annoyed, anxious, frustrated, motivated, delirious, and so on
  - Translating this into different aspects of the user experience
- Why people become emotionally attached to certain products (for instance, virtual pets)
- Can social robots help reduce loneliness and improve well-being?
- How to change human behavior through the use of emotive feedback

Activity

- Try to remember the emotions you went through when buying a big ticket item online (for example, a refrigerator, a vacation, or a computer)
- How many different emotions did you go through?

Why has this simple way of obtaining visitor feedback been so effective?

Pulling at the heart strings with an emotive message

How easy is it to design an interface to match or change how we are feeling?

- Should an interface be designed to improve how we feel?
  - If so how?
- Our moods and feelings are continuously changing
  - How does the interface keep track and know when to do something?
- What moods match which kinds of interfaces?
- How would you design an interface for when someone is happy, angry, sad, bored, or focused?

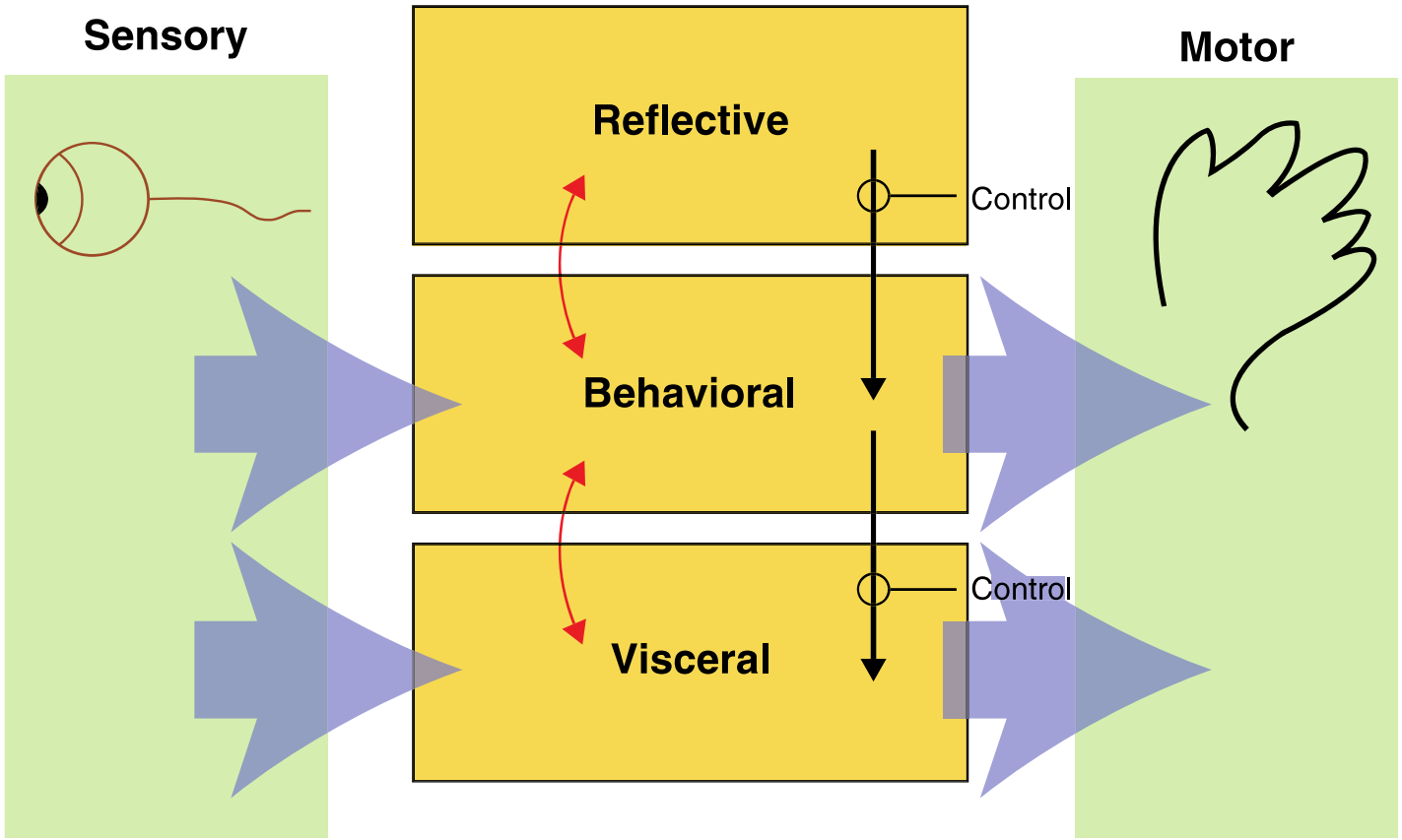
How do emotions affect behavior and behavior emotions?

