

Mon 5 Jan

Feeling/interaction with technology

Lecture 3: Emotional Interaction

Overview

- Emotions and the user experience
- Expressive and emotional design
- Affective computing and emotional AI
- Persuasive technologies and behavioral change
- Anthropomorphism

Based on material from:

Sharp, H., Preece, J. and Rogers, Y.(2019). *Interaction Design Beyond Human-Computer Interaction*. 5th Ed. Sussex: John Wiley & Sons Ltd.

Learning Outcomes

- How emotion relate to the user experience
- Provide examples of interfaces that are both pleasurable and usable
- Describe how technologies can be designed to change people's attitudes and behaviour

1. Emotions and the user experience

- HCI has traditionally been about designing efficient and effective systems *only looking at usability aspect*
- 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
- Emotional interaction is concerned with how we feel and react when interacting with technologies

Emotional interaction

- What makes us happy, sad, annoyed, anxious, frustrated, motivated, delirious and so on
 - translating this into different aspects of the user experience *emotionally attached to phone since I use it and feel lost without*
- Why people become emotionally attached to certain products (e.g. virtual pets)
- Can social robots help reduce loneliness and improve wellbeing?
- 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 (e.g. a fridge, a vacation, a computer)
 - registering your subjects for new semester online
 - uploading your vacation photos on the Facebook
- How many different emotions did you go through?

diff emotions using 1 program

TikTok → fun
→ short
→ interactive

Gen alpha emotionally attached to gadgets
disciplined through it ↑



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



Pulling at the heart strings with emotive message

[Homepage](#) | [Get involved](#) | [Reserve a place at Crisis at Christmas](#)[DONATE](#)

Will you help someone take their first step out of homelessness today?



1 place

2 places

5 places

10 places

20 places

50 places

100 places

£28.18

Donate £28.18 now

Or

Number of places

Donate

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, focussed?

How do emotions affect behavior and behavior emotions?

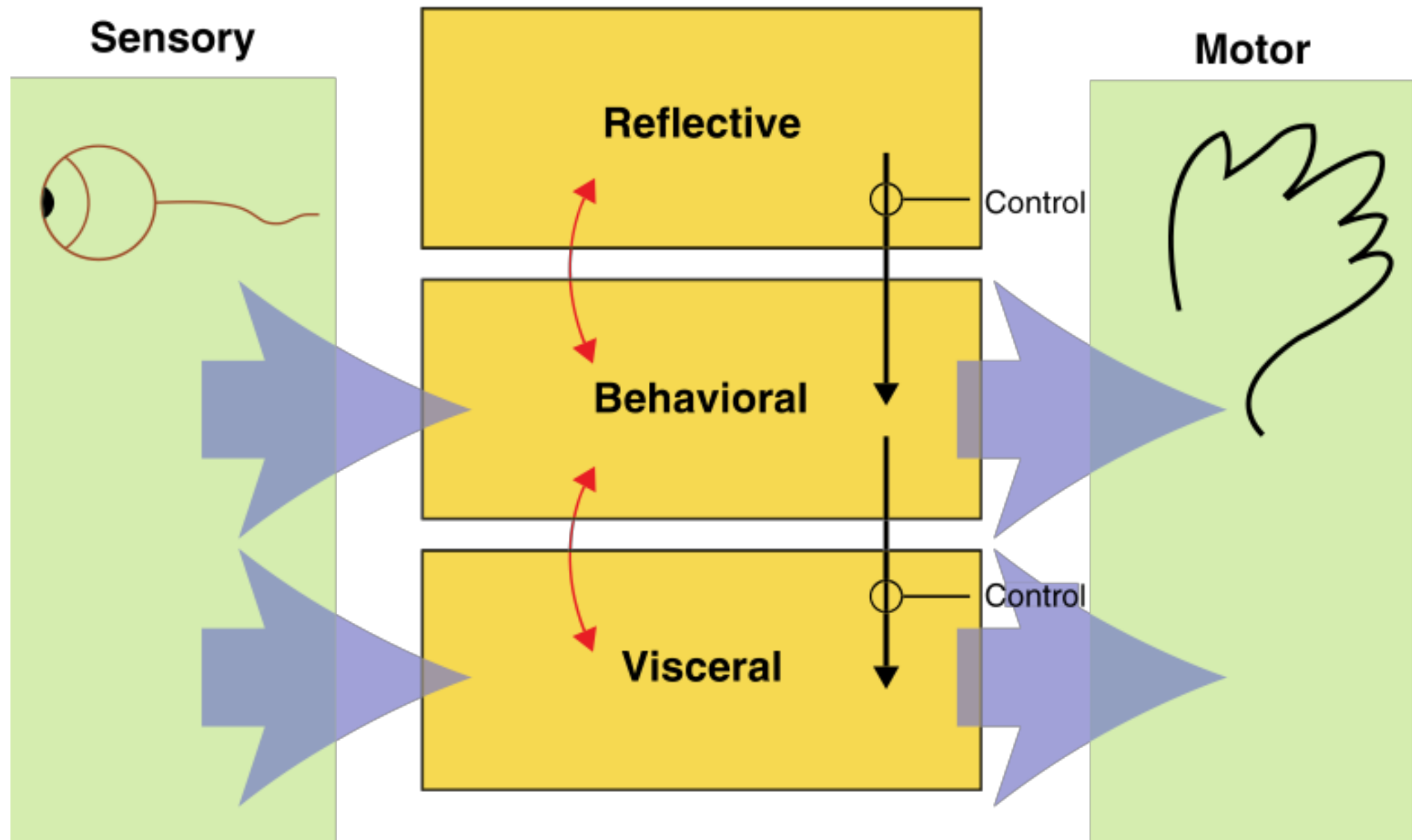
- Examine how people express themselves and read each other (emotional intelligence)
 - understand relationship between facial expressions, body language, gestures and tone of voice, e.g.
 - when people are happy they laugh and relax body posture
 - when they are angry they screw up their face
- Does 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

