

Index

A

action-value function 154
active mental model 116
alignment in communication 110, 118
a posteriori method 310
artificial agent 108
artificial agent, community 107
artificial intelligence (AI) 1, 2, 19, 21, 22, 63, 75, 94, 102, 104, 105, 108, 166, 168, 176, 201, 207, 329, 343, 344, 347, 351, 356
artificial neural networks 308
automated planning 151, 165, 358
automatically defined functions (ADF) 309

B

backjumping 63, 70, 71, 72, 73, 74, 90, 91
backmarking 63, 70, 72, 73, 74, 90, 91
backtracking (BT) 69, 70, 90, 91, 92
Bellman optimality equations 154
bodies of evidence (BOEs) 236, 237, 238, 241, 242, 243, 244, 245, 246, 247, 248, 249
bottleneck problem 108
branch-and-bound (B&B) 98, 99, 100

C

classification and ranking belief simplex (CaRBS) 234, 235, 234, 235, 234, 235, 236, 249, 235, 237, 238, 239, 240, 241, 243, 246, 247, 249, 250
clustering, consensus 219, 229
clustering, recursive 217, 219, 222, 225, 226, 231
cluster partitions 217, 219, 226, 229, 230, 231, 232, 353

co-occurrence 113
cognitive processes 112
coherence maximization 110
coherence relations 115
collaborative language 118
command and control (C2) center 2, 10, 18, 19
communication processes 107
components 115
compositionality 114
comprehension processes 118
computational linguistics 108, 113
computer-simulations 108
conceptual modelling 110
concern modifications 116
consistency 63, 67, 70, 73, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 86, 87, 88, 89, 90, 91, 92, 93, 94, 97, 102, 103, 104, 105, 330, 338, 341, 345, 346, 349, 350, 352, 356
constituents 110
constrained optimisation problem 267, 269
constraint, definition of 64
constraint, satisfaction 63, 64, 65, 66, 74, 75, 88, 89, 90, 94, 100, 101, 102, 103, 98, 103, 101, 104, 105, 329, 330, 331, 335, 338, 339, 341, 344, 345, 349, 350, 351, 353, 355
constraint network 111
constraint networking 124
constraint satisfaction 110, 121, 123, 127
constraint satisfaction problem (CSP) 63, 64, 65, 73, 75, 76, 78, 79, 81, 83, 84, 85, 86, 87, 88, 90, 96, 97, 98, 99, 101
constraint satisfaction problems (CSP) 23, 26, 41, 42, 43, 46, 47, 50, 51, 56, 57, 60, 348
constraint satisfaction processes 110

construction 117
 constructions-integration (CI) theory 115
 context 115
 CPT 26, 46, 50, 53, 54, 61
 crossover 294, 295, 297, 298, 306

D

database layers, deliberative 1, 6, 7
 database layers, reactive 1, 2, 5, 6, 7, 13, 18, 20, 330
 data clustering 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 330, 331, 338, 342, 345, 348
 data mining 218
 decompositional rule extraction 310
 Dempster-Shafer theory (DST) 234, 235, 236, 237
 denotations 112
 dialogical alignment 107, 118, 119
 distance, Euclidean 267, 269, 272, 274, 275, 276, 278
 distance, Manhattan 267, 269, 274, 278
 distributed cognition 108, 110, 118
 distributed interaction 118
 distributed learning 109, 118
 distribution 124
 domain filtering 87, 102, 330
 durative action 28, 36, 41
 DYNA algorithm 162
 dynamical systems 137, 138, 139, 145
 dynamics 120, 121

E

elf-organization 130
 empirical interpretation 114
 encompassing social system 110
 ensemble clustering 217, 219, 220, 231
 enumeration 63, 101
 epiphenomenal system 109
 evolutionary algorithms 284, 285
 evolutionary computing 284, 285, 306, 337
 evolutionary higher order neurons (eHONs) 220, 221, 222, 223, 225, 228, 229, 230, 231
 exact belief 236
 exploration planning 156, 157, 165, 358

F

forward edge of battle area (FEBA) 3, 11, 18
 four layer-model of language simulation 109
 fuzzy constraints 130

fuzzy membership function 254, 263
 fuzzy optimization 256, 264, 356
 fuzzy parameters 256
 fuzzy rules 124

G

genetic algorithms (GA) 289, 284, 307, 284, 287, 285, 286, 288, 285, 291, 289, 290, 293, 294, 295, 296, 297, 298, 299, 306, 307, 333, 340, 350, 353, 355
 genetic programming 308
 genetics 121
 gent communication 109
 global positioning system (GPS) 4
 graphplan 59, 345
 grounding problem 108, 113
 group decision making 2