- Examine how people express themselves and read each other (emotional intelligence)
  - For example, understand relationship between facial expressions, body language, gestures, and tone of voice.
  - When people are happy they laugh and relax body posture
  - When they are angry they screw up their face
- Does being angry make you concentrate better or more distracted?
- When you are happy do you take more risks such as spend more money or buy more?
- Baumeister et al (2007) argue the relationship is more complex than a single cause-and-effect model

Automatic (affect) versus conscious emotions

- Emotions can be short-lived (for instance, a fit of anger) or complex and long-lasting (for example, jealousy)
- Emotions have been categorized as automatic or conscious:
  - Automatic ones are rapid and dissipate quickly
  - Conscious ones develop slowly and take a long time to go (for instance, reflection)

Ortony et al. (2005) model of emotional design



Claims from model

- Our emotional state changes how we think
  - When frightened or angry, we focus narrowly and our bodies respond by tensing muscles and sweating
    - More likely to be less tolerant
  - When happy, we are less focused and our bodies relax
  - We are more likely to overlook minor problems and be more creative

Designing with the three levels in mind

- Visceral design refers to making products look, feel, and sound good
- Behavioral design is about use, and it equates with traditional values of usability
- Reflective design is about considering the meaning and personal value of a product

Analyzing a swatch watch design using the model

- Cultural images and graphical elements designed at the reflective level
- Affordances of use at the behavioral level
- Brilliant colors and wild design attract user's attention at the visceral level

Expressive interfaces

- Provide reassuring feedback that can be both informative and fun
- Can also be intrusive, however, causing people to become annoyed and even angry
- Color, icons, sounds, graphical elements, and animations are used to make the 'look and feel' of an interface appealing
  - Conveys an emotional state
- In turn, this can affect the usability of an interface
  - People are prepared to put up with certain aspects of an interface (for instance, slow download rate) if the end result is appealing and aesthetic

The appearance of an interface

(a) Emotional icons were used in the 1980s to indicate rebooting or crashed computer

- Smiling apple face

(b) Nowadays, computers use more impersonal but aesthetically-pleasing icons to indicate that the user needs to wait

- Beachball

(a)

(b)

The design of thermostats

(a) The Nest thermostat has a minimalist and aesthetically-pleasing design

- Round face and simple dial
- Large font and numbers

(b) It is very different from earlier thermostat designs

- Utilitarian and dull

(a)

(b)

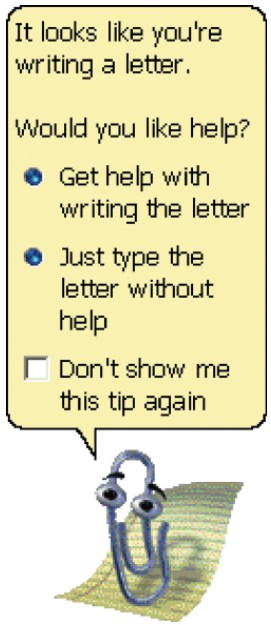
Annoying interfaces

- Microsoft pioneered friendly interfaces for technophobes
  - For example, ‘At Home with Bob’ software
  - 3D metaphors based on familiar places (for instance, living rooms)
- Agents in the guise of pets (such as a bunny or dog) were included to talk to the user
  - Made users feel more at ease and comfortable
  - But many people did not like the idea of Bob, so it never made it as a product

At home with Bob

Microsoft's Clippy and IKEA's Anna

- Clippy did…
- But was disliked by so many?
  - Was it annoying, distracting, patronizing, or other?
- Anna appeared as a virtual agent
  - Blinked, moved her lips and head to suggest facial expressions