automatic vs. conscious
Short lived

- Emotions can be short-lived (e.g. fit of anger) or complex and long-lasting (e.g. jealousy)
- Have been categorized as automatic or conscious
 - Automatic ones are rapid and dissipate quickly
 - ^{hating / jealous} Conscious ones develop slowly and take a long time to go (e.g. 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 body responds by tensing muscles and sweating
 - more likely to be less tolerant
- when happy we are less focused and the body relaxes
- More likely to overlook minor problems and be more creative

Designing with the three levels in mind

Imgs:
colors
categories



- Visceral design refers to making products look, feel and sound good

message
view grades
submit hw

functions & features

- Behavioral design is about use and equates with traditional values of usability

personal value

- Imgs
e-learning platform
- Reflective design is about considering the meaning and personal value of a product

Analyzing a swatch watch design using the model



Apple watch
personal value: smart watch

personal value:

represent funky images

- Cultural images and graphical elements designed at reflective level

behavioral $\begin{matrix} \nearrow \text{time} \\ \searrow \text{date} \end{matrix}$

- Affordances of use at behavioral level

visceral

- Brilliant colors and wild design attract user's attention at visceral level



2. Expressive interfaces



- Provide reassuring feedback that can be both **informative** and **fun**
- But can also be intrusive, causing people to get annoyed and even angry
- Color, icons, sounds, graphical elements and animations are used to make the 'look and feel' of an interface appealing *Talked about before*
 - 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 (e.g. slow download rate) if the end result is appealing and aesthetic

User-created expressiveness

- Users have created a range of *emoticons* - compensate for lack of expressiveness in text communication:
 - Happy :)
 - Sad :<
 - Sick :X
 - Mad >:
 - Very angry >:-)
- Also use of icons and shorthand in texting and instant messaging has emotional connotations, e.g.
 - LOL, I 12 CU 2NITE

TTFN → Winnie the pooh
Ta-ta for now

The appearance of an interface

making it more appealing

- (a) Emotional icons were used in the 80s to indicate rebooting or crashed
 - smiling apple face
- (b) Nowadays use more impersonal but aesthetically pleasing icons to indicate user needs to wait
 - the beachball



(a)



(b)

