CMPT 363: User Interface Design
Summer 2021

Week 11: Emotional Design + Inclusive Design + Accessibility

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Assignment 2

- Individual assignment (available on Canvas https://canvas.sfu.ca/courses/63144/assignments/653607)
- Due on Jul 23, 11:59p
- Come up with 2 Questions & Answers based on materials we covered
  - Marked based on relevance, level, and clarity
- ~~Part 1 (not marked, optional)~~
  - ~~Submit 1 question by Jul 14 to get some feedback~~ (now available at "Submission Details" > "Comments")
- Part 2
  - Submit your actual work

Group Project Part 3

- Overview
  - To design the interface for an online calendar that facilitates different kinds of activities for university students
- Part 3 (due on Aug 6) (https://canvas.sfu.ca/courses/63144/assignments/653608)
  - Continue with your MFPs
    - Cognitive Walkthrough
    - Reflection
    - Video demo (upload to SFU Vault by Aug 1)
- Group Project Contribution Form (individual) (due on Aug 9)

Recap from Last Lecture

- Analytical evaluation
  - Cognitive walkthrough
    - Steps involved, its focus
  - Fitts' Law
    - What it is, examples of use
  - GOMS & KLM
    - What they are, strength & weaknesses
  - Involving users implicitly
    - What they are, strength & weaknesses

Today

- Emotional Design
- Inclusive Design (part 2)
- Accessibility (part 2)

Remember This Guy from Our First Lecture?

https://giphy.com/gifs/S7u66urzxc2J2

How Are Emotions & User Experience Related?

- Appearance & usage of interface affect users during and even after the interaction (lasting effects)
  - Frustrating to use, fear of making mistakes, uncertainty of progress
  - Feel of in control, smooth & thoughtful process, personalized experiences
- Persuasive technologies causing behavioural change
  - Changing one's attitudes towards an activity (e.g., gamifying language learning), motivating people (e.g., dynamic interfaces)
- Automatic emotional recognition/detection and adjustment of interface
  - Adjusting how information is presented based on current emotional state (e.g., selecting the right tone/response based on emotions and sentiments expressed by users over chat), building a more "human" interface

Why Are Emotions Important?

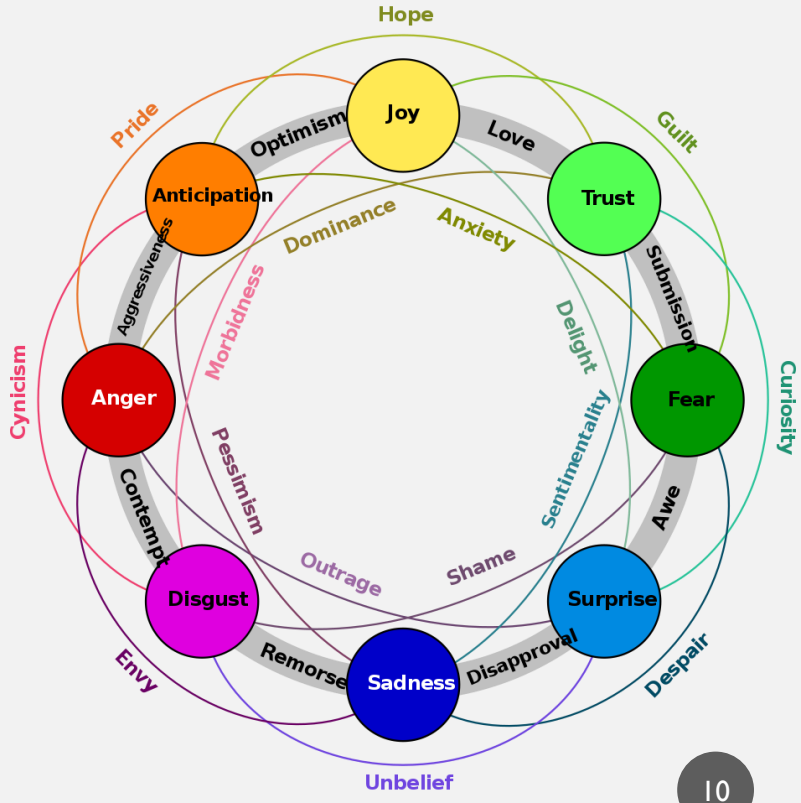
- When people feel good they tend to do more & buy more
  - Implication: beneficial to create interfaces that engenders positive emotions for employees & customers
- When people have negative emotions they tend to make more mistakes & become more aggressive
  - Implication: interfaces for stressful activities needs to provide more details and fail-safe mechanisms
- Satisfying user experience builds customer loyalty, brings in reputation & business
  - Do you remember last time when you were in a shop and being treated well or the transaction was very smooth?
- Recognizing user's emotions makes technology that is already pervasive more versatile and useful
- Human beings are emotional creatures, catering to this need makes technologies more suitable for human use
  - People tend to be more careful and forgiving with interfaces that show emotion