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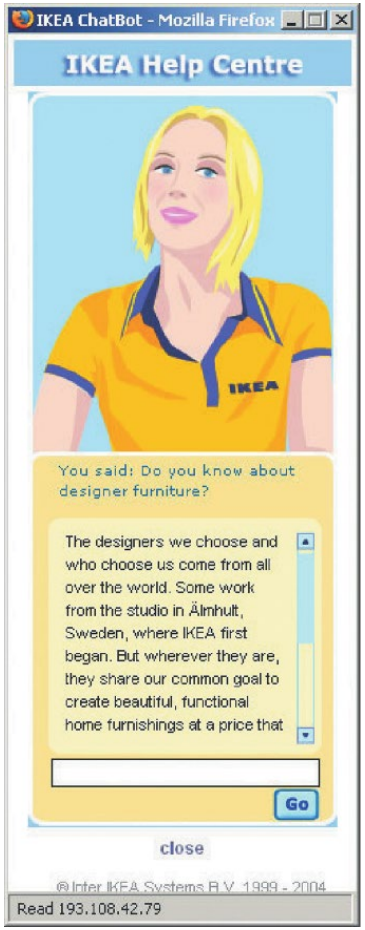

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Frustrating interfaces

Many causes:

- When an application doesn't work properly or crashes
- When a system doesn't do what the user wants it to do
- When a user's expectations are not met
- When a system does not provide sufficient information to enable the user to know what to do
- When error messages pop up that are vague, obtuse, or condemning
- When the appearance of an interface is garish, noisy, gimmicky, or patronizing
- When a system requires users to carry out too many steps to perform a task, only to discover that a mistake was made earlier and that they need to start all over again

Error messages

"The application Word Wonder has unexpectedly quit due to a type 2 error."

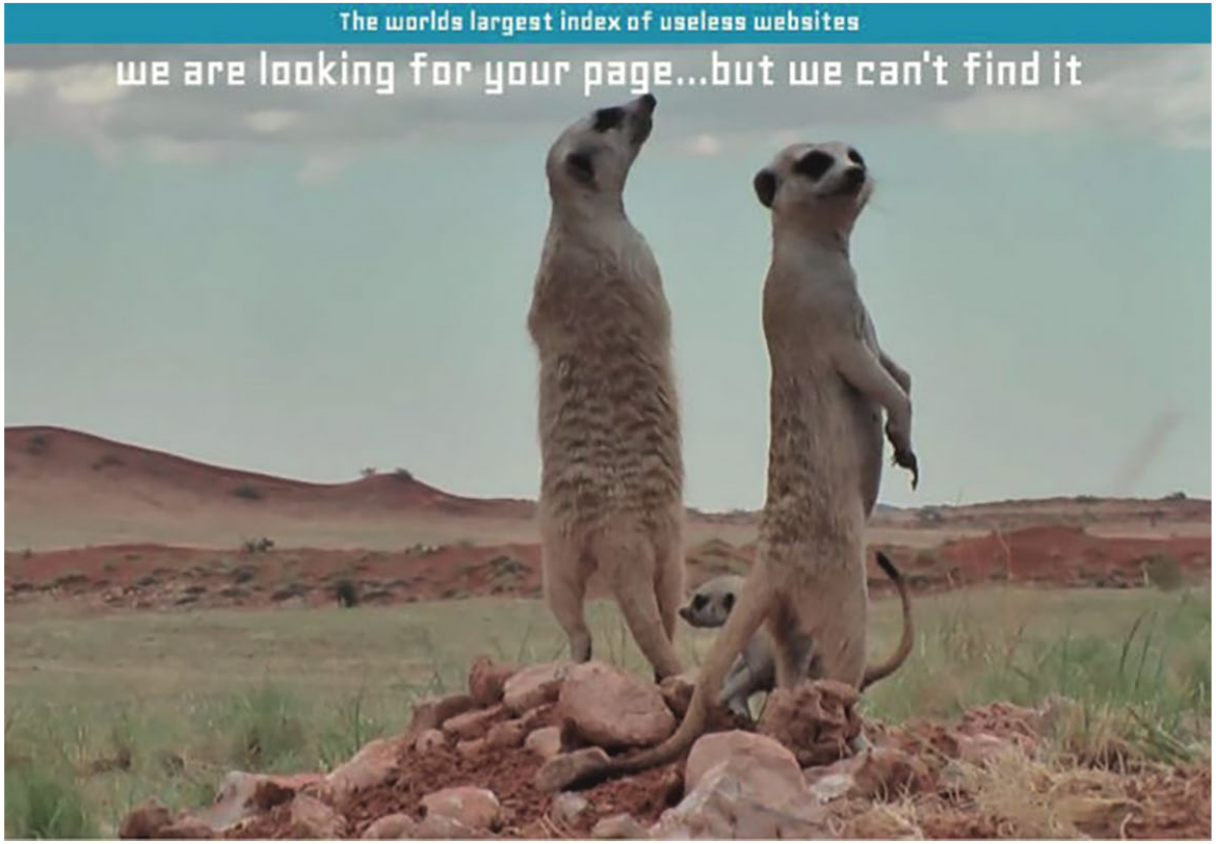
Why not instead?