H

heuristic planning 36, 59, 341
 heuristics 63, 65, 97, 98, 102, 103, 167, 170, 176, 177, 178, 186, 187, 188, 192, 208, 286, 307, 330, 335, 339, 346, 348
 higher order neuron (HON) structure 219, 220, 222, 224, 228, 229, 230

I

implied optimization method 310
 imputation 235, 246, 247
 inductive algorithm 312
 inductive learning 110, 112, 113
 inductive logic programming (ILP) 166, 167, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 187, 188, 189, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 206, 207, 208, 209, 210, 211, 212, 213, 216, 332, 334, 336, 337, 338, 340, 341, 344, 346, 347, 348, 349, 351, 352, 353, 354, 355, 357
 inductive logic programming (ILP), descriptive 172, 173, 174, 177, 178, 179
 inductive logic programming (ILP), predictive 172, 173, 174, 177, 178, 192, 216
 inference operators 181, 184
 inferrability 114
 integration 117
 interaction model 118
 interlocutors 111
 iterated learning model 108

K

kernel functions 139, 140, 145
 knowledge 308
 knowledge extraction 311
 Koza, J. 309

L

language change 108
 language evolution 107
 language of thought 114
 language simulations 110, 129
 language system 107
 latent semantic analysis (LSA) 113
 law of polysemy 128
 learning 115
 learning machine (ML) 149
 learning semantics 192
 level of satisfaction 254, 257, 258, 259, 260, 261,
 262, 263, 264, 330
 lexico-grammar 108
 lexicon size 124
 linear programming 137, 139, 140, 141, 146, 340
 linear programming, support vector regression (LP-SVR) 139, 137, 141, 140, 141, 142, 143, 144, 145
 linguistic context 116
 linguistic items 115
 linguistic signs 107
 logic programming 166, 167, 168, 171, 172, 181,
 182, 192, 198, 201, 203, 204, 205, 206, 207,
 208, 209, 210, 211, 212, 213, 329, 330, 331,
 333, 334, 335, 336, 337, 338, 340, 341, 342,
 343, 344, 345, 346, 347, 348, 350, 351, 352,
 353, 354, 357, 358
 long term memory 116
 look-ahead 92

M

machine learning 109, 113
 machine learning perspective 166, 167, 171, 176,
 192, 200, 201, 202, 203, 204, 205, 206, 207,
 208, 209, 210, 211, 212, 331, 332, 333, 334,
 335, 336, 337, 338, 340, 343, 344, 345, 347,
 348, 350, 351, 352, 354, 355, 358
 macroscopic order parameters 107
 macroscopic units 111
 Markov decision process (MDP) 153, 158, 159, 160
 MATLAB® 257, 259
 meaning 115

meaning constitution 107

Mediate learning 119
 mission management system (MMS) 1, 2, 4, 10, 18
 mission management system (MMS) architecture 1
 mobile agents 5
 model sparsity 137, 139, 145
 multi-agent-based simulation 112
 multi-agent modelling 107
 multi-agent simulation model 124
 multi-agent systems 108
 mutation 285, 286, 290, 291, 294, 295

N

need of encoding 111
 negative constraint 110
 neural networks (NN) 217, 231, 232, 345, 357

O

objective function 235, 238, 239, 241, 243, 245,
 247, 249, 255, 257, 258, 259, 263, 267, 270,
 272, 274, 276, 278, 272, 274, 276, 278
 optimal planners 53, 54
 optimal solution 254, 256, 259, 260
 optimization 110
 order parameters 109, 111, 120, 121

P

parallel constraint satisfaction 110
 parallel genetic algorithms 306, 307, 340, 350
 partial-order causal-link (POCL) 23, 26, 30, 39, 40,
 41, 42, 44, 45, 43, 44, 45, 46, 49, 50, 51, 54,
 55, 56, 60, 350, 356
 party puzzle 291
 pedagogical rule extraction 310
 planning-graph 23, 26, 30, 32, 35, 55
 planning domain definition language (PDDL) 151
 planning system 149, 151, 163
 polylexy 124
 polysemy 128
 possibilistic linear programming (PLP) 255
 preference function 268, 271, 273, 275, 277, 278,
 280, 282
 preference ranking organization method for enrichment evaluation
 (PROMETHEE) 266, 267, 268, 269, 270, 271, 275,
 276, 279, 280
 premature convergence 284, 286, 287, 288, 289,
 294, 297, 298, 306
 prepositional phrase (PP) attachment 116
 principle of compositionality (CP) 114

prioritized sweeping 157, 158, 162, 163, 328, 335
 procedural models of cognitive processes 115
 processing agents 107
 process models 112
 productivity 114

