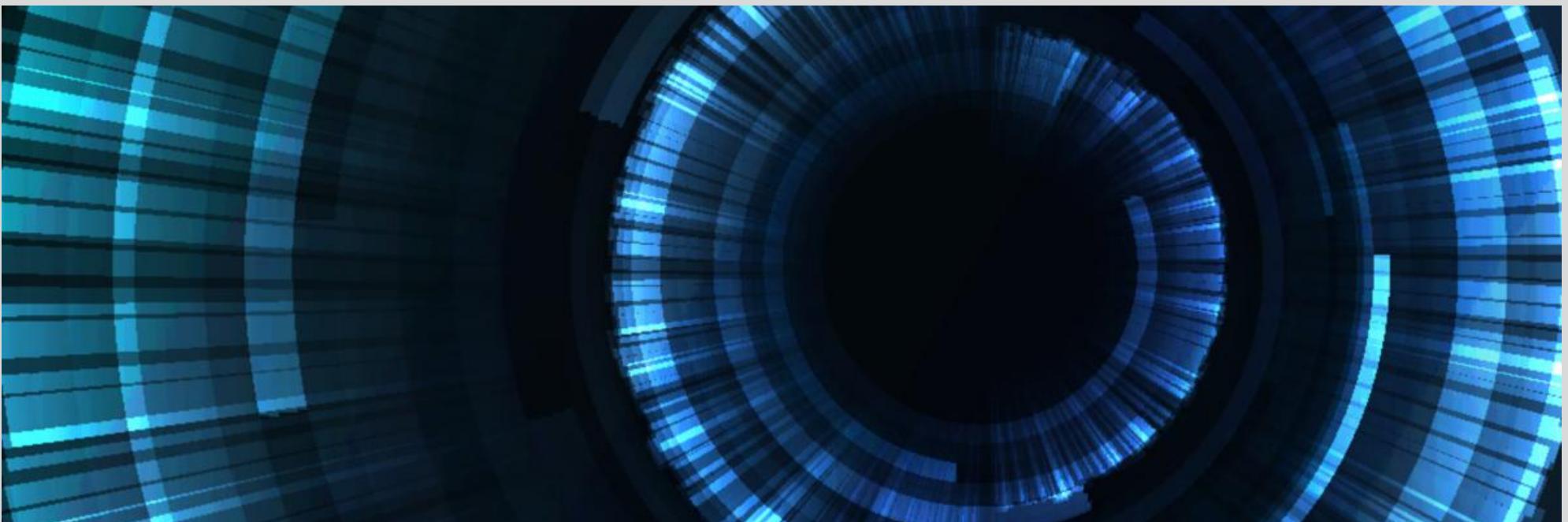


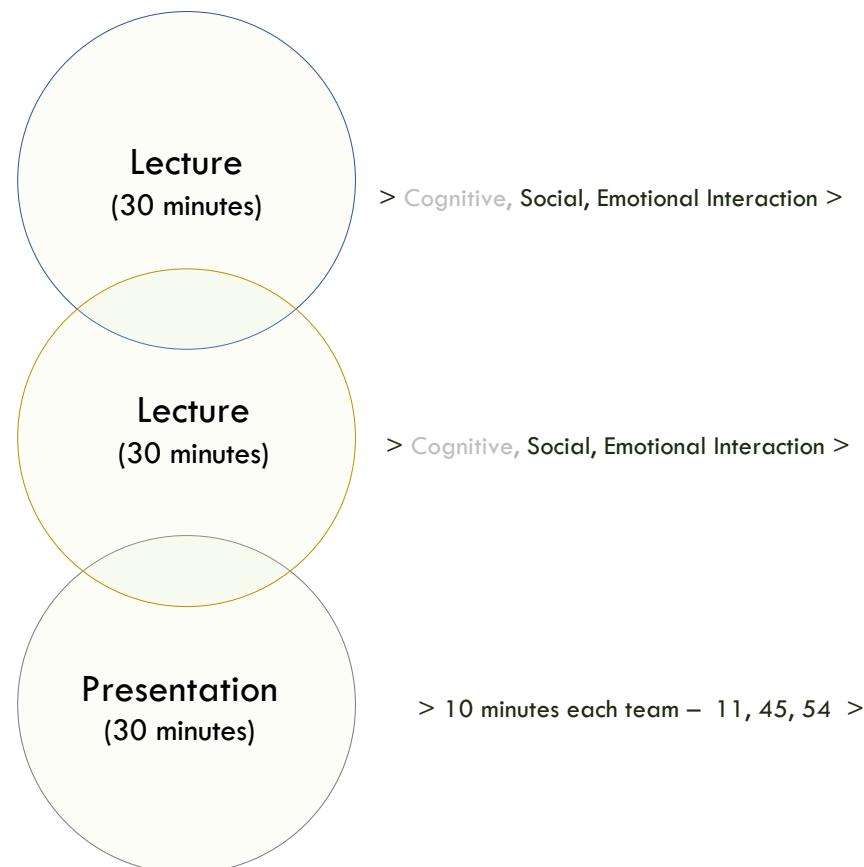
Human Computer Interaction



Original PPT: Dr Grace Eden
grace@iiitd.ac.in



Agenda – 16 February



This week – 14 & 16 February

Monday 14 February

.. AMS - 1, 34, 47

Wednesday 16 February

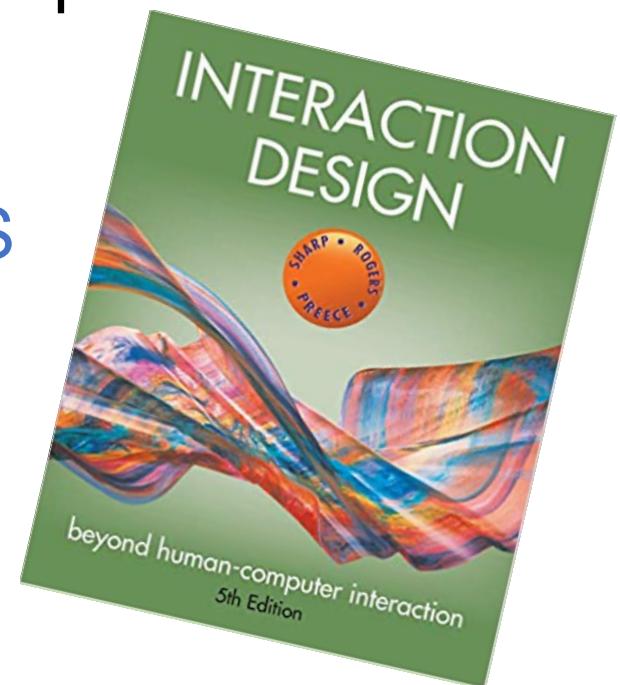
TEAMS - 11, 45, 59

Next Week – Mid-Semester Examination

Wednesday 23 February 11:00-12:00pm

Interaction Design: Beyond Human-Computer Interaction.
2019. (5th Edition)

ALL CHAPTERS & LECTURE TOPICS
COVERED UPTO END OF WEEK 7



Goals of this session

- ◆ *Individual cognition*
 - ◆ *What is cognition*
- ◆ *Social interaction*
 - ◆ *Presence and conversation*
- ◆ *Emotional interaction*
 - ◆ *Expressing the interface*

Social Interaction

Social interaction

People are inherently social: we live together, work together, learn together, play together, interact and talk with each other, and socialize.

A number of technologies have been developed specifically to enable us to persist in being social when physically apart from one another, many of which have now become part of the fabric of society.

These include the widespread use of smartphones, video chat, social media, gaming, messaging, and telepresence. Each of these afford different ways of supporting how people connect.

Social interaction

There are many ways to study what it means to be social. In context to HCI, we focus on how people communicate and collaborate face-to-face and remotely in their social, work, and everyday lives—with the goal of providing models, insights, and guidelines to inform the design of “social” technologies that can better support and extend them.

A diversity of communication technologies have changed the way people live—how they keep in touch, make friends, and coordinate their social and work networks.