Emotional Design

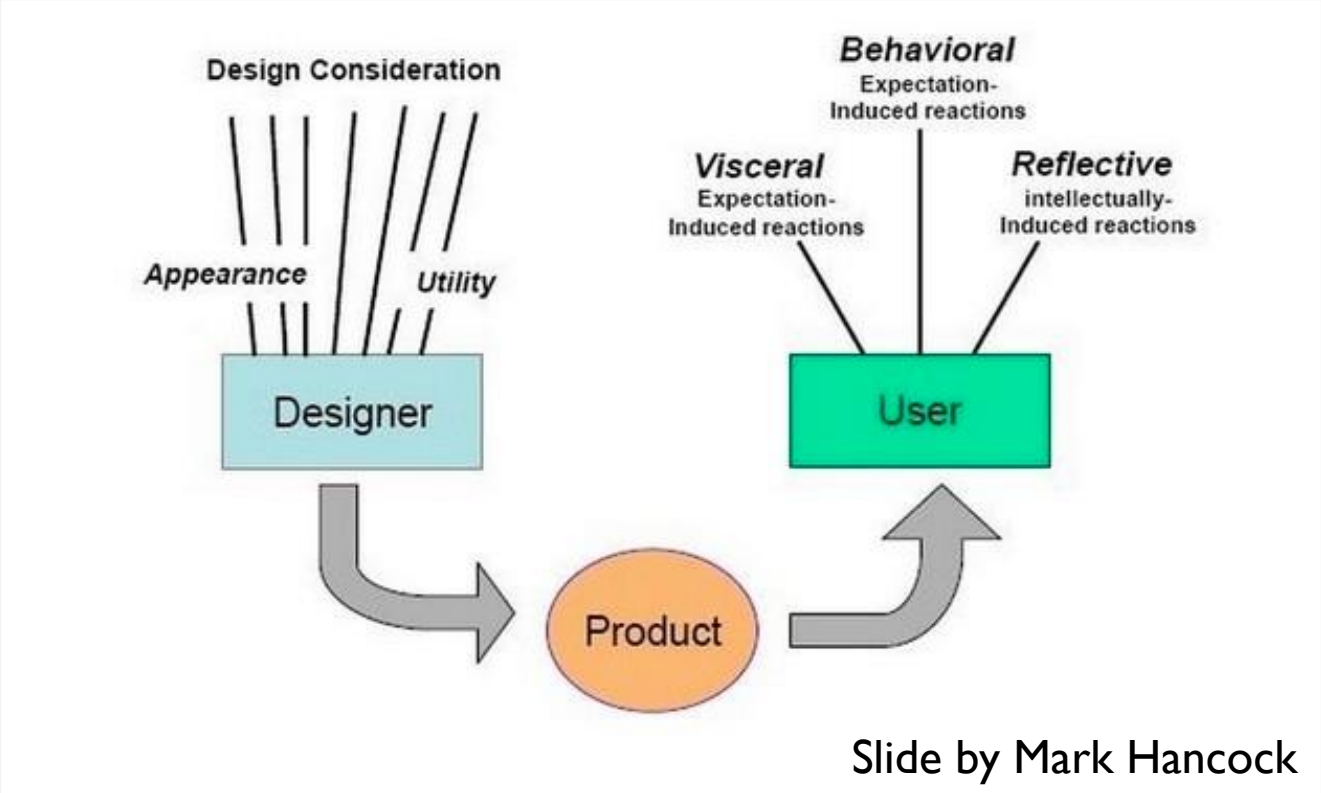
- The design of technology that can engender desired emotional states, for example, apps that enable people to reflect on their emotions, moods, and feelings (ID-Book p166)
  - Focuses on how to design interactive products to evoke different emotional responses in people
  - Examines why people become emotionally attached to certain products (e.g., social media platforms, virtual pets)
  - How social robots might help to cope with certain emotions (e.g., loneliness, grief, frustrations)
  - How to change human behaviour through emotive feedback