"The application has expectedly quit due to poor coding in the operating system"

Shneiderman's classic guidelines for error messages include:

- Avoid using terms like FATAL, INVALID, or BAD
- Audio warnings
- Avoid UPPERCASE and long code numbers
- Messages should be precise rather than vague
- Provide context-sensitive help

A friendly cute image instead of the impersonal 404 error message



Dilemma: Should computers say they're sorry?

- Reeves and Naas (1996) argue that computers should be made to apologize
- Should emulate human etiquette
- Would users be as forgiving of computers saying they're sorry as people are of each other when saying they're sorry?
- How sincere would they think the computer was being? For example, after a system crash:
  - "I'm really sorry I crashed. I'll try not to do it again"
- How else should computers communicate with users?

Dilemma: Should voice assistants teach kids good manners?

- Many children talk to Alexa as if she was their friend
- They also learn that it is not necessary to say please and thank you to her when asking questions
- Is this lack of using etiquette a problem?
- Would it transfer over to real life situations?
  - For example, demanding “Auntie, get me my drink.”
- Parents should still teach their kids good manners
- Alexa can be configured to be polite as well
- How much parental control should voice assistants be given?
- Would children find it weird or creepy that their Alexa (who is their friend) nags them to clean their teeth?

Affective Computing and Emotional AI

- *Affective computing is* concerned with how to use computers to recognize and express emotions as humans do (Picard, 1998)
- It involves designing ways for people to communicate their emotional state
- It uses sensing technologies to measure GSR, facial expressions, gestures, and body movement
- Explores how affect influences personal health
- *Emotional AI* aims to automate the measurement of feelings and behavior using AI to infer them from facial expressions and voice
- The goal is to predict user's emotions and aspects of their behavior
  - For example, what is someone most likely to buy online when feeling sad, bored, or happy