The design of thermostats

- (a) The Nest has a minimalist and aesthetically pleasing design
 - Round face and simple dial
 - Large font and numbers
- (b) Very different from earlier thermostat designs
 - utilitarian and dull



(a)



(b)

fall under deeply
↑ unpleasurable

3. Frustrating interfaces

Delay in website: can't submit homework
requires too many steps: deeply driven

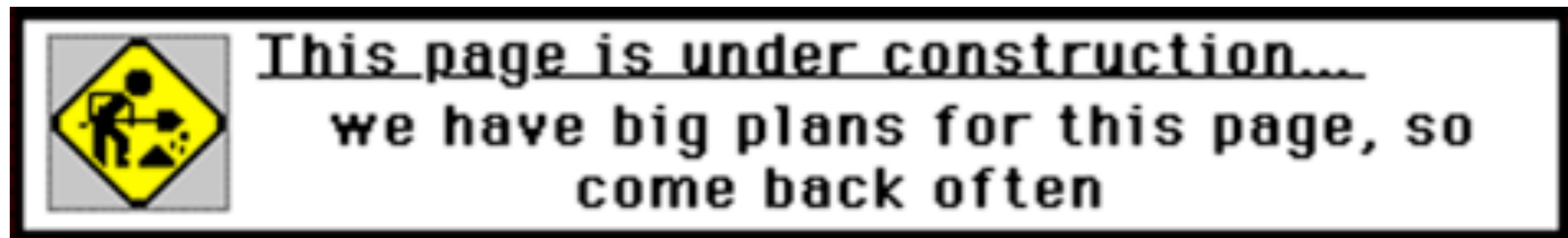
must relate real-life
examples to each cause

- 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 a mistake was made earlier and they need to start all over again

Gimmicks

- Amusing to the designer but not the user, e.g.
- Clicking on a link to a website only to discover that it is still 'under construction'

Expecting website to work, but it doesn't



Error messages

- “The application Word Wonder has unexpectedly quit due to a type 2 error.”

→ Shows that the risk out of developers' hand

- **Why not instead:**

avoid jargon

- “the application has *expectedly* quit due to poor coding in the operating system”
- Shneiderman's guidelines for error messages include:
 - avoid using terms like FATAL, INVALID, BAD
 - Audio warnings
 - Avoid UPPERCASE and long code numbers
 - Messages should be precise rather than vague
 - Provide context-sensitive help