Understanding Emotions

- Some primary types
  - Anger, disgust, fear, happiness, sadness, surprise (Paul Ekman)
  - Anger, fear, sadness, disgust, surprise, anticipation, trust, joy (Robert Plutchik)
  - …etc. with secondary and tertiary, interconnected types
- Exhibited through
  - External: facial expressions, body languages, behaviours, tones
  - Internal: thoughts, hormonal releases, biometrics
- Can be simple & short-lived (automatic, typically caused by external triggers) or complex & long-lasting (conscious, result of conscious cognitive behaviour such as reflection & contemplation)



3 Levels of Emotional Design by Don Norman



Slide by Mark Hancock

Emotional Design Book by Don Norman, available through SFU library
https://sfu-primo.hosted.exlibrisgroup.com/permalink/f/15tu09f/01SFUL_ALMA51316126040003611

Visceral Level of Emotional Design

- Visceral – Physical features of the design that directly affect a person's perception
  - Lowest level concerned with how the brain is prewired to respond automatically to events happening in the world
  - Taps into user's attitudes, beliefs, feelings, wants
  - Described as pretty, cute, fun, attractive, gross, …etc.
  - Engendered by shape, form, & materials
    - E.g., "shiny" appearances, attractive outlooks

Behavioural Level of Emotional Design

- Behavioural – Utility and functionality of the design
  - Middle level concerned with how the design gets the work done
  - Taps into people's need to feel in control, the pleasure & effectiveness of use
  - Described as practical, functional, learnable, memorable, effective…etc.
  - Engendered by understanding user's needs, providing good usability (what we have been covering in the classes)
    - E.g., practical tools, multipurpose devices

Reflective Level of Emotional Design

- Reflective – Overall impression of the design on the user
  - Top level concerned with message, culture, and meaning of ownership or use
  - Taps into people's need of self-fulfillment, esteem, belonging, …etc.
  - Described as prestige, rarity, exclusiveness, meaningful, …etc.
  - Engendered by matching with the value of the user
    - E.g., bespoke accessories, responsible/ethical products

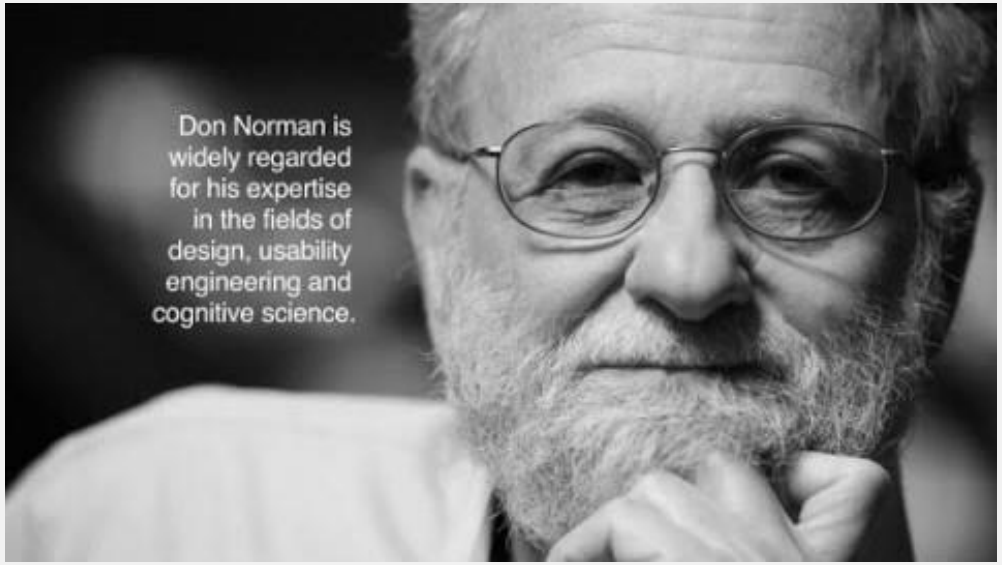
Notes on The 3 Levels of Emotional Design

- All 3 levels define the overall emotional user experience
- Depends on the context one might be more important than the other
  - Example: utility over all others in critical tasks, sentimental value over all others for collectibles
- Users might put up with (some) issues on some levels if they can get other non-functional benefits
  - Examples: a nice-looking car that uses more gases, an expensive watch that is heavy and needs to adjust often