The conversation mechanisms that have conventionally been used in face-to-face interactions are described and discussed in relation to how they have been adapted for the various kinds of computer-based conversations that now take place at a distance.

Social interaction - overview

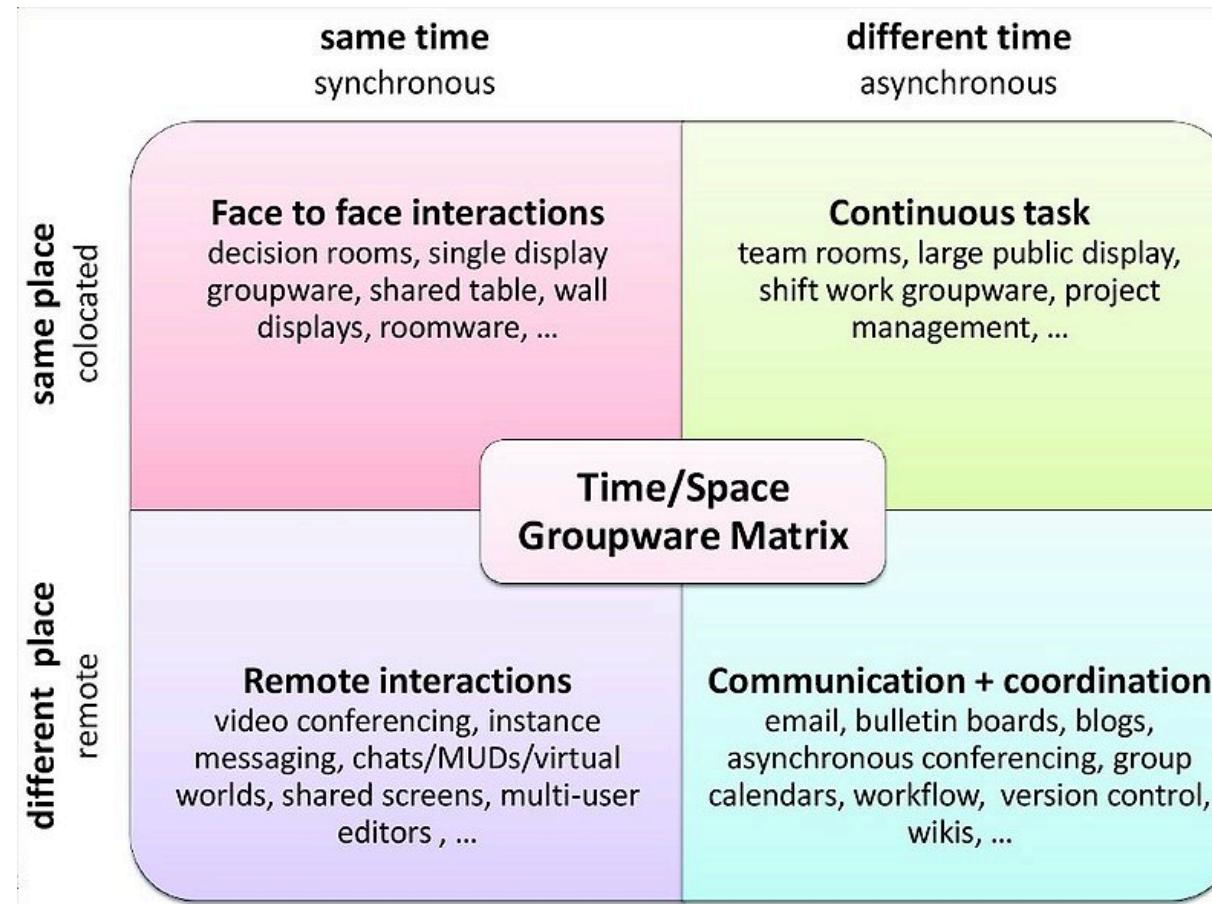
1. Being social
2. Face to face conversations
3. Remote conversations
4. Tele-presence
5. Coordination mechanisms
6. Awareness mechanism

1. Being social

During the last 20 or so years, social media, teleconferencing, and other social-based technologies (often referred to as social computing) have also transformed how people collaborate and work together globally.