Website error messages

Error 404 – Web Page Not Found

FLPPS009

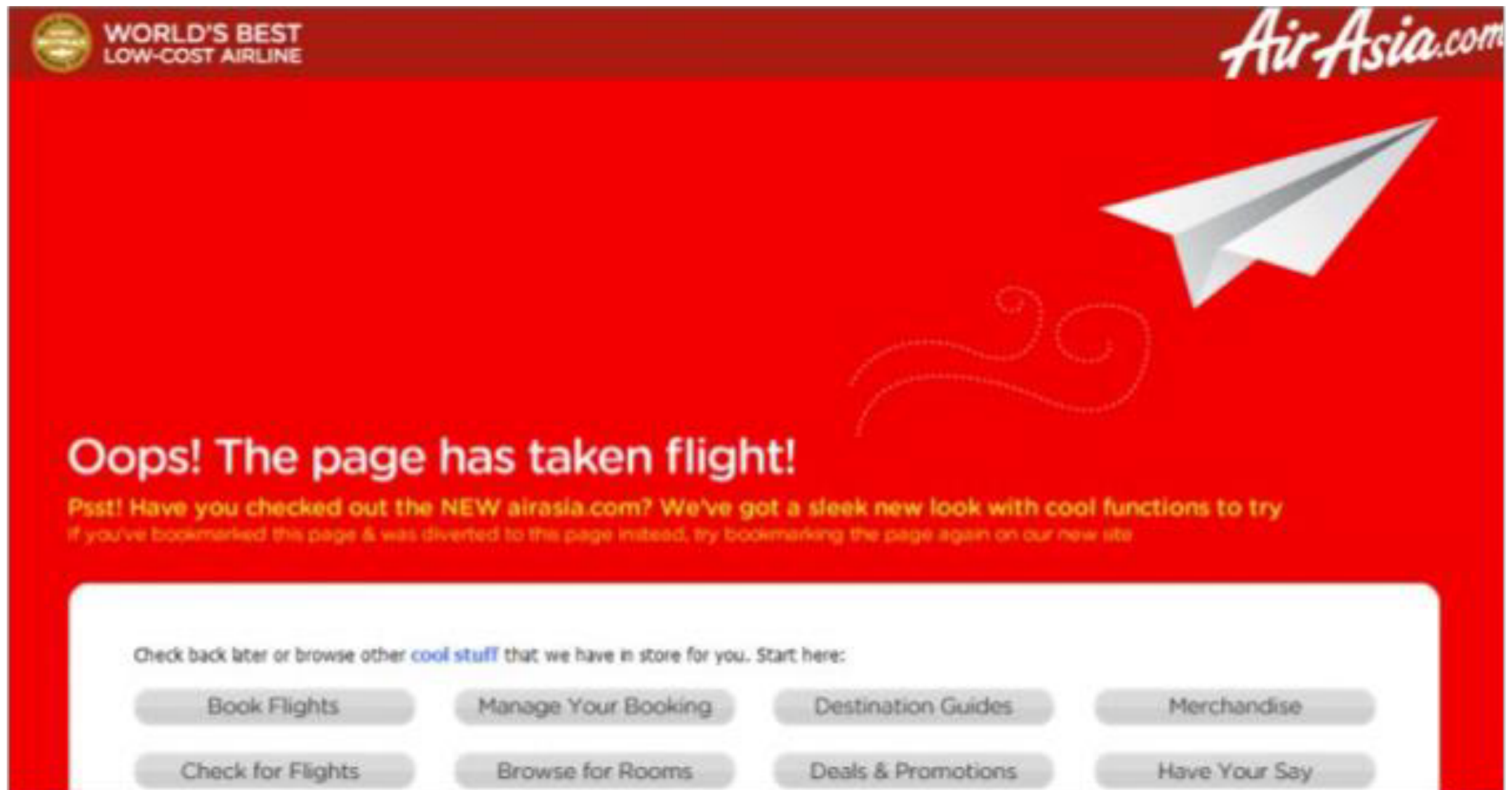
FastLane Error!

Your login information is incorrect...