- Activity – think about an object/application that you still have/use despite that there are better options which you can still afford and are available (feel free to share it in the Discussion forum: Week 11 Activity)

5min (video) 5min (think+share) 5min (break)

- Watch Don Norman and his theory on emotional design
- Think about examples of watches that satisfy different levels of emotional design



https://www.youtube.com/watch?v=G7MeRkDkRN4

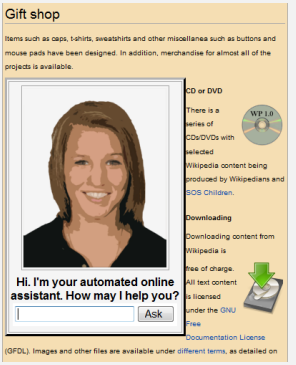
Expressive Interfaces

- Features added to an interface
  - Create an emotional connection or feeling with the user (e.g., warmth, sadness)
  - Elicit certain kinds of emotional responses from users (e.g., at ease, comfort, happiness)
- Examples
  - Emojis 😀 🤣 😌
  - Animations, e.g., genie effect in OSX
  - Sonifications, e.g., a door knock, bell ring, swoosh sound
  - Vibrotactile feedback, e.g., distinct buzz patterns in smartphones

https://www.cultofmac.com/269980/slow-window-minimize-animation-mavericks-os-x-tips/

Why Expressive Interfaces?

- People tend to prefer interfaces that elicit positive emotions
  - Make the interaction more engaging
  - Make the experience more enjoyable
  - "User-friendliness"



- People are likely to be more tolerant to the system (e.g., willing to wait for a bit longer)
  - See next page for an example

A Study of Progress Bar Perception

- Progress bars with animated ribbing moving backwards in a decelerating manner has a strong effect in making the progress to "appear" faster (by 11%).

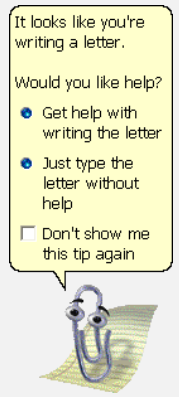
https://youtu.be/CDnN3wLY3OE

Chris Harrison, Zhiquan Yeo, and Scott E. Hudson. 2010. Faster progress bars: manipulating perceived duration with visual augmentations. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '10). Association for Computing Machinery, New York, NY, USA, 1545–1548. DOI: https://doi.org/10.1145/1753326.1753556

But… Too Much Can Become Annoying

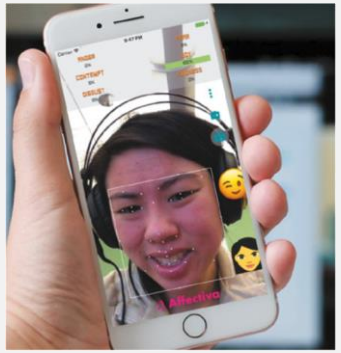
- Intrusive, make people feel silly
  - Microsoft Bob (1995) intended to model the computer system as a cozy living room, even included a dog agent
  - Microsoft Clippit (2000) intended to assist using the Office software

- Think about this – should computers apologize?

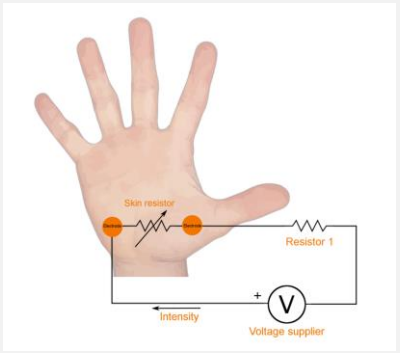


Affective Computing

- A field concerned with using computers to recognize and express emotions in the same way as humans do
  - Deduce or predict user's emotions through
    - Sensing technologies (e.g., cameras for facial expressions & body language, biosensors for heart rate or galvanic skin response (GSR), speech recognizers for words/phrases)
    - Machine learning & artificial intelligence to analyze data collected
  - Respond by
    - Adjusting the language or graphical components in the interface
    - Anthropomorphism (see next page)



