Sensors et al.

If you can hug it, it's tangible

Sensors

Any device measuring and communicating a system's physical properties
● Posture, skin conductivity, heart-rate, grip

Used to gather data allowing interpretation of user's affective state

Cameras - Devices recording visual images

Used to monitor affective state using:
- facial expression
- hand/body gestures
- gesture controls?
- failsafe for other channels

Eye-tracking

Measuring the location and fixation of the subject's gaze

Used to determine
- affective state
- metacognitive behaviour
- attention levels

Tangibles

Physical objects used in human-computer interactions

Why?

Easy, Friendly, Intuitive, Engaging, Immersive, Fun

Other non-standard hardware

Robots: used to provide a more social, human-like interaction

EEG: direct observation of cognitive activity

AutoTutor Emotions

- Face tracking & Pressure pads to infer affective state
- "Decision-level fusion algorithm" used to select overall student affective state
  - Boredom, Confusion, Frustration and Flow
- Affective state + production rules => regulate negative affective states by providing emotional feedback
- Happy relaxed "flowing" people = better learners

Robovie

- Robot used to expose Japanese children to English
  - Only communicates and understands English
- Sensors for identification of individual children, location of user and listeners, audio to respond to child's utterances
- Tangible interface of robot helps establish relationship and notion of robot being a peer

Project LISTEN's Reading Tutor

- Single-channel EEG sensor
  - £79
  - Bluetooth communication
- EEG features vary with mental state/cognitive activity

Project LISTEN's Reading Tutor

- Stimulus - words/sentences, varying difficulty
  - Train classifier to predict difficulty from EEG signal
- Successful (better than chance)
- Demonstrates *potential* for consumer-EEG products in ITS
  - Why aren't we using this in schools yet?

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