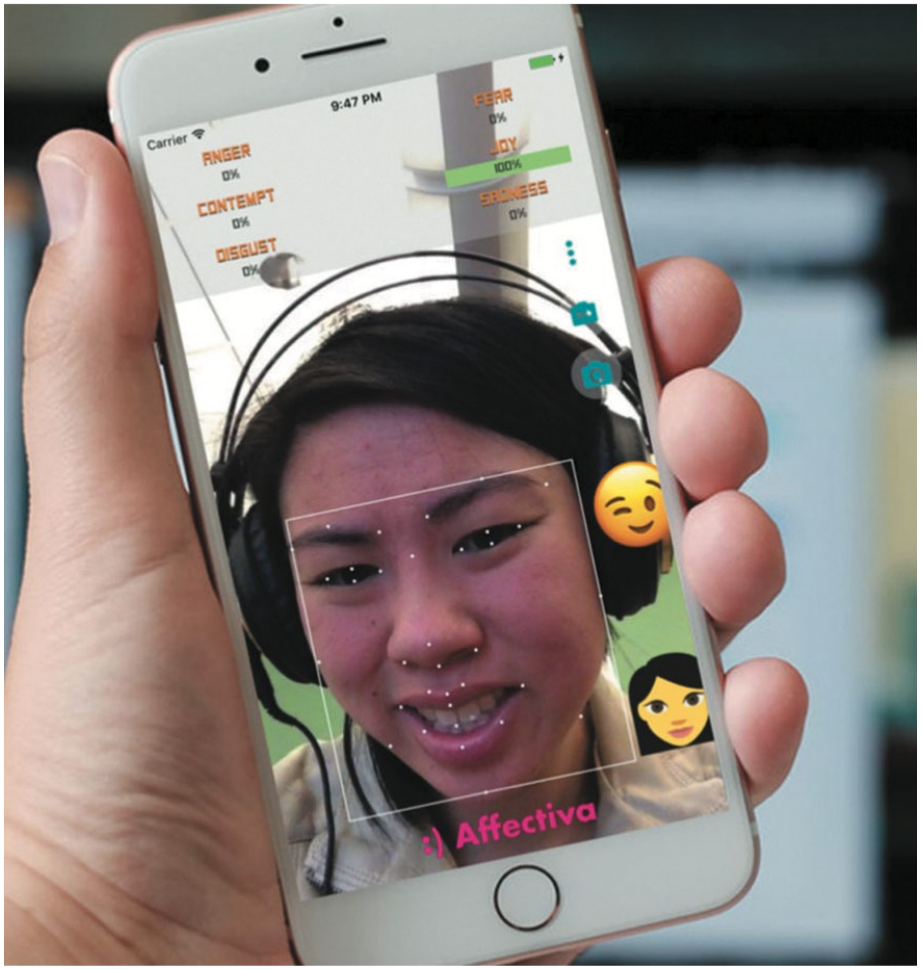
Techniques used

- Cameras for measuring facial expressions
- Biosensors placed on fingers or palms to measure GSR
- Affective expression in speech (for example, intonation, pitch, and loudness)
- Body movement and gestures using accelerometers and motion capture systems

Classification of emotions

- Six core expressions typically measured:
  - Sadness, disgust, fear, anger, contempt, and joy
- Type of facial expression chosen by AI through detecting presence of absence of:
  - Smiling, eye widening, brow raising, brow furrowing, raising a cheek, mouth opening, upper-lip raising, and wrinkling of the nose

Facial coding using Affdex software



How is this emotional data used?

- If user screws up their face when an ad pops up
  - ➡ Feel disgust
- If user starts smiling
  - ➡ They are feeling happy
- Website can adapt its ad, movie storyline, or content to match user's emotional state
- If system used in a car, it might detect an angry driver and suggest they take a deep breath
- Eye-tracking, finger pulse, speech, and words/phrases also analyzed when tweeting or posting to Facebook

Indirect emotion detection

- Also used more to infer or predict someone's behavior
  - For instance, determining a person's suitability for a job or how they will vote in an election
- Do you think it is ethical that technology can read your emotions from your facial expressions or from your tweets?

Persuasive technologies and behavioral change

- Interactive computing systems designed to change people's attitudes and behaviors (Fogg, 2003)
- A diversity of techniques now used to change what they do or think
  - Pop-up ads, warning messages, reminders, prompts, personalized messages, recommendations, or Amazon 1-click
  - Commonly referred to as *nudging*

Nintendo's Pocket Pikachu

Developed to change bad habits and improve well being

- Designed to motivate children to be more physically active on a regular basis
- Owner of the digital pet that 'lives' in the device is required to walk, run, or jump
- If owner does not exercise, the virtual pet becomes angry and refuses to play anymore

How effective?