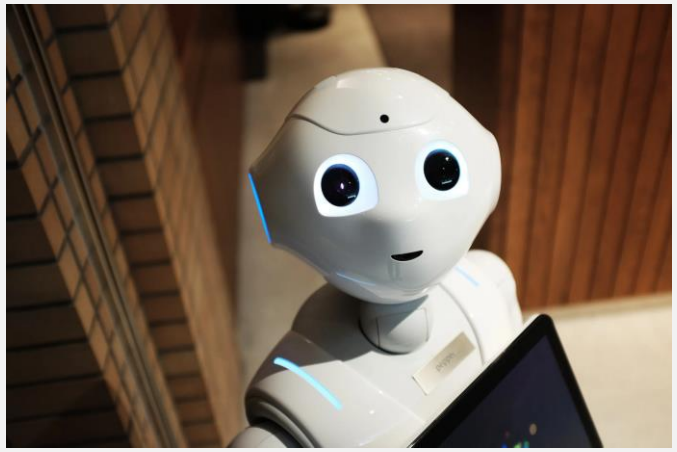
Facial code by Affective, Inc.



Galvanic skin response

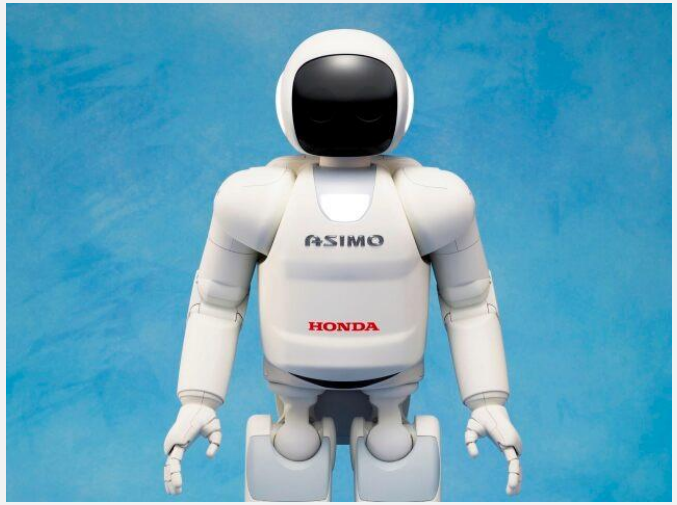
Anthropomorphism

- The propensity people have towards attributing human qualities to animals and objects
  - Example: talk to them, give them pet names, make animations out of them
- Interface designers add in facial expression, live-like animation, and sound to promote the feeling of emotion



Companionship? Helper?

- Designs aiming at establishing relationship between robots and human
  - Make them look like and behave like human or animal, more likely to be accepted



Honda ASIMO

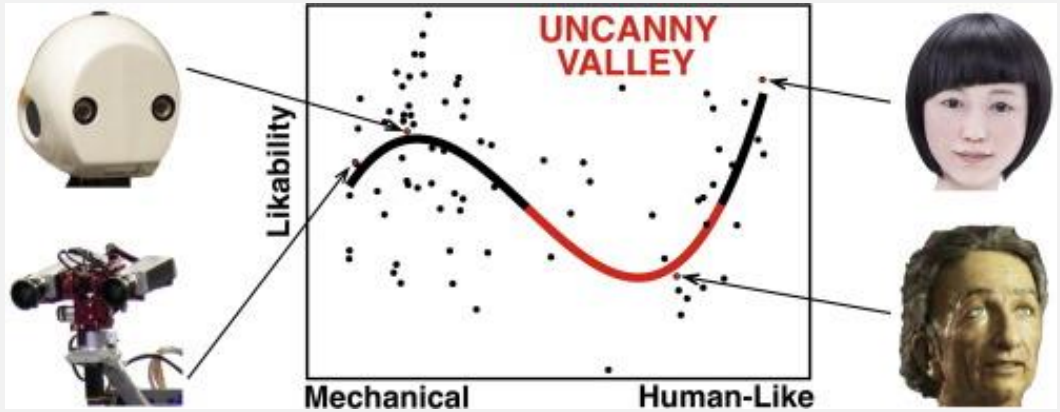
Boston Dynamics Spot & Atlas

Sony Aibo

Want to watch something fun? Check out https://www.youtube.com/watch?v=kHBcVlqpvZ8, https://www.youtube.com/watch?v=fn3KWM1kuAw

Uncanny Valley

- A hypothesis that human replicas that appear almost, but not exactly like human, elicit eerie feelings