- Are F2F conversations being superseded by our social media interactions?
People now spend several hours a day communicating with others online—texting, instant messaging, email, Tweet, Facebook, Skype, Webex, Zoom, Google Meet, WhatsApp, Instagram, Snapchat, etc and and other workplace communication/collaboration tools, such as Shared Calendars, Google Docs, Slack, Yammer, Teams or Trello. Widespread use of networking platforms such as LinkedIn...
- How many friends do you have on Facebook, LinkedIn, etc. vs. real life?
- How much overlap?
- How are the ways we live and interact with one another changing?
- Are the established rules and etiquette still applicable to online and offline? Keeping the video off during class/meeting?
Answering these questions can help us understand how existing tools support communication & collaborative work while helping to inform the design of new ones.

Social computing



2. Face-to-face conversation

- Turn-taking used to coordinate conversation
 - A: I have one class in the evening.
 - B: On Mondays?
 - A: Yuh, Wednesdays.
 - B: Ah, Wednesdays,
- Implicit and explicit cues
 - e.g. looking at watch, putting things in your bag
 - saying “I must go, look at the time, I’m late...”

Breakdowns in conversation

When someone says something that is misunderstood:

- Speaker will repeat with emphasis
 - A: But you said x
 - B: No, I said y
- Also use tokens
 - Eh? Huh? Mmm?

What happens in computer-mediated conversations?

- Do same conversational rules apply?
- Are there more breakdowns?
- How do people repair them for:
 - Phone?
 - email?
 - Instant messaging?
 - texting?
 - Skyping?

3. Remote conversations

- **Meet/Zoom, etc.:**
 - Seeing others on screen enables more intimacy than audio phone
- **Facebook & Twitter:**
 - Real-time updates of daily life, emergencies, traffic, political action
- **Virtual worlds:**
 - Second life and gaming allows for real-time interaction through an avatar
 - Metaverse (a virtual-reality space in which users can interact with a computer-generated environment and other users.)

4. Telepresence

- Technologies designed to allow a person to feel as if they were present in the other location
 - Projecting their body movements, actions, voice and facial expressions to the other location or person
 - e.g telepresence robots have been developed to enable children who are in a hospital to attend school by controlling their assigned robots to roam around the classroom
 - e.g. superimpose images of the other person on a workspace