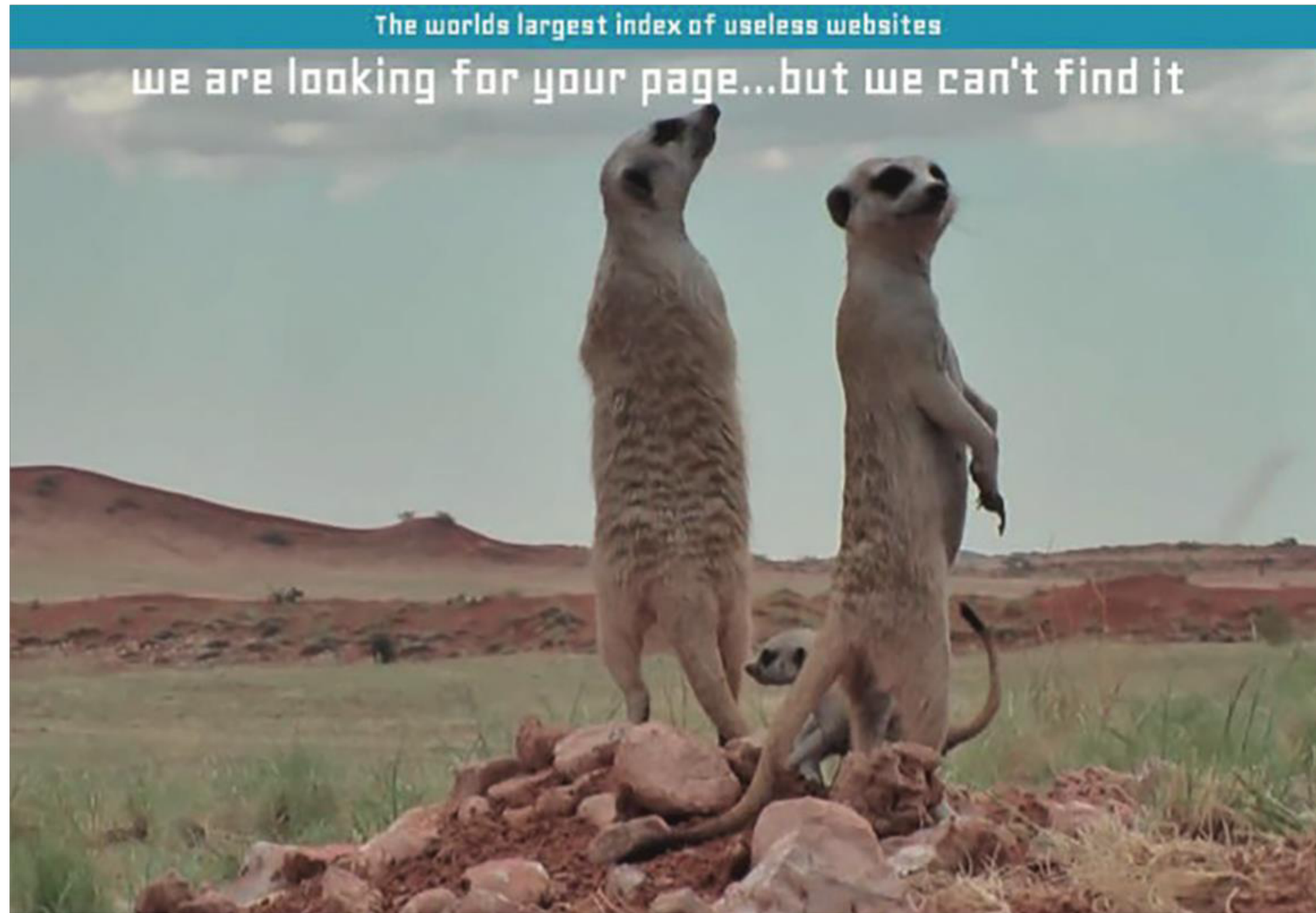
Please verify that you typed in your Last Name, SSN and Password correctly. If you still cannot login, Please contact the FastLane Administrator regarding your access rights.

[Return To Previous Page](#)

More helpful error message (cont)



A friendly cute image instead of the impersonal 404 error message



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 sorry as people are of each other when saying 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?
 - e.g. demanding “Aunty, 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* concerned with how to use computers to recognize and express emotions as humans do (Picard, 1998)
- Involves designing ways for people to communicate their emotional state
- Uses sensing technologies to measure GSR, facial expressions, gestures, 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
- Aim is to predict user's emotions and aspects of their behavior
 - e.g. what is someone most likely to buy online when feeling sad, bored or happy