Q

quadratic programming 137, 138, 139
 quadratic programming support vector regression (QP-SVR) 137, 138, 139, 141, 142, 143, 144, 145
 quantification 110
 quantitative linguistics 108

R

Ramsey numbers 284, 291, 292, 284, 306
 Ramsey theory 284, 291, 307, 340
 rank improvement 267, 269, 270, 272, 273, 274, 277, 278, 279, 282
 ranking 266, 267, 268, 269, 270, 271, 272, 275, 279, 280
 ranking, analysis 266
 realizing 108
 referential meaning 113
 regularization 139, 140, 145, 146, 333, 351
 reinforcement learning (RL) 152, 153, 155, 156, 159, 160, 161, 162, 164, 351
 relation 64
 restriction 73, 75, 87
 routinization 112, 115
 rule extraction 310

S

S-curve membership function 255, 256, 263
 schematic knowledge 116
 schematization 115
 Schnotz 117
 search 63, 67, 68, 69, 72, 73, 74, 75, 79, 81, 87, 88, 90, 91, 92, 93, 94, 95, 96, 97, 98, 100, 101, 102, 103, 104, 105, 329, 338, 339, 340, 341, 343, 346, 356, 357
 search procedure 166, 167, 172, 167, 176, 177, 186, 187, 188, 191, 192, 193, 195, 197
 self-organization 107, 122
 self-regulation 107
 self organizing maps (SOMs) 218, 219, 221, 223, 224, 225, 226, 228, 229, 230, 231
 semantic diversification 127, 128
 semantics 108
 semantic similarity 113

semiotic 108
 semiotic preference orde 124
 sense relations 113
 sign processing 108, 109
 sign processing, systems 109
 sign systems 107
 simplex plot 235, 237, 238, 239, 242, 243, 244
 simulated data 124
 simulation 107
 simulation model 107, 108, 109
 simulation models of language evolution 120
 simulation validity 107
 single agents 112
 small worlds 120
 social networking 109, 120, 121, 122
 soft constraints 110
 speech community 121, 128
 Stanford Research Institute planning system (STRIPS) 150, 151, 158, 159, 163
 statistical moment 124
 steady state 112
 stratification 110
 stratified constraint network 112
 stratified constraint satisfaction network 107
 structural meaning 113
 structure modelling 124
 suboptimal planners 53, 54, 55
 support vector regression (SVR) 137, 140, 141, 139, 138, 137, 138, 141, 139, 137, 142, 141, 139, 141, 142, 143, 144, 145, 146, 352
 suppression of enemy air defense (SEAD) mission 2, 3, 17
 synergetic linguistics 107, 110, 111
 synergetic multi-agent simulation model 107, 124
 synergetics 111
 synonymy 128
 syntactic dependency 115
 syntactic patterns 115
 syntax formation 108
 synthesis 116
 synthetic aperture radar (SAR) 4
 systematically interrelated 112
 systematicity 114
 system components 111
 systems identification 137, 139, 142, 143
 system variables 107, 109

T

tectonics 120, 121
 temporal planning 23, 25, 26, 28, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 44, 46, 51, 52, 54,

55, 56, 57, 58, 59, 60, 338, 339, 345, 350
 text comprehension 123
 text network 121, 122
 text networking 121
 TGP 26, 32, 34, 35, 36, 37, 44, 51
 thematic knowledge 116
 time series forecast 317
 TPSYS 35, 45
 trigonometric differential evolution (TDE) 266,
 267, 269, 270, 272, 273, 281, 266, 267, 268,
 269, 279, 281

U

unmanned combat air vehicles (UCAV) 1, 2, 3, 4, 5,
 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19
 unsupervised learning 217, 219, 220, 222, 223, 229,
 230, 231
 usage regularities 115

V

vagueness 254, 255, 258, 260, 261, 262, 263
 validity 130
 value, mass 236, 240
 value, missing 235, 239, 246, 247, 248, 249, 250
 version spaces 166, 167, 168, 170, 177

W

weak contextual hypothesis 113

Z

Zipf-like distributions 124
 Zipfian perspective 124