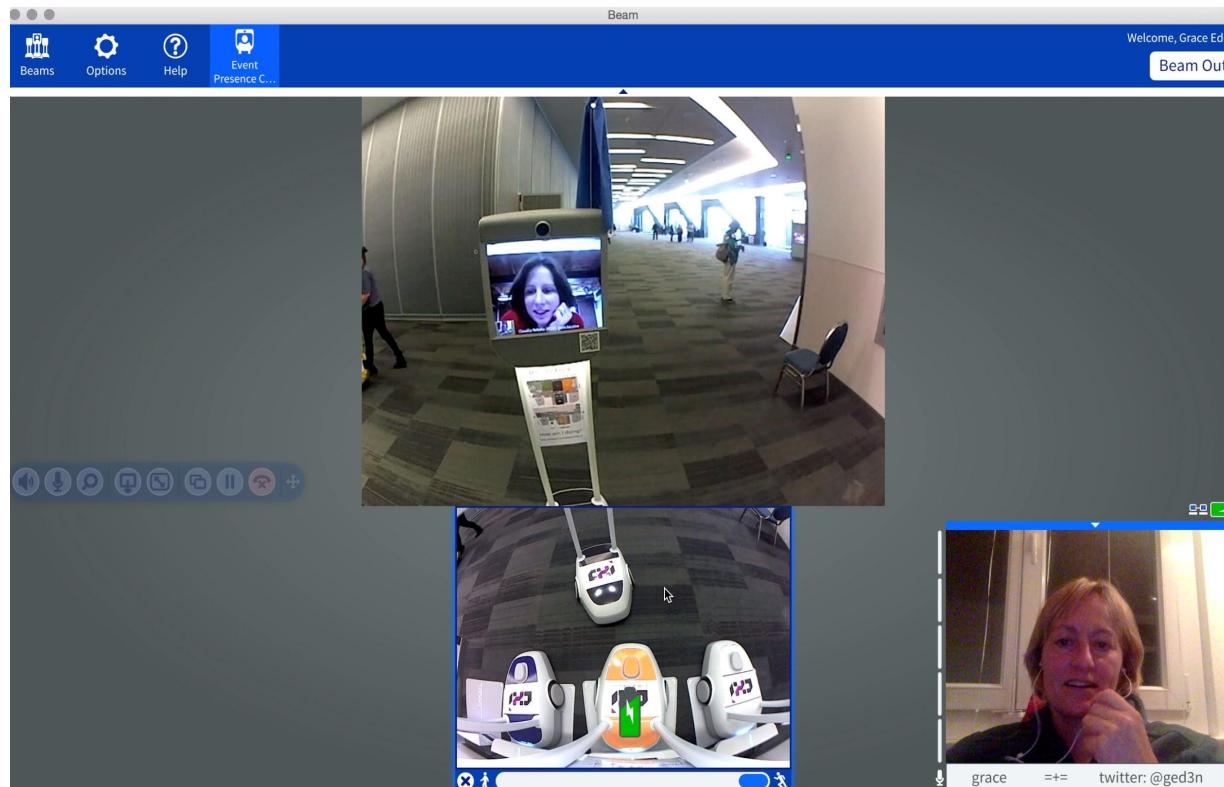
Telepresence



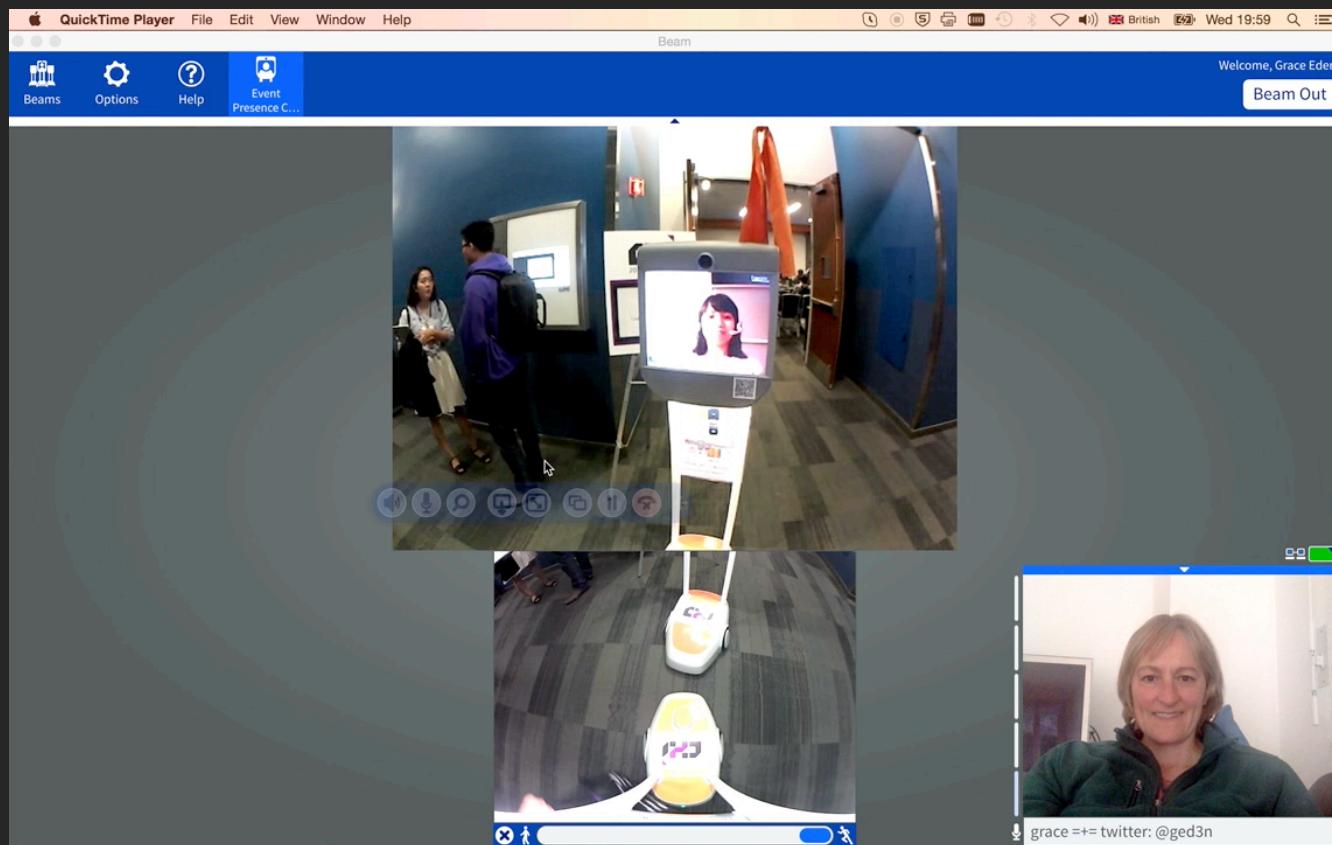
Figure 4.8 A telepresence room

Source: Cisco Systems, Inc with permission.

Telepresence



Telepresence



5. Coordination mechanisms

- When a group of people act or interact together they need to coordinate themselves
 - e.g., playing football, navigating a ship
- They use:
 - verbal and non-verbal communication
 - rules, and conventions
 - shared understandings

6. Awareness mechanisms

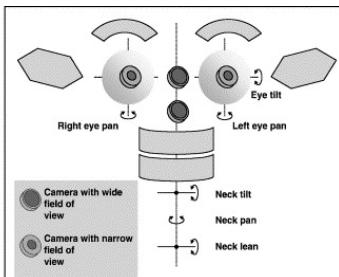
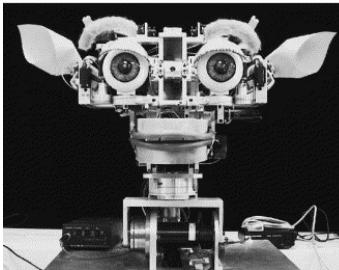
- Involves knowing who is around, what is happening, and who is talking with whom
- Peripheral awareness
 - keeping an eye on things happening in the periphery of vision
 - Overhearing and overseeing - allows tracking of what others are doing without explicit cues

Summary

- Human beings are inherently social.
- People will always need to collaborate, coordinate, and communicate with one another, and the diverse range of applications, web-based services, and technologies that have emerged enable them to do so in more extensive and diverse ways.
- Core aspects of social interaction, namely, communication, collaboration and social mechanisms have evolved in face-to-face and remote contexts to facilitate conversation, coordination, and awareness.
- Many kinds of technologies have been developed to enable people to communicate remotely with one another.
- Keeping aware of what others are doing and letting others know what you are doing are important aspects of collaborative working and socialising

Emotional Interaction

Emotional Interaction



Kismet is a robot head made in the 1990s at Massachusetts Institute of Technology by Dr. Cynthia Breazeal as an experiment in affective computing (Designing technology to detect and recognize someone's emotions automatically from sensing aspects of their facial expressions, body movements, gestures, and so forth, a machine that can recognize and simulate emotions.) The name Kismet comes from a Turkish word meaning "fate".

[Wikipedia](#)

Emotional design is a growing area relating to the design of technology that can engender desired emotional states, for example, apps that enable people to reflect on their emotions, moods, and feelings. The focus is on how to design interactive products to evoke certain kinds of emotional responses in people. It also examines why people become emotionally attached to certain products (for instance, virtual pets), how social robots might help reduce loneliness, and how to change human behavior through the use of emotive feedback (affective computing).



ROBIN is a social companion robot that was designed to support children in healthcare settings. In Armenia, where it was developed, it was preliminarily studied in outpatient clinics and showed promise in reducing children's anxiety levels.

[Wikipedia](#)

Image Credit: UCLA Health



ZORA BOTS is a Belgian company specialized in new robotics comprehensive solutions designed to assist nurses, childcare and seniorcare workers in the support of children and the elderly.