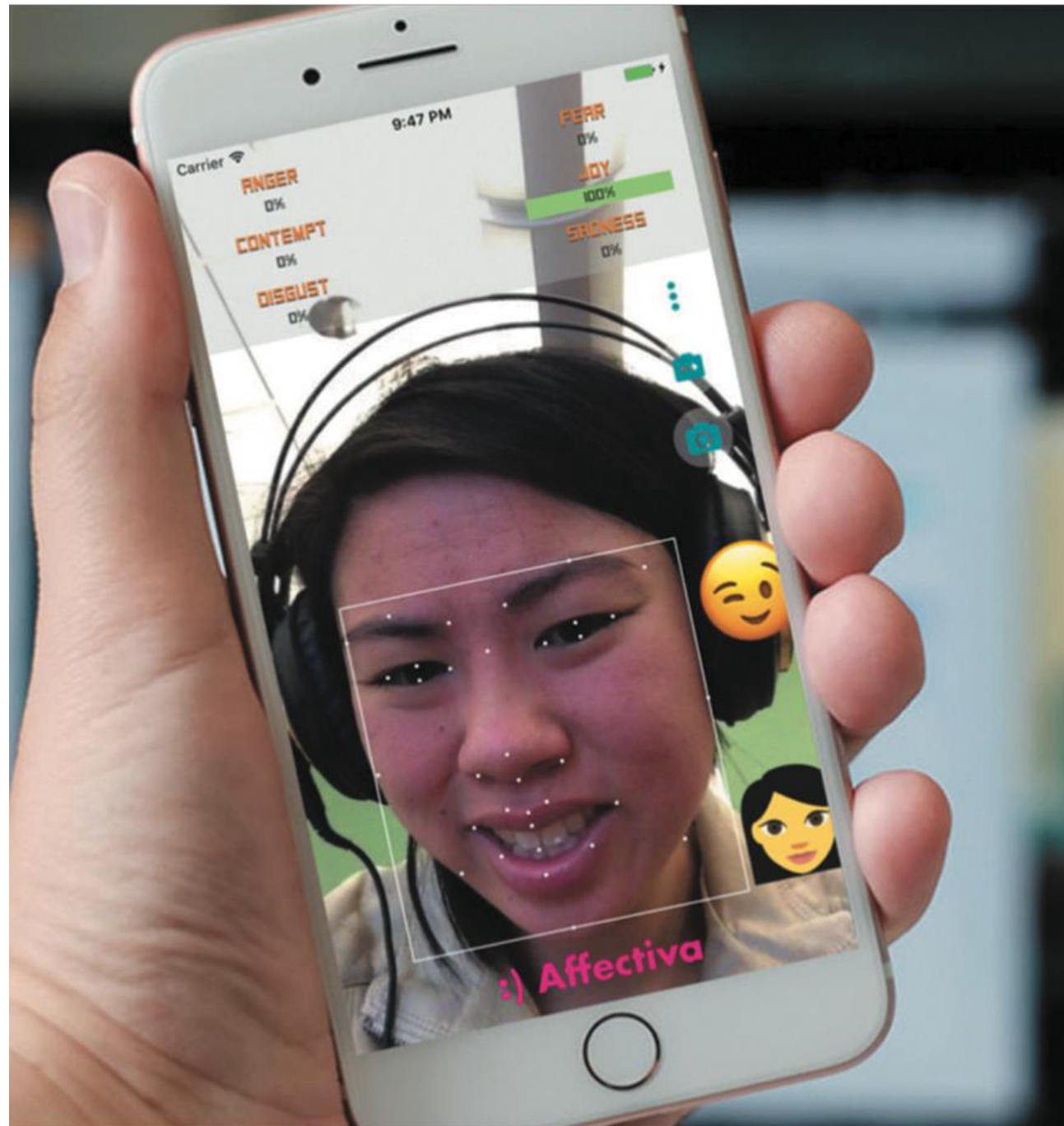
Techniques used

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

Classification of emotions

- Six core expressions typically measured:
 - sadness, disgust, fear, anger, contempt, 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, wrinkling of the nose

Facial coding using Affdex software



Happy

How is this emotional data used?

- If user screws up their face when an ad pops up -> feel disgust
- If start 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 driver takes a deep breath
- Eye-tracking, finger pulse, speech and words/phrases also analysed when tweeting or posting to Facebook



Indirect emotion detection

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

4. Persuasive technologies and behavioral change

- Interactive computing systems deliberately 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, Amazon 1-click
 - Commonly referred to as nudging

Enhance system interaction

How effective?

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



Tracking devices

- Mobile apps designed to help people monitor and change their behaviour (e.g. fitness, sleeping, 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 that 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 householders 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 realtime feedback that all could see change each day
 - reduced electricity consumption by 15%



Phishing scams

- Web used to deceive people into parting with personal details
 - e.g. Paypal, eBay, and won the lottery letters
- 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

Phishing & trust

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5. Anthropomorphism

lightning
Turning objects to life

- 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

Anthropomorphism

- Attributing human-like qualities to inanimate objects (e.g. cars, computers)
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 - make user experience enjoyable, motivating, make people feel at ease, reduce anxiety
- Furnishing technologies with personalities can make them enjoyable to interact with

Which do you prefer?

1. As a welcome message

more humane

“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.”

②

①

Which do you prefer?

