

Index

- abuse, 225, 240
- action units, 154
- Actroid, 66
- actuators, 32
 - electric, 32
 - pneumatic, 34
- addiction, 223
- affect, 149
- affordances, 60
- A.I.*, 231
- AI. *See* artificial intelligence
- Aibo, 17, 24, 204, 238
- Alexa, 17
- Alexander, Christopher, 61
- AlphaGo, 232
- Amazon Mechanical Turk, 174
- androids, 24, 63, 65
- animation, 66, 108
- animism, 139
- anthropomorphism, 136
- anthropomorphization, 64–66
 - behavior, 68
 - design, 68
- anxiety, 250
- application architecture, 37
- applications, 198
 - care robots, 238
 - cleaning robots, 211
 - collaborative robots, 214
 - customer service, 200
 - delivery robots, 212
 - education, 202
 - entertainment, 204
 - exhibitions, 205
 - learning, 202
 - performing arts, 205
 - personal assistants, 210
 - pets, 204
 - receptionist robots, 202
 - retail robots, 202
 - security robots, 213
 - service robots, 211
 - sex robots, 206
 - tele-operation, 218
 - tour guide robots, 201
 - toys, 204
- artificial intelligence, 17, 24, 42
 - AlphaGo, 232
 - Deep Blue, 232
 - Watson, 232
- Asimo, 24, 66
- Asimov, Isaac, 6, 236
- Astro, 17
- Astro Boy, 233
- attention theft, 224
- autism. *See* autism spectrum disorder
- autism spectrum disorder, 152, 208
- autonomous cars. *See* self-driving cars
- autopilot, 215
- avatar robots, 221
- back-channeling, 128
- Battlestar Galactica*, 231, 235
- Baxter, 15, 214
- BellaBot, 213
- Bicentennial Man*, 231
- Blade Runner*, 231
- BlessU2, 76
- Buddy, 211
- bullying. *See* abuse
- Čapek, Karel, 230
- camera, 27
- care robots, 238
- Care-O-bot, 201
- CASA (computers as social actors), 163
- characters
 - Andrew Martin, 231
 - Astro Boy, 233
 - David (*A.I.*), 231
 - David (*Prometheus*), 234
 - Eto Demerzel, 233
 - Johnny Five, 234
 - Mr. Data, 231
 - R. Daneel Olivaw, 233
 - Rachael, 231
- chatbots, 124
- ChatGPT. *See* large language models
- Chinese room, 51, 126
- Cimon, 250

Index

311

- circumplex model. *See* Russell's circumplex model
- cleaning robots, 211
- cloud computing, 210
- CNNs (convolutional neural networks), 45
- cognitive mechanisms, 109
- Cohen, Jacob, 188
- collaborative robots, 214
- computers as social actors (CASA), 163
- confidence interval, 189
- contingent behavior, 69
- conversational analysis, 173
- conversational fillers, 114
- convolutional neural networks (CNNs), 45
- correlation, 189
- COVID-19, 84, 201
- Cozmo, 16, 155
- crowdsourcing, 173
- culture, 69, 76, 172
- customer service, 200

- Dall-e, 46
- David (*A.I.*), 231
- David (*Prometheus*), 234
- Deep Blue, 232
- deep learning, 45, 116
- Deep Q-learning, 48
- deictics, 109
- deliberative approach, 37
- delivery robots, 212
- Demerzel, Eto, 233
- depth sensors, 28
- design, 57
- design patterns, 61
- dialogue, 122
- dialogue management, 122
- Dick, Philip K., 63, 231
- dynamic window approach (DWA), 87

- Eddie, 154
- education, 202
- effect size, 188
- Ekman, Paul, 150
- Elliq, 208
- Elvis, 209
- emotion models, 155
- emotional attachment, 239
- emotions, 148, 149
 - basic, 157
 - expressing, 154
 - in robots, 152
 - perception, 153
 - problems with, 151
- employment, 242
- eMuu, 154, 155
- engagement, 107
- engineering design process, 70
- entertainment, 204
- Epley, Nicholas, 136
- ethics, 240
 - ethics of experimentation, 191
 - informed consent, 191
 - robots in film, 229
- ethnographic studies, 172
- Ex Machina*, 233
- exhibitions, 205
- experiments, 162, 165–167
- eye movement. *See* gaze