- Can interactive technologies that monitor, nag, or behave like a human keep them interested in looking after it and in doing so make themselves more fit?
- How does looking after a virtual pet change a child's behavior?
  - Emotional attachment
  - Happy Pokemon makes them feel good
  - Sulking Pokemon makes them feel bad

Tracking devices

- Mobile apps designed to help people monitor and change their behavior (for instance, fitness, sleeping, or weight)
- Can compare with online leader boards and charts to show how they have done in relation to their peers and friends
- Also apps that encourage reflection, which in turn increase well-being and happiness

Sustainable HCI

- Focus on designing tech interventions to help people reduce their energy consumption
- An effective technique is to provide homeowners with feedback on their consumption
- Simple infographics and emoticons are often most powerful:
  - Encourage people to reflect and see what they can change to reduce their energy consumption
- Peer pressure and social norms are also powerful methods

The Tidy Street project

- Large-scale visualization of the street's electricity usage
  - Stenciled display on the road surface using chalk
  - Provided real-time feedback that all could see change each day
  - Reduced electricity consumption by 15 percent

(Bird and Rogers, 2010)

Phishing scams

- Web used to deceive people into parting with personal details
  - For example, PayPal, eBay, and “you won the lottery” emails
- Allows Internet fraudsters to access their bank accounts and draw money from them
- Many vulnerable people fall for it
- The art of deception is centuries old but internet allows ever more ingenious ways to trick people

Anthropomorphism

- Attributing human-like qualities to inanimate objects (for instance cars or computers)
- Well known phenomenon in advertising
  - Dancing butter, drinks, and breakfast cereals
- Much exploited in human-computer interaction
  - Make user experience enjoyable and motivating
  - Make people feel at ease by reducing anxiety
- Furnishing technologies with personalities can make them enjoyable to interact with

Which message you prefer?

As a welcome message:

- *“Hello Chris! Nice to see you again. Welcome back. Now what were we doing last time? Oh yes, Exercise 5. Let’s start again.”*
- *“User 24, commence Exercise 5.”*

Which do you prefer?

Feedback when user gets something wrong:

1. *"Now Chris, that's not right. You can do better than that. Try again."*
2. *"Incorrect. Try again."*

Is there a difference as to what you prefer depending on type of message? Why?

Evidence to support anthropomorphism

- Reeves and Naas (1996) found that computers that flatter and praise users in educational software programs result in:

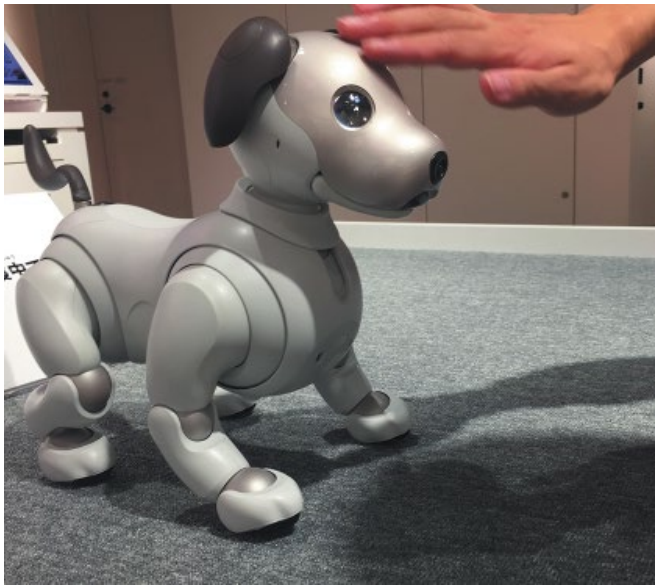
  ⇨ Positive impact on users

"Your question makes an important and useful distinction. Great job!"

- Students were more willing to continue with exercises with this kind of feedback

Robot-like or cuddly?

Which do you prefer and why?



(a)

Aibo

(b)

The Haptic Creature

Is it OK for seniors to develop an emotional attachment with the robot Zora?

Summary

- Emotional aspects of interaction design are concerned with how to facilitate certain states (for example, pleasure) or avoid reactions (for instance, frustration)
- Well-designed interfaces can elicit good feelings in people
- Aesthetically-pleasing interfaces can be a pleasure to use
- Expressive interfaces can provide reassuring feedback to users
- Badly designed interfaces make people frustrated, annoyed, or angry
- Emotional AI and affective computing use AI and sensor technology for detecting people's emotions by analyzing their facial expressions and conversations
- Emotional technologies can be designed to persuade people to change their behaviors
- Anthropomorphism is the attribution of human qualities to objects
- Increasingly, robots are being used as companions in the home