2. Feedback when get something wrong

“Now Chris, that’s not right. You can do better than that. Try again.” ①

“Incorrect. Try again.” ② quicker but less

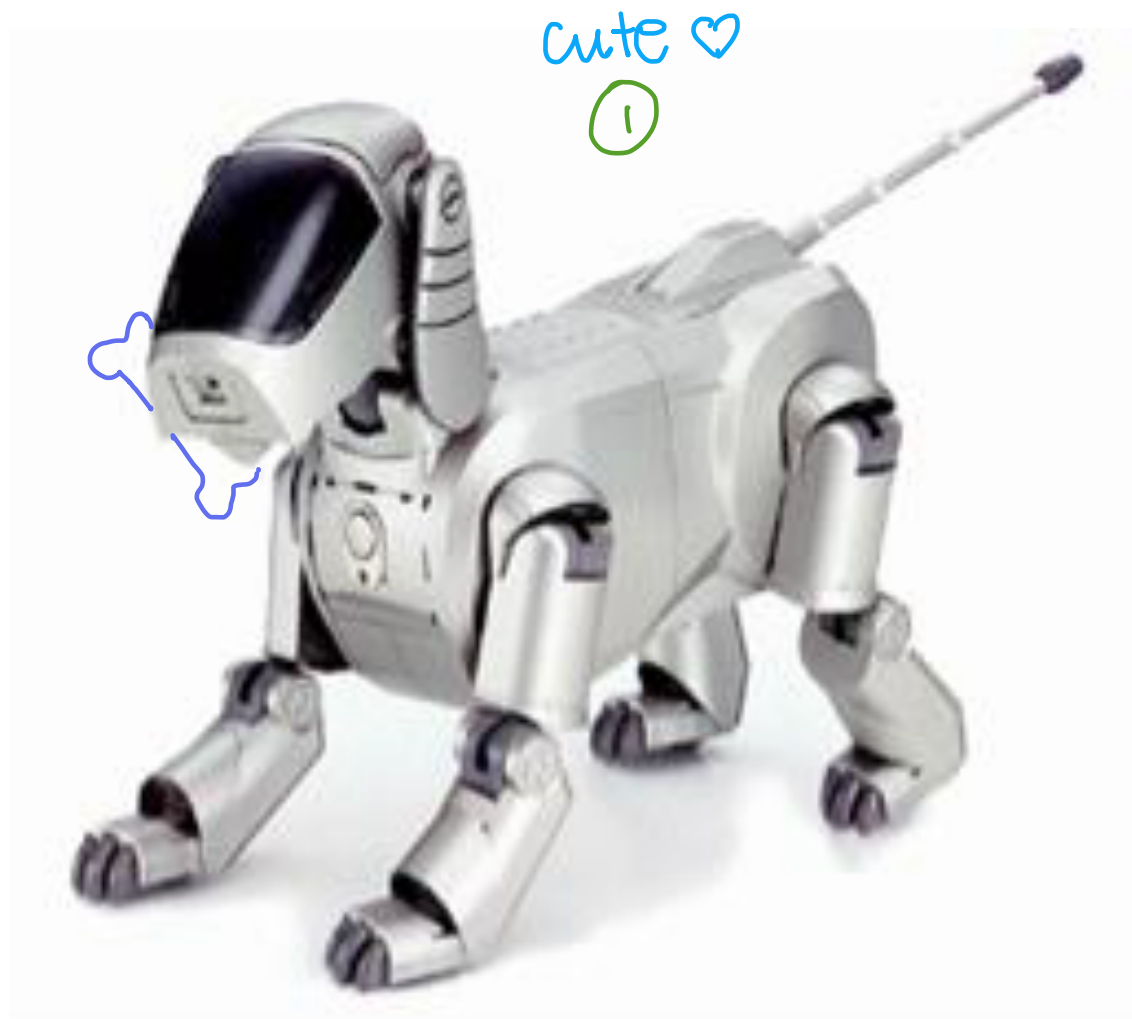
Is there a difference as to what you prefer depending on type of message? Why?

Evidence to support anthropomorphism

- Reeves and Naas (1996) found that computers that flatter and praise users in education software programs - > positive impact on them
- “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 cuddly?

- Which do you prefer and why?



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



Summary

- Emotional aspects of interaction design are concerned with how to facilitate certain states (e.g. pleasure) or avoid reactions (e.g. 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 through 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

BOJ