[Wikipedia](#)

Emotional interaction - overview

- **Emotions and the User Experience**
- **Expressive Interfaces and Emotional Design**
- **Aesthetic Vs Annoying Interfaces**
- **Affective Computing and Emotional AI**
- **Persuasive Technologies and Behavioural Change**
- **Anthropomorphism**

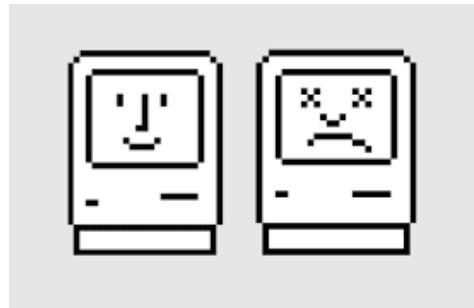
Emotions & the user experience

- 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
 - e.g. to be happy, to be trusting, to learn, to be motivated, adventurous (gamification)
- Emotional interaction is concerned with how we feel and react when interacting with technologies
- A good place to start understanding how emotions affect behavior and how behavior affects emotions is to examine how people express themselves and read each other's expressions.

Expressive Interfaces & Emotional Design

- Designers use a number of features to make an interface expressive. Emojis, sounds, colors, shapes, icons, and virtual agents are used to
 - (1) create an emotional connection or feeling with the user (for instance, warmth or sadness) and/or
 - (2) elicit certain kinds of emotional responses in users, such as feeling at ease, comfort, and happiness.
- Other ways of conveying expressivity include the following:
 - (3) Animated icons (for example, a recycle bin expanding when a file is placed in it and paper disappearing in a puff of smoke when emptied)
 - (4) Sonifications indicating actions and events (such as whoosh for a window closing, “schlook” for a file being dragged, or ding for a new email arriving)
 - (5) Vibrotactile feedback, such as distinct smartphone buzzes that represent specific messages from friends or family

- (a) Smiling and Sad Apple icons depicted on the classic Mac
(b) the spinning beach ball shown when an app freezes
(c) Android uses a spinning circle to show when a process is loading



Aesthetic Interfaces vs Annoying Interfaces



The Nest thermostat is more than just a smart meter, however. It was also designed to have a minimalist and aesthetically pleasing interface. It elegantly shows the temperature currently on its round face and to which temperature it has been set. This is very different from earlier generations of automatic thermostats, which were utilitarian box-shaped designs with lots of complicated buttons and a dull screen that provided feedback about the setting and temperature. It is little wonder that the Nest thermostat has been a success.



Sprouting provides tools that help parents by providing real-time insights about their child through wearable monitors.

Fisher-Price's wearable baby monitor is an unreliable rash machine

<https://www.engadget.com/2018-04-10-fisher-price-sprouting-baby-monitor-review.html>

Pros	Cons
<ul style="list-style-type: none">Excellent selection of sounds and songs	<ul style="list-style-type: none">Notifications are unreliable and confusingUrgent roll-over alerts indistinguishable from other messagesMay irritate sensitive skinBasic "baby monitor" features are missing
<p>The good</p> <p>The Sprouting app interface includes sections for 'Night Light' (with sliders for brightness and color), 'Music Play' (with a 'Choose a song' dropdown and playback controls), and a 'Sound' library with categories like 'High Beep', 'Low Beep', 'Drip Drip', 'Thunderstorm', and 'Blinking light'.</p>	

Annoying Interfaces

Interfaces, if designed poorly, can make people sometimes feel insulted, stupid, or threatened. The effect can be to annoy them to the point of losing their temper. There are many situations that cause such negative emotional responses. These include the following:

- 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 let the user know what to do
- When error messages pop up that are vague or obtuse
- When the appearance of an interface is too noisy, garish, gimmicky, or patronizing

Persuasive technologies & behavioural change

- Technology interventions have also been developed to change people's behaviors the emphasis is on changing someone's habits or doing something that will improve an individual's well-being through monitoring their behavior.