- Facial Action Coding System, 154
- feature extraction, 44
- Field, Andy, 187
- films and TV shows
 - A.I.*, 231
 - Battlestar Galactica*, 231, 235
 - Bicentennial Man*, 231
 - Blade Runner*, 231
 - Ex Machina*, 233
 - Futurama*, 235
 - Her*, 235
 - Interstellar*, 231
 - Prometheus*, 234
 - Robot and Frank*, 235
 - Short Circuit*, 234
 - Star Trek*, 231
 - The Matrix*, 232
 - The Terminator*, 232
 - Westworld*, 235
 - iRobot*, 232
- fine-tuning, 47
- Fisher, Sir Ronald Aylmer, 185
- Flobi, 155
- Furby, 24
- Furhat, 24
- Futurama*, 235

- Galactica, 46
- gaze, 98
- Geminoid, 65, 142
- gender, 167
- gesture, 99
- Giertz, Simone, 200
- Goldacre, Ben, 234

- Haptic Creature, 104
- haptics, 103
- hardware, 23
- Harmony X, 207
- Haru, 66
- Hawking, Stephen William, 254
- Her*, 235
- human–computer interaction, 7
- human–robot team, 219
- humanoid, 24, 65

- iCat, 154, 155
- iCub, 24, 31, 100
- impression formation, 135

intent recognition, 120 <i>Interstellar</i> , 231 <i>iRobot</i> , 232	Olivaw, R. Daneel, 233 OriHime, 221
Jibo, 211 jobs, 242 Joggobot, 82 Johnny Five, 234	<i>p</i> -value, 186 PackBot, 218 PAD model, 156 PaPeRo, 208 Papert, Seymour, 75 pareidolia, 64 Paro, 15, 24, 181, 208, 238 participants, 176 participatory design, 73 people tracking, 86 Pepper, 14, 24, 128, 202 performing arts, 205 personal assistants, 210 personal robotic assistants, 210 pets, 204 phonemes, 114 physiotherapy, 209 Pirsig, Robert M., 78 Pleo, 24, 204, 209 police robots, 213 posture, 104 PR2, 30 pressure sensors. <i>See</i> tactile sensors projection robots, 24 Prolific, 174 <i>Prometheus</i> , 234 prosthetics, 210 prototyping, 74 proxemics, 83, 88
language, 112 artificial, 118 understanding, 119 language models, 45 large language models, 120, 124, 128 laser range finders, 29 LEGO Mindstorms, 75, 202 localization, 86	Q-learning, 48 Qrio, 199 Queen of Shitty Robots, 200
machine learning, 42 Martin, Andrew, 231 <i>Matrix, The</i> , 232 McDermott, Drew, 51 media, 252 microphone array, 30 microphones, 30, 115 military robots, 219 mimicry, 101 Mirokai, 11 mood, 149 Mori, Masahiro, 66 morphology, 59 motion planning, 89 motors. <i>See</i> actuators Mr. Data, 231 Musk, Elon, 254 Muu, 60	Rachael, 231 reactive behavior, 69 RealDoll, 206 receptionist robots, 202 recurrent neural networks (RNNs), 45 reinforcement learning, 48 relationships, 252 research methods between-subjects design, 177 causation, 165, 166 confidence interval, 189 confirmatory research, 163, 164 correlation, 165, 166, 189 counterbalance, 178 debriefing, 191 dependent variable, 167, 168 descriptive statistics, 186 direct measures, 184 ethics of experimentation, 191 experimental condition, 167 experiments, 162, 165–167 exploratory research, 163, 167
Nabaztag, 211 Nao, 14, 24, 209 Nass, Clifford, 163 navigation, 87 neural networks, 45 nonverbal interaction, 95 null hypothesis significance testing, 187, 188	
observational methods, 170 OCC model, 155 odometry, 86	