Maya B. Mathur, David B. Reichling, Navigating a social world with robot partners: A quantitative cartography of the Uncanny Valley, Cognition, Volume 146, 2016, Pages 22-32

SEER
Simulative Emotional Expression Robot

Sofia the robot

Criticism of Anthropomorphism

- People might feel that it is deceptive
  - In the backend it is really just a computer simulating human emotions
- People might feel that it is patronizing and annoying in some contexts
  - Language can be designed by someone who might not know the context, things might be repetitive
- Current technologies do not have the capability to interpret and provide the range of intelligence to respond in the nuanced ways humans do with each other
  - Micro-expressions, subtext, context, history…etc. are difficult to pick up, even for humans

Persuasive Technologies

- Interactive computing system designed to change people's attitudes or behaviours (Fogg 2002)
  - Example: resource consumption, fitness, habit forming, …etc.
- Used widely in the commercial world to change what people do or think
  - More explicit: pop-up ads, prompts, "last item", targeted price adjustments
  - More subtle: colour scheme, simplified & easy process
- Example of changing bad habits & improving well-being: Nintendo's Pocket Pikachu
  - Step counter 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 doesn't exercise the pet becomes angry and refuses to play anymore

B. J. Fogg. 2002. Persuasive technology: using computers to change what we think and do. Ubiquity 2002, December, Article 5 (December 1 - December 31, 2002), 32 pages. DOI:https://doi.org/10.1145/764008.763957

Operant Conditioning

- The process whereby the consequences of behaviour feedback to the person and change the probability that the behaviour will occur again (Kirman et al. 2010)

- Positive Reinforcement – presentation of a stimulus (reward) as a consequence of the behaviour makes it more likely to occur again
  - Example: slamming the faulty washing machine door shut makes it work properly, so more likely to slam the door again
- Negative Reinforcement – removal of an existing stimulus (aversive) as a consequence of the behaviour makes it more likely to occur again
  - Example: closing a door prevents a cold draught (removes it), so more likely to close the door
- Punishment – presentation of a stimulus as a consequence of the behaviour makes it less likely to occur again
  - Example: penalty given to dangerous fouls in sports makes the player less likely to foul

Ben Kirman, Conor Linehan, Shaun Lawson, Derek Foster, and Mark Doughty. 2010. There's a monster in my kitchen: using aversive feedback to motivate behaviour change. In CHI '10 Extended Abstracts on Human Factors in Computing Systems (CHI EA '10). ACM, New York, NY, USA, 2685–2694. DOI:https://doi.org/10.1145/1753846.1753852

Exercise

- Poll – Which of the following is a positive reinforcement technique in an app that promotes regular exercises?
  - A - Doing exercises results in extra items for the avatar to do something cool
  - B - Doing exercises results in the avatar not getting sick in the game
  - C - Missing exercises results in the avatar getting sick in the game
  - D - Missing exercises results in the avatar exhibiting angry emotions to the owner

Challenges for HCI & UX

- Traditional HCI & UX focus on efficient and effective designs
  - Building trust-worthy/fun-to-use/easy-to-learn systems require more considerations in the design process
- Human emotions are mostly internal states
  - Need ways to measure them
- Not easy for interfaces to express emotions
  - Emotion is embedded in a lot of aspects
  - Uncanny valley

Summary

- Emotional Design
  - Emotions & UX, 3 levels of emotional design – Visceral, Behavioural, Reflective
  - Expressive interfaces – adding features to interfaces to create emotional connection or elicit emotional response
  - Affective computing – recognize and express emotions in the same way as humans do
  - Anthropomorphism – making interfaces more human-like
  - Persuasive technologies – designed to change people's attitudes or behaviours

Post-Lecture Activity

- Read/watch these (and those in the slides)
  - ID-Book Ch. 6
  - Designing Emotional Interfaces by Gleb Kuznetsov (13min read)
    https://www.smashingmagazine.com/2019/01/designing-emotional-interfaces-future/
  - Applying Anthropomorphism to Ads (6min watch)
    https://www.youtube.com/watch?v=fkatwsysiCY
  - What is Inclusive Design
    http://www.inclusivedesigntoolkit.com/whatis/whatis.html

- See next page

The Dancing Traffic Light

- Think about this: what is this design trying to encourage pedestrians doing? What kind of mechanism is it using?

Project video: https://www.youtube.com/watch?v=SB_0vRnkeOk