- Interactive computing systems deliberately designed to change people's attitudes and behaviours
- Various techniques now used to change what you do or think
 - Pop-up ads, warning messages, reminders, prompts, personalized messages, recommendations, Amazon 1-click
 - Commonly referred to as nudging

Affective Computing and Emotional AI

The main techniques and technologies that have been used to recognise & express emotions are as follows:

- Cameras for measuring facial expressions
- Biosensors placed on fingers or palms to measure galvanic skin response (which is used to infer how anxious or nervous someone is as indicated by an increase in their sweat)
- Affective expression in speech (voice quality, intonation, pitch, loudness, and rhythm)
- Body movement and gestures, as detected by motion capture systems or accelerometer sensors placed on various parts of the body.

- Affective computing is concerned with how to use computers to recognize and express emotions in the same way as humans do (Picard, 1998). It involves designing ways for people to communicate their emotional states, through using novel, wearable sensors and creating new techniques to evaluate frustration, stress, and moods by analyzing people's expressions and conversations.
- More recently, emotional AI has emerged as a research area that seeks to automate the measurement of feelings and behaviors by using AI technologies that can analyze facial expressions and voice in order to infer emotions.
- A number of sensing technologies can be used to achieve this and, from the data collected, predict aspects of a user's behavior, for example, forecasting what someone is most likely to buy online when feeling sad, bored, or happy.

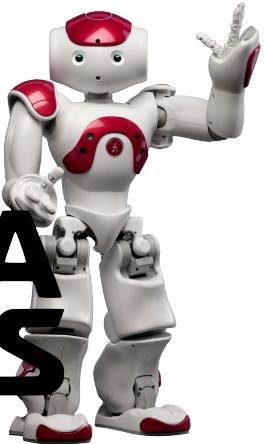
Anthropomorphism

Anthropomorphism is the inclination people have to attribute human qualities to animals and objects. For example, people sometimes talk to their computers as if they were humans, treat their robot cleaners as if they were their pets, and give all manner of cute names to their mobile devices, routers, and so on.

- Attributing human-like qualities to inanimate objects (e.g. cars, computers)
- Well known phenomenon in advertising
 - Dancing butter, drinks, breakfast cereals
- Much exploited in human-computer interaction
 - Make user experience more enjoyable, more motivating, make people feel at ease, reduce anxiety

Humaniod Robots

ZORA
BOTS



A number of commercial physical robots have been developed specifically to support care giving for the elderly. Early ones were designed to be about 2 feet tall and were made from white plastic with colored parts that represented clothing or hair. An example was Zora, developed in Belgium, that was marketed as a social robot for healthcare.

One was bought by a nursing home in France. Many of the patients developed an emotional attachment to their Zora robot, holding it, cooing, and even giving it kisses on the head.

However, some people found this kind of robot care a little demeaning. Certainly, it can never match the human touch and warmth that patients need, but there is no harm in it playing an entertaining and motivating role alongside human caregivers.



Animal Robots

A Robot or a Cuddly Pet?

Early robot pets, such as Sony's AIBO, were made of hard materials that made them look shiny and clunky. In contrast, a more recent trend has been to make them look and feel more like real pets by covering them up in fur and making them behave in more cute, pet-like ways.

Most people like stroking pets, so they may prefer a soft pet robot that they can also stroke



(a)



(b)

When the Haptic Creature is stroked, it responds accordingly, using the ears, breathing, and purring to communicate its emotional state through touch. On the other hand, the sensors are also used by the robot to detect the human's emotional state through touch.

Summary

- Well-designed interfaces can elicit good feelings in people
- Expressive interfaces can provide reassuring feedback to users
- Emotional technologies can be designed to persuade people to change their behaviours or attitudes
- Anthropo/Zoo - morphism is the attribution of human/animal qualities to objects

Key points

- Take each into account when considering interface design:
 - Cognitive Aspects or Processes
 - Social Interaction
 - Emotional Interaction

Human Computer Interaction



Original PPT: Dr Grace Eden
grace@iiitd.ac.in

Presented by Dr Indrani De Parker
indrani@iiitd.ac.in