- field studies, 178, 179
- hypothesis, 164
- independent variable, 167, 168
- indirect measures, 185
- informed consent, 191
- interaction dyad, 180
- lab studies, 178
- manipulation check, 168
- measuring, 184
- null hypothesis significance testing, 187, 188
- p*-hacking, 189
- p*-value, 186, 187
- participants, 176
- power, statistical, 178, 190
- preregistration, 164
- qualitative research, 166, 191
- quantitative research, 166
- research question, 163
- sample size, 177
- self-report, 184
- significance, 187
- spurious correlation, 165, 189
- standards, 189
- statistics, 185
- survey, 168
- Type I error, 187
- Type II error, 190
- within-subjects design, 177
- Wizard of Oz, 191
- retail robots, 202
- RGBD sensors, 28
- rhythm, 106, 128
- RNNs (recurrent neural networks), 45
- robots, 60
- Robosapiens, 204
- robot abuse, 225
- Robot and Frank*, 235
- Robot Operating System (ROS), 36
- robot taxis, 215
- robots
 - Actroid, 66
 - Aibo, 17, 24, 204, 238
 - androids, 24, 63
 - Asimo, 8, 24, 66
 - Astro, 17
 - Baxter, 15, 16, 69, 214
 - BellaBot, 213
 - BlessU2, 76
 - Blossom, 18
 - Buddy, 211
 - Care-O-bot, 201
 - Cimon, 250
 - Cozmo, 16, 155
 - Eddie, 154
 - Elliq, 208
 - Elvis, 209
 - eMuu, 154, 155
 - Flobi, 155
 - Furby, 24
 - Furhat, 24
 - Geminoid HI 4, 65
 - Haptic Creature, 104
 - Harmony X, 207
 - Haru, 66
 - humanoid, 24
 - iCat, 154, 155
 - iCub, 24, 31, 100
 - InMoov, 18
 - Jibo, 211
 - Joggobot, 82
 - K5, 213
 - Kaspar, 152, 209
 - Keepon, 14, 66
 - Kismet, 13, 154
 - Kiwi, 209
 - KUKA, 34
 - Kuri, 199
 - LEGO Mindstorms, 75, 202
 - Mirokai, 11
 - Muu, 60
 - Nabaztag, 211
 - Nao, 14, 24, 65, 209
 - OriHime, 221
 - PackBot, 218
 - PaPeRo, 208
 - Paro, 15, 24, 208, 238
 - Pepper, 14, 24, 66, 128, 202
 - Philip K. Dick, 63
 - Pleo, 24, 204, 209
 - PR2, 30
 - projection, 24
 - Qrio, 199
 - RealDoll, 206
 - Robosapiens, 204
 - Robovie, 24, 65, 170
 - Robovie MR2, 76
 - Roomba, 16, 38, 211, 212
 - Sawyer, 16
 - Snackbot, 73
 - Sphero, 204
 - Telenoid, 104
 - telepresence, 25
 - Terminator, the, 232
 - Thrifty, 105
 - Tiago, 36
 - Toyota T-HR3, 220
 - Trossen, 33
 - TurtleBot, 57
 - types, 23
 - Vector, 16
 - Vex Robotics, 75
 - virtual agent, 24
 - Wakamaru, 24, 66
 - Walt, 214
 - Zeno, 209
 - zoomorphic, 24
- Robovie, 24, 170

- Robovie MR2, 76
- Roomba, 16, 38, 211, 212
- ROS (Robot Operating System), 36
- Russell’s circumplex model, 150, 156
- sample size, 177
- Searle, John, 51
- security robots, 213
- self-driving cars, 214
- sentiment analysis, 119
- service robots, 211
- sex robots, 206
- Short Circuit*, 234
- simulation, 183
- simultaneous localization and mapping (SLAM), 86
- smart-home assistants, 210
- smile detection, 153
- Snackbot, 73
- social robots, 12, 23
- software, 26
- space, 82
- spatial interaction, 82
- speakers, 34
- speech, 114
- speech production, 129
- speech recognition, 115, 116
- Sphero, 204
- Spielberg, Steven, 231
- Star Trek*, 231
- statistics, 185
 - Bayesian inference, 190
 - confidence interval, 189
 - correlation, 189
 - descriptive, 186
 - effect size, 188
 - inferential, 186
 - null hypothesis significance testing, 187, 188
 - p*-hacking, 189
 - p*-value, 186, 187
 - power, statistical, 178, 190
 - significance, 187
 - standards, 189
 - Type I error, 187
 - Type II error, 190
- supervised learning, 42
- system architecture, 25
- system studies, 169
- tactile sensors, 30
- teamwork, 76
- tele-operation, 218
- Telenoid, 104
- telepresence, 25, 221
- Terminator: The*, 232
- text-to-speech, 129
- The Dot and the Line, 68
- Thrifty, 105
- TIAGo, 36
- touch, 103
- tour guide robots, 201
- Toyota T-HR3, 220
- toys, 204
- transfer learning, 47
- transformers, 45, 120
- Trossen, 33
- TTS Engines, 130
- turn-taking, 106, 128
- TurtleBot, 57
- tutoring. *See* education
- TV shows. *See* films and TV shows
- uncanny valley, 66, 145
- user-centered design, 72
- utterance, 114
- Vector, 16
- verbal interaction, 112
- Vex Robotics, 75
- virtual agents, 24
- voice-activity detection, 119
- Wakamaru, 24, 66
- Watson, 232
- Westworld*, 235
- Wizard of Oz, 191, 237
- Zeno, 209
- zoomorphic, 24